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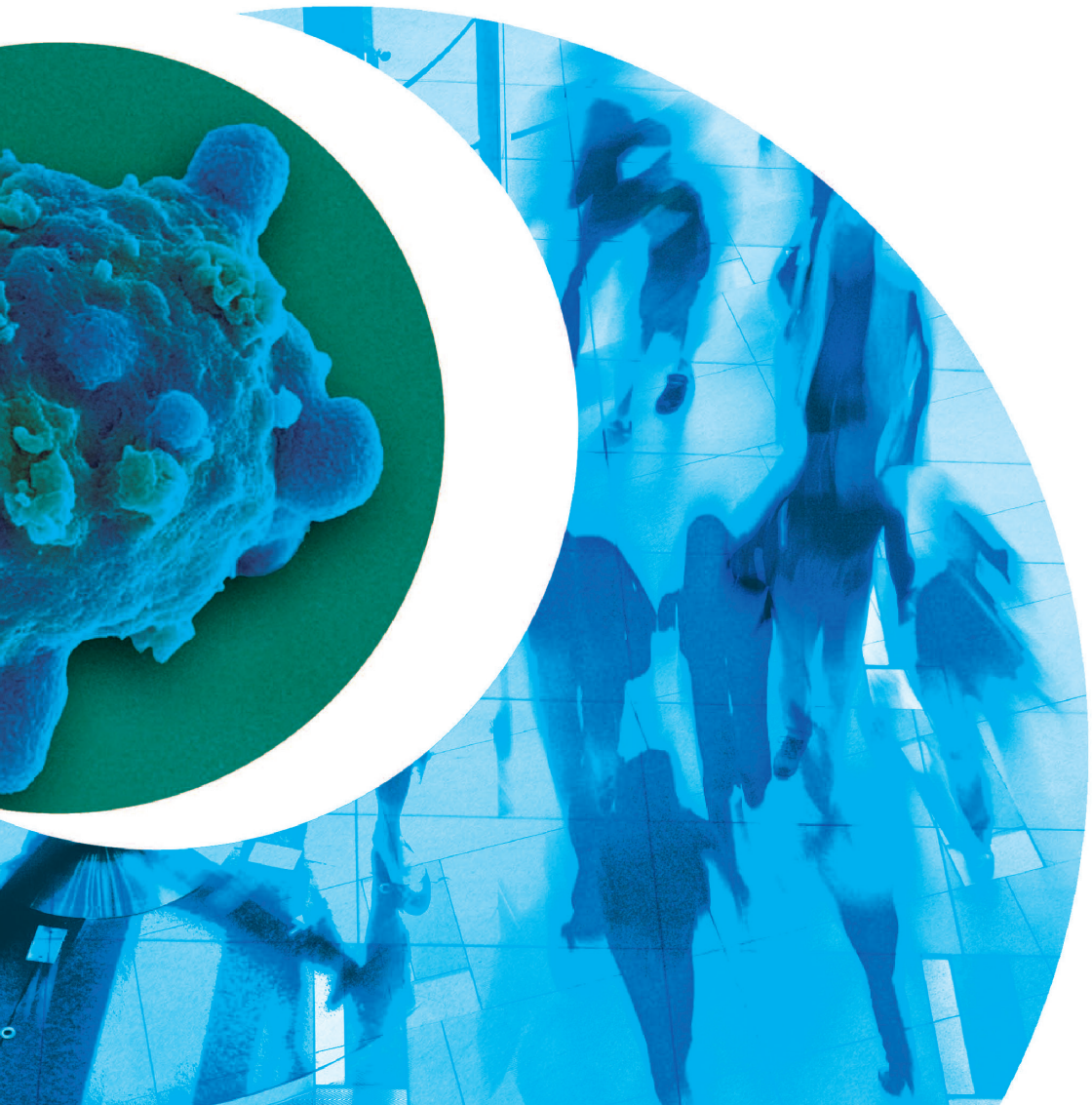
13th European Breast Cancer Conference (EBCC-13)

16–18 November 2022
Barcelona, Spain

ABSTRACT BOOK



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The future of cancer therapy

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European Journal of Cancer

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Abstract Book

13th European Breast Cancer Conference (EBCC-13)

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Aims and Scope

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18 November 2022

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CLINICAL SYMPOSIUM 16 November 2022 15.30–17.00

Breast conservation in high risk patients

1LBA

Complete response of ductal carcinoma in situ to neoadjuvant systemic therapy in HER2-positive invasive breast cancer patients: a nationwide analysis

R. Ploumen[1,2], E. Claassens[1], L. Kooreman[2,3], K. Keymeulen[1], M. van Kats[4], S. Gommers[5], S. Siesling[6,7], T. van Nijnatten[2,5], M. Smidt[1,2]. *[1]Maastricht University Medical Centre+, Surgery, Maastricht, Netherlands; [2]GROW, School for Oncology and Reproduction, Maastricht, Netherlands; [3]Maastricht University Medical Centre+, Pathology, Maastricht, Netherlands; [4]Maastricht University Medical Centre+, Medical Oncology, Maastricht, Netherlands; [5]Maastricht University Medical Centre+, Radiology and Nuclear Medicine, Maastricht, Netherlands; [6]Technical Medical Centre University of Twente, Health Technology and Services Research, Enschede, Netherlands; [7]Netherlands Comprehensive Cancer Organisation, Research and Development, Utrecht, Netherlands*

Background: Neoadjuvant systemic therapy (NST) is increasingly applied in breast cancer to increase breast-conserving surgery (BCS) rates and to improve oncological outcomes. Ductal carcinoma in situ (DCIS) can be present adjacent to invasive breast cancer (IBC), especially in HER2-positive IBC. DCIS was previously considered to be insensitive to NST. Consequently, mastectomy rates are higher in IBC with adjacent DCIS. Recent studies have shown that DCIS can be sensitive to NST, however, only small populations were investigated. Therefore, the aim of this study was to determine the rate of complete response of adjacent DCIS in HER2-positive IBC and to assess the potential influence of clinicopathological variables in a nationwide cohort.

Materials and methods: All women diagnosed with HER2-positive IBC, treated with NST and surgery between January 2010 and December 2019, were selected from the Netherlands Cancer Registry (NCR). Of these patients, all pre-NST biopsy and postoperative specimen pathology reports were obtained from PALGA, the Dutch Pathology Registry, and assessed for presence of DCIS. Response of DCIS was defined as absence of DCIS in postoperative pathology when a DCIS component was present in the pre-NST biopsy. Clinicopathological factors associated with DCIS response were assessed using logistic regression analyses.

Results: In total, 5834 patients were included, of whom 1443 (24.7%) had a DCIS component in the pre-NST biopsy. Mastectomy rates were higher in IBC with adjacent DCIS compared to IBC without adjacent DCIS in the pre-NST biopsy (53.6% versus 41.0%, p<0.001). Of these 1443 patients, 743 (51.5%) showed complete response of the DCIS component. Complete response of DCIS occurred more frequently in patients who also had a complete response of IBC (63.4% versus 33.8%, p<0.001). Multivariable logistic regression analysis showed ER negative IBC (OR 1.79; 95% CI 1.33-2.42) and treatment with HER2-targeted therapy (OR 5.97; 95% CI 1.82-19.55) to be independently associated with complete response of DCIS.

Conclusions: More than half of HER2-positive IBC patients with adjacent DCIS in the pre-NST biopsy showed a complete response of the DCIS component to NST. Complete response of DCIS should be considered, especially in ER-negative HER2-positive IBC and in case of complete response of IBC. Future studies should investigate the evaluation of DCIS response by imaging and the possibility of increasing breast-conserving surgery rates.

No conflict of interest.

PLENARY SESSION 16 November 2022 14.30–15.30

PLENARY SESSION

1 Oral

Early detection of breast cancer in high-risk women based on longitudinal changes in serum-based proteins: the TESTBREAST study

S. Hagenaars[1], B. Ravesteijn[2], L. Dekker[2], L. Verhoeff[1], J. Aalberts[1], E. Meershoek-Klein Kranenbarg[1], J. de Vries[3], A. Witkamp[4], K. Schenk[5], K. Keymeulen[6], M. Menke-Pluijmers[7], A. Dassen[8], B. Kortmann[9], E. Rutgers[10], C. Cobbaert[11], T. Luider[2], W. Mesker[1], R. Tollenaar[1], TESTBREAST study group. *[1]Leiden University Medical Center, Surgery, Leiden, Netherlands; [2]Erasmus Medical Center, Neuro-Oncology Laboratory/Clinical and Cancer Proteomics, Rotterdam, Netherlands; [3]University Medical Center Groningen, Surgery, Groningen, Netherlands; [4]University Medical Center Utrecht, Surgery, Utrecht, Netherlands; [5]Máxima Medical Center, Surgery, Veldhoven, Netherlands; [6]Maastricht University Medical Center, Surgery, Maastricht, Netherlands; [7]Albert Schweitzer Hospital, Surgery, Dordrecht, Netherlands; [8]Medisch Spectrum Twente, Surgery, Enschede, Netherlands; [9]Spaarne Gasthuis, Surgery, Hoofddorp, Netherlands; [10]Netherlands Cancer Institute, Surgery, Amsterdam, Netherlands; [11]Leiden University Medical Center, Clinical Chemistry and Laboratory Medicine, Leiden, Netherlands*

Background: Women who have a high risk of developing breast cancer due to a familial predisposition or mutations in susceptibility genes undergo adapted screening programs. The earlier onset of screening and higher number of screening moments leaves quite a burden on these women, next to that interval cancers can still occur between scheduled screening moments. Therefore, the prospective, multicenter Dutch TESTBREAST study aims to identify a novel panel of blood-based protein biomarkers. Hereby, the aim is to enable early breast cancer detection for high-risk women using a relatively simple blood test to monitor biomarker levels.

Material and methods: The TESTBREAST study was designed to include 1250 women in several hospitals across The Netherlands, of which 40 women were expected to develop breast cancer during the study period. Using longitudinally acquired blood samples of high-risk women which were collected 1–4 times per year during screening appointments and at the time of breast cancer diagnosis, prediagnostic changes in protein levels were analyzed through targeted mass spectrometry. In a nested case-control analysis, serum samples of 3 women who developed a breast malignancy (cases) were longitudinally compared to 3 high-risk women who did not get the disease (controls). Cluster analyses were done to indicate differences between and within protein levels in serum samples of individuals. Statistical analyses were performed using ANOVA to select distinctive proteins for early breast cancer detection.

Results: After 10 years, 1174 women have been enrolled in 9 Dutch hospitals. Over 3000 serum samples were acquired, of which some women surpassed 20 study visits. First analyses on 30 longitudinally acquired samples have resulted into unique, strong patterns of protein clustering for each patient, indicating a greater interpatient than intrapatient variability in protein levels of the longitudinally acquired samples. Moreover, a targeted panel of 6 distinctive proteins that are indicative of early breast cancer onset was selected ($p < 0.05$). These proteins differ between patients and controls using either personalized or population-based cut-off levels and levels already changed 1–2 years before clinical diagnosis.

Conclusions: Using targeted mass spectrometry, strong clustering patterns within longitudinal intrapatient samples have demonstrated the importance of identifying small changes in protein levels for individuals over time. This underlines the significance of longitudinal serum measurements, that patients can serve as their own controls, and the relevance of the current study set-up for early detection. Additionally, a panel of 6 proteins for early breast cancer detection in high-risk women was established. Our promising protein panel will be validated in the complete TESTBREAST cohort, offering potential for more frequent (self)testing.

No conflict of interest.

CLINICAL SYMPOSIUM 18 November 2022 10.30–12.00

Questions for Innovations in Radiotherapy

2 Oral

Randomised controlled trial of breast conserving therapy: 30 year analysis of the Scottish breast conservation trial

L. Williams[1], K. Taylor[2], D.A. Cameron[3], W. Jack[4], J. Bartlett[5], J. Caldwell[6], I. Kunkler[7], J. Dunlop[8]. *[1]University of Edinburgh, Edinburgh Clinical Trials Unit, Edinburgh, United Kingdom; [2]University of Edinburgh, Institute of Cancer and Genetics, Edinburgh, United Kingdom; [3]University of Edinburgh, Cancer Research UK Edinburgh Centre, Edinburgh, United Kingdom; [4]NHS Lothian, Edinburgh Breast Unit, Edinburgh, United Kingdom; [5]University of Edinburgh, Deanery of Molecular, Genetic and Population Health Sciences, Edinburgh, United Kingdom; [6]Public Health Scotland, Information Consultant, Edinburgh, United Kingdom; [7]University of Edinburgh, Clinical Oncology, Edinburgh, United Kingdom; [8]Public Health Scotland, Principal Trial Manager, Edinburgh, United Kingdom*

Background: The standard of care for most early breast cancer patients is breast conserving surgery (BCS), adjuvant radiotherapy (RT) and systemic therapy. Several trials have confirmed that RT reduces local recurrence, but there are few reports of trials with longterm follow up assessing the impact of omission of RT on overall survival. The Scottish Conservation trial of BCS & systemic therapy appropriate to ER status ± postoperative whole breast RT (Forrest et al. Lancet 1996;348:708–13) showed ipsilateral breast tumour recurrence (IBTR) of 24.5% in the no RT arm and 5.8% in the RT arm but no difference in overall survival at 6 years after randomisation. We report the long-term impact within this study of postoperative loco-regional RT or its omission on IBTR, overall survival, regional recurrence, metastases and breast cancer deaths.

Methods: 585 patients aged ≤70 years with early breast cancer ≤4 cm (T0,T1a,T2a, N0, N1a, N1b, M0) underwent local excision with a 1 cm margin, axillary node sampling or axillary node clearance. Adjuvant systemic therapy of tamoxifen or CMF was given dependent on ER status. Patients were stratified by menopausal and ER status (≥20,<20, unknown) then randomised to RT (291) versus noRT (294). Clinical outcomes were compared by Log-Rank test. Point estimates for actuarial rates at 10, 20 and 30 years are given in the table. Hazard ratios (HR) are reported with no RT as the reference. Failures of the proportional hazards (PH) assumption are reported if significant.

Results: The two arms were well balanced for age, menopausal status, adjuvant systemic therapy, type of axillary surgery, laterality, tumour size, grade, histological type, nodal status and ER status. IBTR was significantly lower in the RT arm: HR = 0.39 (95%CI 0.27–0.55), although there was evidence of a failure of the PH assumption ($p < 0.0001$). The Log Rank test was similarly statistically significant ($p < 0.0001$). Exploration of the hazard rate suggests that there are differences in the first 10 years after treatment, but beyond that the risk is similar in both arms. There was no difference in overall survival, HR = 1.08 (95% CI 0.89, 1.30), p = 0.43, with survival rates similar to 30 years (table 1).

	10 years		20 years		30 years	
Rate (95% CI)	RT	No RT	RT	No RT	RT	No RT
LR	8.8% (5.3, 12.2%)	31% (25.5, 36.5%)	15.2% (10.2, 20.2%)	37.6% (31.6, 43.7%)	27.8% (19.0, 36.5%)	42.7% (35.8, 49.6%)
OS	72.5% (67.3, 77.6%)	70.8% (65.5, 76.0%)	48.6% (42.7, 54.4%)	48.4% (42.5, 54.2%)	23.7% (18.3, 29.0%)	27.5% (22.0, 32.9%)

Conclusions: Adjuvant loco-regional RT with systemic therapy appropriate to ER status reduces the risk of IBTR in the first 10 years of follow up but has no impact thereafter on IBTR nor on overall survival up to 30 years.

No conflict of interest.

CLINICAL SYMPOSIUM **18 November 2022 10.30–12.00**

Practical management of endocrine therapy-related toxicities

3 Oral

Matching adjusted indirect comparison of PFS & OS comparing ribociclib + letrozole vs palbociclib + letrozole as first-line treatment of HR+/HER2– ABC: Analysis based on updated PFS & final OS results of MONALEESA-2 & PALOMA-2

K. Jhaveri[1], J. O'Shaughnessy[2], P. Fasching[3], F. Cardoso[4], S. Tolaney[5], E. Hamilton[6], V.K. Sharma[7], C. Biswas[7], S. Haftchenary[8], P. Pathak[9], H. Rugo[10]. *[1]Memorial Sloan Kettering Cancer Center, New York, NY, USA; [2]Texas Oncology-Baylor University Medical Center and The US Oncology Research Network, Dallas, TX, USA; [3]University Hospital Erlangen, Comprehensive Cancer Center Erlangen–European Metropolitan Region of Nuremberg, and Department of Gynecology and Obstetrics, Friedrich-Alexander University Erlangen-Nuremberg, Erlangen, Germany; [4]Breast Unit, Champalimaud Clinical Center/Champalimaud Foundation, Lisbon, Portugal; [5]Dana-Farber Cancer Institute, Boston, MA, USA; [6]Sarah Cannon Research Institute/Tennessee Oncology, Nashville, TN, USA; [7]Novartis Healthcare Pvt. Ltd., India; [8]Novartis Pharmaceuticals Canada, Montreal, QC, Canada; [9]Novartis Services Inc., USA; [10]Department of Medicine, University of California San Francisco, Helen Diller Family Comprehensive Cancer Center, San Francisco, CA, USA*

Background: CDK4/6i + ET is the preferred 1L tx for pts with HR+/HER2– ABC. All 3 CDK4/6i demonstrated significant improvements in PFS in Phase 3 trials. For postmenopausal (postM) pts, ribociclib (RIB) showed statistically significant OS benefit (MONALEESA-2; ML-2) while palbociclib (PAL) failed to extend OS (PALOMA-2; PAL-2) in a comparable 1L pt population. At the time of this analysis, final OS results for abemaciclib (MONARCH-3) are pending. No CDK4/6i head-to-head studies exist; thus, an anchored matching adjusted indirect comparison (MAIC) of PFS & OS was performed to estimate relative effectiveness of 1L RIB+letrozole (LET) vs 1L PAL + LET.

Methods: PAL-2 & ML-2 (CDK4/6i + LET) included postM pts with HR+/HER2– ABC with no prior tx for ABC & required >12mo from end of (neo) adjuvant tx to recurrence (treatment-free interval, TFI) only if pts received prior NSAI for EBC; the % of pts with TFI ≤12mo in the RIB/PAL arms (ITT) of ML-2 & PAL-2 was 17.7% & 22.1%, respectively. An MAIC of PFS & OS was conducted using individual pt data from the last ML-2 data cut-off (median follow-up [mfu], 80mo) & the last available PAL-2 aggregated data (mfu, 90mo, OS; ≈37mo, PFS). Pts in ML-2 were weighted to match baseline (BL) characteristics in the corresponding arms of PAL-2. HRs for RIB+LET vs PAL + LET were generated via Bucher method.

		ML-2					
		Unmatched[a]		Matched		PAL-2	
		RIB + LET	PBO + LET	RIB + LET	PBO + LET	PAL + LET	PBO + LET
N		304	299	150	112	444	222
Age, %	<65y	56.9	57.9	59.2	63.5	59.2	63.5
Race, %	White	79.6	82.3	77.5	77.5	77.5	77.5
	Other	20.4	17.7	22.5	22.5	22.5	22.5
ECOG, %	0	60.2	60.5	57.9	45.9	57.9	45.9
	1+	39.8	39.5	42.1	54.1	42.1	54.1
No. met sites, %	<3	66.8	64.9	57.4	53.1	57.5	53.1
Visceral (Liver or Lung), %	Yes	55.3	58.5	48.2	49.5	48.2	49.5
Bone only, %	Yes	20.7	22.4	23.2	21.6	23.2	21.6
Stage at initial diagnosis, %	≥3	54.3	55.5	57.7	55.9	57.7	55.9
Prior surgery, %	Yes	67.4	67.6	73.4	73.9	73.4	73.9
Prior radiotherapy, %	Yes	52.6	50.8	53.2	56.3	53.2	56.3
Prior neoadj CT, %	Yes	13.2	7.7	12.2	14.4	12.2	14.4
Prior adj CT, %	Yes	38.5	41.1	40.5	40.1	40.5	40.1
Prior adj ET, %	Yes	55.6	53.5	56.3	56.8	56.3	56.8
TFI[b], %	De Novo	36.8	37.8	37.6	36.5	37.6	36.5
	≤12mo	19.1	21.4	22.1	21.6	22.1	21.6
North American, %	Yes	32.6	35.1	37.8	44.6	37.8	44.60

[a]Some ML-2 ITT pts were removed to match PAL-2 reported BL data categories.
[b]PAL-2 used "disease-free interval" (DFI) to refer to TFI, defined as time from end of (neo) adj tx to recurrence.

Results: All available BL pt & disease characteristics reported in PAL-2 were matched with ML-2 (Table). After weighting, pt characteristics were well balanced between the 2 trials. Post MAIC, the HR for PFS was 0.80 (95% CI 0.58–1.11; *P* = .187) & the HR for OS 0.68 (95% CI 0.48–0.96; *P* = .031) for RIB+LET vs PAL + LET.

Conclusions: Post MAIC between PAL-2 & ML-2, there was no significant difference in PFS, while OS significantly favored RIB + LET over PAL + LET. These results emphasize findings from the individual studies & put confidence in the use of 1L RIB + LET in postM pts with HR+/HER2– ABC.

Conflict of interest:
Komal Jhaveri has nothing to disclose.
Joyce O'Shaughnessy reports personal fees for consultant/advisory board from Abbvie, Agendia, Amgen Biotechnology, Aptitude Health, AstraZeneca, Bayer, Bristol-Myers Squibb, Celgene Corporation, Clovis Oncology, Daiichi Sankyo, Eisai, G1 Therapeutics, Genentech, Gilead Sciences, GRAIL, Halozyme Therapeutics, Heron Therapeutics, Immunomedics, Ipsen Biopharmaceuticals, Lilly, Merck, Myriad, Nektar Therapeutics, Novartis, Pfizer, Pharmacyclics, Pierre Fabre Pharmaceuticals, Puma Biotechnology, Prime Oncology, Roche, Samsung Bioepis, Sanofi, Seagen, Syndax Pharmaceuticals, Taiho Oncology, Takeda, and Synthon.
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CLOSING PLENARY SESSION 18 November 2022 15.30–16.30

Closing Plenary Session

4 Oral

A composite prognostic model for overall survival (OS) based on residual cancer burden (RCB) and tumor-infiltrating lymphocytes (TILs) on residual disease (RCB+TIL) in HER2+ breast cancer patients treated with neoadjuvant therapy: a multicenter study

F. Miglietta[1,2], M. Ragazzi[3], B. Fernandes[4], G. Griguolo[1,2], D. Massa[1,2], A. Bisagni[3], M. Bottosso[1,2], F. Porra[1,2], M. Gaudio[5], D. Iannaccone[1,2], M. Fassan[6,7], M. Lo Mele[8], E. Gasparini[9], G. Zarrilli[6], S. Coiro[10], L. Dore[11], A. Zambelli[5,12], G. Bisagni[9], V. Guarneri[1,2], M.V. Dieci[1,2]. *[1]University of Padova, Department of Surgery, Oncology and Gastroenterology, Padova, Italy; [2]Istituto Oncologico Veneto IRCCS, Oncology 2, Padova, Italy; [3]Azienda USL-IRCCS di Reggio Emilia, Patology, Reggio Emilia, Italy; [4]IRCCS Humanitas Research Hospital- Humanitas Cancer Center, Pathology, Milano, Italy; [5]IRCCS Humanitas Research Hospital- Humanitas Cancer Center, Medical Oncology, Milano, Italy; [6]University of Padova, Department of Medicine DIMED- Surgical Pathology & Cytopathology Unit, Padova, Italy; [7]Istituto Oncologico Veneto IRCCS, Iov, Padova, Italy; [8]University Hospital of Padova, Surgical Pathology Unit, Padova, Italy; [9]Azienda USL-IRCCS di Reggio Emilia, Oncology, Reggio Emilia, Italy; [10]Azienda USL-IRCCS di Reggio Emilia, Breast Surgery, Reggio Emilia, Italy; [11]IRCCS Humanitas Research Hospital- Humanitas Cancer Center, Pathology, Padova, Italy; [12]Humanitas University, Department of Biomedical Sciences, Milano, Italy*

Background: In HER2+ breast cancer (BC) patients undergoing neoadjuvant treatment (NAT), higher levels of baseline TILs are associated with both increased rates of pathologic complete response (pCR) and improved survival. Data regarding the prognostic role of TILs on residual disease (RD) in patients failing to achieve pCR are conflicting.

Material and Methods: HER2+BC patients treated with chemotherapy (CT) plus anti-HER2-based NAT at 3 Italian Institutions were included. RCB and stromal TILs (RD-TILs) were evaluated on post-NAT samples in case of no-pCR. RCB was considered both as a continuous and a categorical variable (classes I/II/III). The Harrell's c-index was used to determine the optimal prognostic cutoff for RD-TILs. The log-rank test was used to perform survival analyses and the Cox regression model to calculate hazard ratios (HRs) and 95% confidence intervals (CIs). C-indexes were evaluated to compare the performance of the prognostic models.

Results: 295 HER2+BC patients were included. NAT consisted on anti-HER2 therapy+CT (83.3% anthracycline + taxane). 66.1% of patients (n = 195) had RD after NAT. RCB and RD-TILs were available for 180 and 159 patients, respectively. Mean and median RCB scores were 2.1 and 1.7; RCB class distribution was: I = 21.7%, II = 62.2%, III = 16.1%. Mean and median RD-TILs were 9.8% and 5.0%. 15% of RD-TILs was identified as the optimal prognostic cutoff for OS. The distribution of RD-TIL categories was: low (<15%) 82.4%, high (≥15%) 17.6%.

RCB was significantly associated with OS (RCB score, $p < 0.001$; 5-year OS for RCB class I vs II vs III: 93.0% vs 86.3% vs 62.0%, $p < 0.001$). High RD-TILs were significantly associated with poorer OS (HR 2.32 [95%CI 1.07–5.03]; 5-year OS for high vs low RD-TILs: 67.9% vs 83.7%, $p = 0.028$).

At multivariate analysis both RCB score and RD-TIL categories maintained their independent prognostic value for OS (RCB: HR 1.90 [95%CI 1.35–2.67] $p < 0.001$; RD-TILs: HR 2.30 [95%CI 1.06–5.01], $p = 0.036$).

The combined score RCB + TIL was calculated from the estimated coefficient of each variable in the bivariate logistic model for OS: RD-TILs (0 = low/1 = high) × 0.83 + RCB (score) × 0.64. RCB + TIL score was significantly associated with OS ($p < 0.001$). The C-index of RCB-TIL score was numerically higher than that of RCB (0.73 vs 0.68, $p = 0.08$) and significantly higher than that of RD-TILs (0.73 vs 0.58, $p = 0.007$).

Conclusions: We reported an independent negative prognostic impact of higher RD-TILs after anti-HER2+CT-based NAT which might potentially underly an unbalance of RD immune microenvironment towards immunosuppressive features. We also provided a new composite prognostic score based on RCB+TIL which was significantly associated with OS. The comparison of prognostic model performance revealed that RCB+TIL score was capable of providing additional prognostic information than either RCB (trend) or RD-TILs alone.

Conflict of interest:
Advisory Board:
FM: Roche, Novartis, Gilead.
GG: EliLilly, Novartis and Gilead.
MF: Astellas Pharma, QED Therapeutics, Diaceutics, Tesaro, Roche, Eli Lilly, and Novartis.
AZ: Pfizer, Roche, Novartis, Lilly, Daiichi Sankyo, Seagen, AstraZeneca, MSD, ExactSciences.
VG: Amgen, Exact Sciences, Gilead, GSK, EliLilly, Merck Serono, MSD, Novartis, Pfizer, Sanofi.
MVD: AstraZeneca, Daiichi Sankyo, EliLilly, Exact Sciences, Gilead, MSD, Novartis, Pfizer, Seagen.

POSTER DISCUSSION SESSION 17 November 2022 16.00–16.45

Poster Discussion Session 1

5 (PB-001) Poster Discussion

The successful patient-preference design for the LORD-trial to test whether active surveillance for low-risk Ductal Carcinoma In Situ is safe

R. Schmitz[1], C. Sondermeijer[2], V. van der Noort[2], E. Engelhardt[3], M. Gerritsma[4], E. Verschuur[5], M. van Oirsouw[5], E. Bleiker[6], N. Bijker[7], R. Mann[8], F. van Duijnhoven[9], J. Wesseling[1], *Grand Challenge PRECISION consortium. [1]Netherlands Cancer Institute, Molecular Pathology, Amsterdam, Netherlands; [2]Netherlands Cancer Institute, Biometrics, Amsterdam, Netherlands; [3]Netherlandfs Cancer Institute, Psycho-Oncology and Epidemiology, Amsterdam, Netherlands; [4]Netherlands Cancer Institute, Psycho-oncology and Epidemiology, Psycho-oncology and Epidemiology, Netherlands; [5]Borstkankervereniging Nederland, Patient Representatives, Utrecht, Netherlands; [6]Netherlands Cancer Institute, Psycho-Oncology and Epidemiology, Amsterdam, Netherlands; [7]Amsterdam University Medical*

Center, Radiation Oncology, Amsterdam, Netherlands; [8]Netherlands Cancer Institute, Radiology, Amsterdam, Netherlands; [9]Netherlands Cancer Institute, Surgery, Amsterdam, Netherlands

Background: Ductal carcinoma in situ (DCIS) is a potential precursor to invasive breast cancer. However, up to 80% will never progress into invasive breast cancer during the patient's lifetime. Therefore, there is a growing concern of overdiagnosis and subsequent overtreatment of women with DCIS. When overtreatment occurs, patients might be unintentionally harmed by diagnostic and treatment procedures.

The LORD trial aims to investigate non-inferiority of an active surveillance strategy in women with low-risk DCIS (grade I–II) compared to the conventional treatment, i.e. surgery with or without radiotherapy. The primary outcome of the trial is the percentage of women without an ipsilateral invasive breast cancer after a follow-up of ten years. As a randomized controlled trial (RCT), recruitment was initially unsuccessful, as many women had a clear preference for either one of the trial arms. Therefore, one could question whether RCT is the optimal design in de-escalation studies or whether a patient preference trial (PPT) would be a more suitable and realistic alternative. In this study we present the effect of the conversion of the LORD-trial to a PPT on the inclusion rate.

Methods: After three years of recruitment, a major amendment transforming the LORD trial from an RCT into a PPT was proposed. A new power calculation was performed, based on an expected 1:1 distribution between both treatment arms based on the screening logs. The new study design was approved in July 2020. An increased target of 2,500 women with low-risk DCIS will be offered the choice of surgery or active surveillance. The greater sample size enables stratification for relevant clinical factors to compare reliably the outcome of active surveillance versus conventional treatment.

Results: Since the transformation of the LORD-trial from a randomized to a patient preference design, recruitment has increased more than tenfold. In the RCT-design, 73 patients were included between 2017 and the design change in 2020. Lack of autonomy was reported as the most important reason to decline randomization. Two years after transformation to a PPT, over 650 additional patients were recruited from 50 sites in the Netherlands.

Conclusions: Transforming the LORD trial into a patient preference trial has boosted the accrual rate manifold. For de-escalating management of low-risk DCIS, most women obviously prefer a shared decision-making strategy, which enables them to make a well-informed decision that is in-line with their values and expectations. It also indicates that sufficient patient numbers can be included to meet the requirements of the power calculation.

This work was supported by Cancer Research UK and by KWF Dutch Cancer Society (ref.C38317/A24043); Web site: https://cancergrandchallenges.org/teams/precision.

No conflict of interest.

6 (PB-002) Poster Discussion

Borderline and malignant phyllodes tumors of the breast: a population-based study of all cases in the Netherlands 1989–2020

S. Bartels[1], J. van Olmen[1], E. Bekers[2], C. Drukker[1], F. van Duijnhoven[1]. *[1]NKI-AvL, Department of Surgical Oncology, Amsterdam, Netherlands; [2]NKI-AvL, Department of Pathology, Amsterdam, Netherlands*

Background: Borderline and malignant phyllodes tumors (BPT/MPT) are rare breast tumors. Guidelines on breast conserving surgery (BCS), surgical margins (>3 mm/≥1 cm) or adjuvant radiotherapy (RT) are based on low level evidence.

Material and methods: Data on all patients with a BPT/MPT 1989–2020 were extracted from the Netherlands Cancer Registry and PALGA (Dutch Pathology Registry). Data were retrospectively analyzed using summary statistics, Kaplan Meier (KM) analysis for overall survival (OS), disease free survival (DFS) and distant metastasis free survival (DFMS); Cox regression for corrected OS and logistic regression for time trends (2000–2019).

	Borderline PT n = 467	Malignant PT n = 468	
Age	50 [42–59]	55 [46–68]	P < 0.001
Tumor size (mm)	40 [25–60]	50 [32–80]	P < 0.001
First surgery type			P < 0.001
Mastectomy	60 (12.8)	177 (37.8)	
BCS	403 (86.3)	284 (60.7)	
Missing	4 (0.9)	7 (1.5)	
Margins after BCS			n/a
Tumor on ink (R1)	129 (32.0)	89 (31.3)	
<1 mm	141 (35.0)	84 (29.6)	
1–3 mm	51 (12.7)	40 (14.1)	
>3 mm	11 (2.7)	12 (4.2)	
Radical (but no mm given)	34 (8.4)	28 (9.9)	
Missing data/ unclear margins	37 (9.2)	31 (11.0)	
Re-excision rates after BCS	112 (27.8)	108 (38.0)	n/a
Re-excision rates after BCS per margin			n/a
Tumor on ink (R1)	83 (64.3)	62 (69.7)	
<1 mm	24 (17.0)	24 (28.6)	
1–3 mm	1 (2.0)	11 (27.5)	
>3 mm	0 (–)	0 (–)	
Final result surgical treatment			P < 0.001
Mastectomy	85 (18.2)	243 (51.9)	
Breast conserving surgery	378 (80.9)	218 (46.6)	
Missing	4 (0.9)	7 (1.5)	
Adjuvant radiotherapy			P < 0.001
Yes	13 (2.8)	69 (14.8)	
No	454 (97.2)	397 (84.8)	
Missing	0 (–)	2 (0.4)	
Any disease recurrence	**47 (10.1)**	**86 (18.4)**	P < 0.001
Locoregional recurrence (LRR) only	44 (9.4)	40 (8.6)	
LRR + distant metastases	0 (–)	14 (3.0)	
Distant metastases only	3 (0.6)	32 (6.8)	
Missing	5 (1.1)	7 (1.5)	
Years to LRR	2.0 [1.1–3.4]	1.3 [0.7–2.4]	P = 0.054
Years to distant metastases	–	1.5 [0.9–4.5]	P = 0.971

Data n (%) or median [IQR].

Results: Baseline, tumor and treatment characteristics of 935 (female) patients are shown in Table 1. Over time, more patients with a BPT had BCS as final procedure (OR 1.07 95%CI 1.03–1.12), but this was not observed in MPT. Over time, more often adjuvant RT was given for MPT (OR 1.06 95%CI 1.01–1.12). KM 10-year estimate for OS in BPT was 87.7%(95%CI 84.1–91.2) and in MPT 70.9%(95%CI 66.6–75.2). OS corrected for age BPT *vs.* MPT: HR 1.92(95%CI 1.42–2.60). KM 5-year estimate for DFS in BPT was 90.2%(95%CI 87.3–93.1) and in MPT 83.2% (95%CI 79.7–86.7). KM 5-year estimate for DMFS in MPT was 91.3%(95%CI 88.6–94.0).

Conclusion: Over time, treatment involved more BCS for BPT and more adjuvant RT for MPT. In BCS, smaller margins were accepted without re-excision then guidelines recommend.

No conflict of interest.

7 (PB-003) Poster Discussion

Intraoperative ultrasound is accurate for guiding breast conservative surgery in non-palpable ductal carcinoma in situ of the breast

A. Esgueva[1], F. Regueira[2], N. Rodríguez-Spiteri Sagredo[2], B. Olartecoechea Linaje[2], L.J. Pina Insausti[3], C. Sobrido Sampedro[4], A.M. Elizalde Pérez[3], M. Abengozar-Muela[5], T. Iscar Galan[6], M.J. Zubillaga Jiménez[7], A. Regojo Bacardí[8], S. Fuente Martínez de Bedoya[8], I.T. Rubio[9]. *[1]Clinica Universidad de Navarra, Breast Cancer Unit, Madrid, Spain; [2]Clinica Universidad de Navarra, Breast Surgical Unit, Pamplona, Spain; [3]Clinica Universidad de Navarra, Breast Imaging Unit, Pamplona, Spain; [4]Clinica Universidad de Navarra, Breast Imaging Unit, Madrid, Spain; [5]Clinica Universidad de Navarra, Pathology Department, Pamplona, Spain; [6]Clinica Universidad de Navarra, Pathology Department, Madrid, Spain; [7]Clinica Universidad de Navarra, Breast Nurse, Pamplona, Spain; [8]Clinica Universidad de Navarra, Breast Nurse, Madrid, Spain; [9]Clinica Universidad de Navarra, Breast Surgical Unit, Madrid, Spain*

Background: Intraoperative ultrasound guided surgery (IOUS) is an effective surgical technique for invasive breast cancer with advantages over wire localization (WL) including smaller resection volumes, lower rate of involved margins and better patient satisfaction. Nevertheless, there are few reports for ductal carcinoma in situ (DCIS) surgery. The objective of this study is to compare specimen margins and volume of excision for DCIS after IOUS vs WL.

Material and methods: From February 2018 to December 2021, women diagnosed with DCIS eligible for breast conserving surgery guided by IOUS or WL were recorded into a prospectively maintained database. For IOUS surgery, after initial core biopsy, a US visible clip was placed at the biopsy site. At the time of surgery, distance from the clip to the end of microcalcifications in mammogram was assessed to guide the clip excision by IOUS. Specimen mammogram was performed to verify complete excision. Comparison was done for margin status, second surgeries and volume of excess of healthy breast tissue resected defined by the calculated resection ratio (CRR).

Results: The study included 108 patients, 41 (37.96%) in the IOUS group and 67 (62.04%) in the WL group. IOUS patients were younger ($p = 0.02$) and had DCIS with comedonecrosis ($p = 0.01$). There were no differences in tumor size ($p = 0.64$) or grade ($p = 0.93$) between groups. IOUS showed smaller surgical volumes: 21.86 cm^3 vs. 47.18 cm^3 ($p = 0.07$) and significantly smaller CRR: 1.6 vs. 2.9 ($p = 0.03$).

Two (4.8%) patients in the IOUS group had positive margins while 7 (10.4%) in the WL group. Re-excision rate was lower in the IOUS group ($p = 0.08$).

Table: Baseline characteristics

	IOUS (41 patients)	WL (67 patients)	p
Age. Mean (Range)	52.87 (35–78)	57.76 (39–82)	0.02
DCIS size	17.46 (4–50)	17.06 (2–70)	0.64
DCIS grade			0.93
I	13 (37.71%)	1 (31.34%)	
II	14 (34.15%)	19 (28.36%)	
III	14 (34.15%)	27 (40.30%)	
Comedonecrosis			0.001
Yes	8 (19.51%)	3 (4.48%)	
No	33 (80.49%)	64 (95.52%)	
ER receptor			0.86
Positive	35 (85.67%)	8 (86.57%)	
Negative	6 (14.63%)	9 (13.43%)	
PR receptor			0.18
Positive	33 (80.49%)	46 (68.66%)	
Negative	8 (19.51%)	21 (31.34%)	
Clip placed after biopsy			0.0001
Yes	41 (100%)	15 (22.73%)	
No	0	51 (77.27%)	
Re-excision for positive margins			0.08
Yes	2 (4.88%)	7 (10.45%)	
No	39 (95.12%)	60 (89.55%)	
Type of Re-excision			0.45
BCS	2 (100%)	5 (71.43%)	
Mastectomy	0	2 (28.57%)	
Radiotherapy			0.22
Yes	38 (92.68%)	65 (97.01%)	
No	3 (7.32%)	2 (2.99%)	
Endocrine therapy			0.35
Yes	34 (82.93%)	58 (86.57%)	
No	5 (12.20%)	7 (10.44%)	
Patient refusal	2 (4.88%)	2 (2.99%)	
Oncoplastic surgery			0.65
Yes	10 (24.39%)	19 (28.36%)	
No	31 (75.61%)	48 (71.64%)	

No differences in DFS were observed (1 recurrence in the WL group vs 0 in the IOUS ($p = 0.45$)), FU of 18.17 months (Range 1.4–43 months).

Conclusions: IOUS is an accurate localization method for guiding DCIS surgery. It decreases excision of healthy breast tissue while increasing rates of negative margins compared to WL.

No conflict of interest.

8 (PB-004) Poster Discussion

Does the use of an Intraoperative device to assess margins reduce need for reexcison after breast conserving surgery: Multicentre Randomised Controlled Trial

N. Bundred[1], M. Dixon[2], R. Acuthan[3], E. Barrett[4], J. Benson[5], C.A. Courtney[6], A. Skene[7], F. Hoar[8], P. Bhaskar[9], C. Todd[10], D. Macmillan[11], D. Watterston[12], N. Barnes[13]. *[1]University Hospital of South Manchester NHS Foundation Trust, Faculty of Biology, Medicine and Health, Manchester, United Kingdom; [2]University of Edinburgh, Breast Surgery, Edinburgh, United Kingdom; [3]Leeds Breast Unit, Breast Unit, Leeds, United Kingdom; [4]University of Manchester, Medical Statistics, Manchester, United Kingdom; [5]Cambridge Breast unit, Breast Unit, Cambridge, United Kingdom; [6]Royal Derby Hospital Breast Unit, Breast Unit, Derby, United Kingdom; [7]Royal Bournemouth Hospital, Breast Unit, Bournemouth, United Kingdom; [8]Birmingham City Hospital, Breast Unit, Birmingham, United Kingdom; [9]North Tees NHS Trust, Breast Unit, Stockton on Tees, United Kingdom; [10]University of Manchester, Professor of Primary Care & Community Health Division of Nursing- Midwifery & Social Work, Manchester, United Kingdom; [11]Nottingham City Hospital, Breast Unit, Nottingham, United Kingdom; [12]Manchester University Foundation Trust, Breast Unit, Manchester, United Kingdom; [13]Manchester University FT, Breast Surgery, Manchester, United Kingdom*

Background: The ABS audit of 17,045 cancers indicates that re-excision is required in 20% of invasive cancers and up to 30% of non-invasive DCIS to clear margins after Breast Conservation(BCS). A further 8% of patients undergo a third procedure to convert to a mastectomy. Reducing the need for further operations benefits patients.

To determine if the use of the MarginProbe, a CE device on the removed surgical specimen margin, (after tumour excision and tissue specimen radiography of a breast cancer (with surrounding ductal carcinoma in situ [DCIS]) or DCIS) reduces rates of surgical re-excision operations, when compared to standard practice. we performed a multicentre UK randomised controlled trial. We aimed to compare the total number of re-excision procedures required following BCS because of positive margins less than 1 mm (circumferentially) and the number of patients presenting with excision margins greater than 1 mm circumferentially clear after BCS, judged by histopathological assessment. Additionally we determined Quality of life and health related facility measures (EQ5D) between patient groups. The Trial randomised women aged 18 to 90 years, with early cancer larger than 1.5 cm (invasive breast cancer with surrounding DCIS or DCIS alone, histologically diagnosed by core biopsy), scheduled to undergo BCS. All 10 UK centres agreed the protocol and were proctored (trained in the use of the device) for their first 5 cases.

Results: In total 467 patients were randomised by block allocation, 242 underwent marginprobe assessment intraoperatively and 225 no probe assessment (control).

Seventyeight patients required a repeat lumpectomy/excision within 9 months (40 MarginProbe & 38 Control). DCIS, rexcision rate was 20.5% and Invasive cancer was 13.5%.Re-excision rates did not differ between the groups (39/94 = 41.5% MarginProbe & 35/89 = 39.3% Control patients with closest margin width <1 mm had re-excision within 9 months). However 0.7% MarginProbe & 2.2% Control patients with closest margin width >1 mm had re-excision within 9 months.

Rexcision rate in the Marginprobe arm varied across centres from 6.5 to 33.3% (Highest Centre rexcision rate vs lowest centre $p = 0.0029$) and controls from 7.5%–45%.

There was no difference in the tissue weight excised between the treatment groups.

Neither Body Image or Sexual Adjustment sub-scales at 9 months differed between the treatment groups, after adjusting for baseline scores

FACT-B TOI Quality of Life scores between patients who had re-excision & those that didn't differ, at any of the follow-up time points (1,3,9 months).

Conclusion: Due to variation in margin clearance between centres, no effect of marginprobe device use on clearance was identified. Although the idea of intraoperative testing of margins to prevent recurrence appealed to patients, device use did not impact outcomes.

No conflict of interest.

POSTER DISCUSSION SESSION 17 November 2022 16.00–16.50

Poster Discussion Session 2

9 (PB-005) Poster Discussion

Forty-eight weeks of yogic intervention improves serum interleukins IL-10 and IL-1β along with fatigue and quality of life during the radiotherapy/chemotherapy in breast cancer patients: a randomized control study

A. Mishra[1], M. Jain[2], V. Yadav[3], H. Shyam[4], S. Kumar[2], S.K. Mishra[3], P. Ramakant[5]. [1]*King George's Medical University, Department of Thoracic Surgery, Lucknow, India;* [2]*King George's Medical University, Department of Thoracic Surgery, Lucknow, India;* [3]*University of Lucknow, Department of Physical Education, Lucknow, India;* [4]*King George's Medical University, Department of Center for Advance Research, Lucknow, India;* [5]*King George's Medical University, Department of Endocrine Surgery, Lucknow, India*

Background: Yoga improved fatigue and immunological profile in cancer survivors and has been a promising alternative therapy. Breast cancer treatments are rapidly improving along with their side effects. In this study we investigated the effect of the yogic intervention at a different time interval during the radiotherapy/chemotherapy on the pro and anti-inflammatory interleukins along with the fatigue and quality of life among patients with stage II/III breast cancer.

Methods: A total of 96 stage II/III breast cancer patients were enrolled in this study and randomly divided into two different groups. Group-I (non-Yoga) received chemotherapy and/or radiotherapy and group II (Yoga) received an additional yogic intervention. Both the groups were followed up for a period of 48 weeks and blood was collected at the time of enrollment, 16, 32, and 48 weeks and serum were isolated to measure the pro and anti inflammatory interleukins, fatigue, and functional scale questionnaire was obtained at each time point. We have also used the validated questionnaire of the European Organization for Research and Treatment of Cancer to measure the quality of life (EORTC-QLQ30) of breast cancer patients.

Result: In group II functional scale was improved from the baseline to 16, 32, and 48 weeks were 44.49 ± 2.31, 55.64 ± 2.09, 60.8 ± 1.96, 72.14 ± 1.79 respectively. Whereas in group-I overall little improvement was also recorded from baseline 46.27 ± 1.76 to 48 weeks 54.43 ± 2.38. In group-II fatigue was also improved from the baseline to 16, 32, and 48 weeks were 42.38 ± 2.70, 54.9 ± 2.79, 58.33 ± 2.61, 62.44 ± 2.58 respectively and overall little improvement was also recorded in the group-I from baseline 42.18 ± 2.81 to 48 weeks 50.95 ± 3.20. In group-II overall quality of life was improved from the baseline to 16, 32, and 48 weeks were 37.33 ± 1.33, 39.87 ± 2.99, 38.79 ± 3.23, 74 ± 1.59 respectively. Whereas the poor quality of life was recorded in the group-I during treatment from baseline (39.51 ± 0.96) to 48 weeks (20.51 ± 1.57). Level of IL-1β (pg/ml) decreased significantly from 69.77 ± 2.62 to 61.16 ± 3.41 (p = 0.001) in group-II (baseline to 48 weeks) whereas an increase in the group-I (baseline to 48 weeks) was recorded from 73.14 ± 2.66 to 81.13 ± 2.04 (p = 0.35). The level of IL-10 (pg/ml) decreased significantly from 10.47 ± 1.10 to 4.855 ± 0.81 (p = 0.001) in group-II (baseline to 48 weeks) whereas a slight decrease was recorded in the group-I (baseline to 48 weeks) was recorded from 10.97 ± 0.83 to 9.385 ± 1.216 (p = 0.35).

Conclusion: These finding suggested that improved fatigue and functional scale is associated with a lower level of IL-1β. Yoga may be important additional therapy along with the cancer treatment to help the patients with cancer-related fatigue and improve their overall immunological profile and overall quality of life during treatment.

No conflict of interest.

10 (PB-006) Poster Discussion

Long-term breast cancer risk after benign breast disease in population-based screening

M. Roman[1], J. Louro[2], I. Vázquez[3], F. Saladié[4], L. Peñalva[5], X. Bargalló[6], M.J. Quintana[7], J. Del Riego[8], C. Vidal[9], X. Castells[2], IRIS study group. [1]*Hospital del Mar, Epidemiology and Evaluation, Barcelona, Spain;* [2]*IMIM Hospital del Mar Medical Research Institute, Epidemiology and Evaluation, Barcelona, Spain;* [3]*IMIM Hospital del Mar Medical Research Institute, Pathology, Barcelona, Spain;* [4]*Hospital Universitari Sant Joan de Reus, Epidemiology and Cancer Prevention Service, Tarragona, Spain;* [5]*Private Foundation Asil Hospital, Breast Cancer Screening Technical Office, Granollers, Spain;* [6]*Hospital Clinic, Radiology, Barcelona, Spain;* [7]*University Hospital de la Santa Creu i Sant Pau, Clinical Epidemiology and Public Health, Barcelona, Spain;* [8]*Parc Taulí University Hospital-UAB, Radiology, Sabadell, Spain;* [9]*Catalan Institute of Oncology ICO, Cancer Prevention and Monitoring Program, Barcelona, Spain*

Background: To assess the long-term risk of breast cancer after benign breast disease diagnosed through breast screening.

Methods: We analysed individual-level data from 778 306 women aged 50–69 years with at least one mammographic screening participation in ten Breast Cancer Screening centres in Spain from 1996 to 2015 and followed-up until 2017. We compared rates of incident breast cancer among women with and without benign breast disease. We calculated crude and adjusted rate ratios to compare both groups. Poisson regression was used for adjusted analyses.

Results: By December 2017, 242 557 women had been followed for up to 4 years, 179 167 for 5–8 years, 188 399 for 9–12 years, 150 356 for more than 12 years. Over the study period, 17 827 women were diagnosed with benign breast disease and 11 708 women had an incident breast cancer, corresponding to an incidence rate of 14.8 (95% CI 14.5 to 15.1) per 1000 women among those without a benign breast disease; and 24.8 (95% CI 22.6 to 27.2) among those with a benign breast disease. Women with benign breast disease had an overall increased relative risk of 1.77 (95%CI: 1.61 to 1.95). The excess risk in women with benign breast disease remained increased over time, with relative risk 1.99 (95%CI: 1.73 to 2.29) for those followed less than 4 years, to 1.96 (95%CI: 1.32 to 2.92) for those followed 12 to 20 years. The excess incidence risk was independent of year at mammography or age at mammography.

Table: Crude and adjusted rate ratios of incidence breast cancer in women with benign breast disease at screening, according to year, age, and time since index mammogram.

	No Benign Breast Disease Cases/ Women	Benign Breast Disease Cases/ Women	Crude Ratio (95%CI)	Adjusted Ratio (95%CI)
Year at index mammogram				
1996–2000	2 776/117 837	95/2 287	1.76 (1.44–2.16)	1.49 (1.21–1.82)
2001–2005	5 042/237 613	156/3 985	1.84 (1.57–2.16)	1.57 (1.34–1.85)
2006–2010	2 715/210 947	128/5 156	1.93 (1.62–2.30)	1.95 (1.64–2.33)
2011–2015	733/194 082	63/6 399	2.61 (2.02–3.37)	3.11 (2.41–4.03)
Age at index mammogram				
50–54	6 477/455 833	233/8 926	1.84 (1.61–2.09)	1.68 (1.47–1.91)
55–59	2 938/146 256	107/3 773	1.41 (1.16–1.71)	1.53 (1.26–1.86)
60–64	1 645/118 008	79/3 152	1.80 (1.43–2.25)	2.38 (1.90–2.98)
65–69	206/40 382	23/1 976	2.28 (1.48–3.51)	3.25 (2.11–5.00)
Time since index mammogram				
≤4 years	4 096/242 557	201/7 582	1.57 (1.36–1.81)	1.99 (1.73–2.29)
>4 and ≤8 years	3 990/179 167	147/4 662	1.42 (1.20–1.67)	1.58 (1.34–1.86)
>8 and ≤12 years	2 337/188 399	69/3 361	1.66 (1.30–2.10)	1.64 (1.29–2.08)
>12 years	843/150 356	25/2 222	2.01 (1.35–2.99)	1.96 (1.32–2.92)

Conclusion: Women with benign breast disease experienced higher long-term risks of breast cancer than women with negative screens for two decades. Women with benign breast disease could benefit from closer surveillance and more personalised screening strategies.

No conflict of interest.

11 (PB-007) Poster Discussion

Psychosocial factors and the incidence of breast cancer: two-stage individual participant data meta-analyses

L. Van Tuijl[1], M. Basten[2], K.Y. Pan[3], A. de Graeff[4], J. Dekker[3], A. Hoogendoorn[3], F. Lamers[3], M. Geerlings[2], R. Vermeulen[5], A. Voogd[6], J. Rosmalen[7], A. Ranchor[1], PSY-CA group. [1]*University Medical Center Groningen, Department of Health Sciences, Groningen, Netherlands;* [2]*University Medical Center Utrecht, Julius Center for Health Sciences and Primary Care, Utrecht, Netherlands;* [3]*Amsterdam UMC, Department of Psychiatry, Amsterdam, Netherlands;* [4]*University Medical Center Utrecht, Department of Medical Oncology, Utrecht, Netherlands;* [5]*Utrecht University, Institute for Risk Assessment Sciences, Utrecht, Netherlands;* [6]*Maastricht University Medical Centre, Department of Medical Oncology, Maastricht,*

Netherlands; [7]University Medical Center Groningen, Department of Psychiatry, Groningen, Netherlands

Background: Over the last decades, it has been repeatedly suggested that psychosocial factors such as depression and anxiety increase the risk of breast cancer, through mechanisms such as mutation, DNA repair, neuroendocrine processes, immunological processes, or unhealthy behaviours. With individual participant data meta-analyses, we aimed to test whether depression, anxiety, recent loss event, and perceived social support increase the risk for breast cancer. We also explored the effects of neuroticism, general distress, and relationship status.

Materials and methods: IPD meta-analyses were performed with up to twenty-two studies in the PSY-CA consortium (up to: N = 220,258, person years = 2,502,822, breast cancer incidences = 5724). At stage 1, Cox regression models were fitted in each cohort for each psychosocial factor (outlined above) and breast cancer outcome. Two models were tested: a minimally-adjusted model (correcting for sociodemographic covariates) and a maximally-adjusted model (additionally correcting for several health behaviors and other potential confounders such as parity). At stage 2, hazard ratios (from stage 1) were pooled using random-effects meta-analyses.

Results: Most psychosocial factors were not related to breast cancer incidence, with the exception of anxiety symptoms which showed a protective effect (HR = 0.95 [0.91, 0.998], $p = 0.04$) in the minimally adjusted model. When adjusting for further potential confounders, this effect was no longer statistically significant (HR = 0.96 [0.90, 1.02], $p = 0.14$).

Conclusions: We found no consistent evidence for an association between psychosocial factors and the incidence of breast cancer, with the possible exception of anxiety symptoms showing a small, protective effect. Further research is needed to test whether health-related behaviours, such as unhealthy behaviours or menopausal status, moderate the association between psychosocial factors and breast cancer.

No conflict of interest.

12 (PB-008) Poster Discussion

Effectiveness of a nurse-navigation intervention in vulnerable breast cancer patients – The Rebecca Study

P.E. Bidstrup[1], N. Kroman[2], C. Johansen[3], B.G. Mertz[2]. *[1]Danish Cancer Society Research Center, Survivorship Unit, Copenhagen, Denmark; [2]Gentofte Hospital, Breast Surgery, Hellerup, Denmark; [3]Rigshospitalet-Copenhagen University Hospital, Oncology, Copenhagen, Denmark*

Background: Women with breast cancer may suffer from adverse effects of treatment including psychological distress, anxiety, and depression as well as physical symptoms such as pain and fatigue. Despite available rehabilitation services breast cancer patients still report unmet needs for support.

The aim of this study was to evaluate the effectiveness of the REBECCA intervention combining nurse navigation and systematic screening for psychological and physical symptoms in vulnerable breast cancer patients using a randomized controlled design.

Material and Methods: Between 2017–2019 all eligible patients were invited consecutively to participate in the study by a project nurse. Enrolled patients reporting moderate to severe distress at baseline were randomized using a computer-generated assignment 1:1 to either standard care or to the REBECCA intervention. The intervention comprised repeated screening using patient reported outcome measures and up to 8 individual nurse navigation sessions providing psychoeducation, support, and referrals to symptom management.

Questionnaire data was collected at baseline before surgery and, 6, 12 and 18 months after. Primary outcome was distress. Secondary outcomes were e.g., anxiety, depression, and breast cancer specific health related quality of life (HQoL). In intention to treat analyses (ITT), we applied linear mixed regression models with 95% confidence intervals to examine the effect of the intervention on primary outcomes at the four time points. Effect sizes were evaluated using Cohens d.

Results: We identified 309 vulnerable patients with breast cancer who were randomly assigned to the intervention (N = 153) or the control (N = 156). Overall intervention effects were seen for depression ($p = 0.037$) and breast cancer specific HQoL ($p = 0.03$) and a borderline significant intervention effect was seen for anxiety ($p = 0.062$) with strongest effects at either 6 or 12 months follow-up.

Larger effects were seen in adjusted analyses. Patients receiving the REBECCA intervention, compared to standard care had significantly reduced symptoms of distress at 12 months follow-up in the adjusted analyses. Furthermore, significant effects were seen in adjusted analyses for symptoms of anxiety at 6, 12 and 18 months, depression at 6 months, HQoL at 6 and 12 months and for fear of recurrence at 6 and 12 months. The effects were modified by age, patient activation, education, and social support.

Conclusions: The REBECCA intervention did have positive effects on several psychological and physical outcomes. The REBECCA intervention improved symptoms of depression, breast cancer related quality of life and to some extent anxiety. Socially vulnerable sub-groups may have the largest benefit.

Our findings merit further research to refine the nurse navigation framework further.

No conflict of interest.

13 (PB-009) Poster Discussion

External validation and clinical utility assessment of PREDICT v2.2 prognostic model in young, node-negative, systemic treatment-naïve breast cancer patients

Y. Wang[1], G.M. Dackus[1,2], A. Broeks[3], D. Giardiello[1,4], M. Hauptmann[5], K. Jóźwiak[5], E.A. Koop[6], M. Opdam[1], S. Siesling[7,8], G.S. Sonke[9], N. Stathonikos[2], N.D. ter Hoeve[2], E. van der Wall[10], C.H. van Duerzen[11], P.J. van Diest[2], A.C. Voogd[12], W. Vreuls[13], S.C. Linn[1,9], M.K. Schmidt[1]. *[1]Netherlands Cancer Institute, Molecular Pathology, Amsterdam, Netherlands; [2]University Medical Center Utrecht, Pathology, Utrecht, Netherlands; [3]Netherlands Cancer Institute, Core Facility Molecular Pathology and Biobanking, Amsterdam, Netherlands; [4]Institute for Biomedicine affilicated to the University of Lübeck, Eurac Research, Bolzano, Italy; [5]Brandenburg Medical School, Institute of Biostatistics and Registry Research, Neuruppin, Germany; [6]Gelre Ziekenhuizen, Pathology, Apeldoorn, Netherlands; [7]Netherlands Comprehensive Cancer Organization, Research and Development, Utrecht, Netherlands; [8]University of Twente, Department of Health Technology and Services Research-Technical Medical Centre, Enschede, Netherlands; [9]Netherlands Cancer Institute, Medical Oncology, Amsterdam, Netherlands; [10]University Medical Center Utrecht, Cancer Center, Utrecht, Netherlands; [11]ErasmusMC Cancer Institute, Pathology, Rotterdam, Netherlands; [12]Maastricht University, Epidemiology, Maastricht, Netherlands; [13]Canisius Wilhelmina Ziekenhuis, Pathology, Nijmegen, Netherlands*

Background: The PREDICT breast prognostic model is widely used by oncologists for decision-making about systemic treatment for breast cancer patients. However, whether PREDICT could provide accurate predictions before systemic treatment in young patients remains unclear. This study assessed the validity and clinical utility of the latest version of PREDICT (v2.2) in young, node-negative, breast cancer patients who did not receive systemic treatment.

Methods: We selected all women from the Netherlands Cancer Registry, diagnosed with node-negative breast cancer under 40 years of age between 1989 and 2000; a period when national guidelines did not recommend the use of systemic treatment for node-negative patients. The validity of PREDICT to predict all-cause mortality was assessed through calibration and discrimination, calculated as the ratio of observed and expected all-cause mortality (O/E ratio), and the area under the receiver-operating-characteristic-curve (AUC) at 10 years, respectively. Clinical utility of PREDICT was evaluated using decision curve analysis and compared to the clinical utility of the European Society of Medical Oncology (ESMO) guideline. Predefined thresholds for estrogen receptor (ER)-positive and ER-negative patients were based on the MINDACT trial, where adjuvant chemotherapy was recommended to patients with a predicted 10-year all-cause mortality $\geq$8% (ER-negative) or $\geq$12% (ER-positive). Clinical utility was represented by net benefit, calculated as the rate of correctly predicted high-risk patients who should receive chemotherapy minus the weighted (odds of the threshold) rate of falsely predicted high-risk patients who should not receive chemotherapy.

Results: We included 2,264 patients with a median age at diagnosis of 36 years. Most patients had ER-positive (70.9%), and grade 1–2 tumors (56.2%); the median tumor size was 16 mm. Observed 10-year all-cause mortality for all patients was 32% higher than the predicted value (table), which was likely due to earlier years of diagnosis of the study population compared to the PREDICT derivation cohort. PREDICT had a 65% chance (AUC) to correctly separate patients who would and would not die within 10 years. Compared to the ESMO guideline, PREDICT only showed slightly higher net benefit in ER-positive patients.

Patients (%)	O/E ratio (95% CI)	10-year AUC (95% CI)	Net benefit (%) PREDICT	Net benefit (%) ESMO guideline
All (100)	1.32 (1.22–1.43)	0.65 (0.62, 0.68)	–	–
ER-positive (70.9)	1.45 (1.31–1.59)	0.69 (0.66, 0.72)	10.1	9.1
ER-negative (29.1)	1.13 (0.97–1.28)	0.57 (0.52, 0.62)	18.5	18.6

Conclusions: PREDICT on average underestimated all-cause mortality in young, node-negative breast cancer patients. However, the model showed higher clinical utility for ER-positive patients than the ESMO guideline, although the difference was small.

No conflict of interest.

POSTER IN THE SPOTLIGHT **16 November 2022 13.30–14.20**

Poster in the spotlight

20 (PB-020) Poster Spotlight

Contrast Enhanced Mammography in Breast Cancer Surveillance

K. Elder[1], J. Matheson[1], C. Nickson[2], G. Box[3], J. Ellis[3], A. Mou[4], C. Shadbolt[4], A. Park[1], J. Tay[1], A. Rose[3], G.B. Mann[1]. *[1]The Royal Melbourne Hospital, Breast Surgery, Melbourne, Australia; [2]The Daffodil Centre, The University of Sydney, Sydney, Australia; [3]The Royal Melbourne Hospital, Radiology, Melbourne, Australia; [4]The Royal Women's Hospital, Radiology, Melbourne, Australia*

Background: Women with a personal history of breast cancer or DCIS (PHBC) are at increased risk of either a local recurrence or a new primary breast cancer. Adjunctive screening ultrasound or MRI is often used to supplement mammography. Contrast enhanced mammography (CEM) is reported to have higher sensitivity than MG and ultrasound, and similar performance with better accessibility than MRI.

Material and Methods: We introduced CEM as a routine single imaging modality for surveillance of those with PHBC. This report is of the first surveillance round outcomes.

Results: 73/1191 (6.1%) patients were recalled for further assessment. 35 (48%) were true positives (TP), with 26 invasive cancers and 9 cases of DCIS, while 38 (52%) were false positive (FP). Positive predictive value (PPV) 47.9%. 32/73 were recalled due to findings on MG, while 41/73 were only recalled due to Contrast. 14/73 had 'minimal signs' with a lesion identifiable with knowledge of the Contrast finding while 27/73 were 'contrast only'. 41% (17/41) of those recalled due to contrast were TP. Contrast-only TPs were found in those with low and high mammographic density (MD). Bilateral screening breast US reduced by 55% in the year after routine surveillance CEM was implemented.

Conclusion: Compared to MG, CEM as a single surveillance modality for those with PHBC has higher sensitivity and comparable specificity, identifying additional malignant lesions that appear to be clinically significant. Further investigation of interval cancer and subsequent round cancer detection rates is warranted.

No conflict of interest.

21 (PB-021) Poster Spotlight

Breast Cancer Whole Blood Screening: Analytical and Clinical Performance from Early Analysis of the International Identify Breast Cancer (IDBC) Study

N. Bundred[1], K. Fuh[2], N. Asgarian[2], S. Brown[3], D. Simonot[3], R. Shepherd[2], M.L. Quan[4], B.J. Docktor[5], A. Maxwell[6], C. Kirwan[7], A. Hollingsworth[8], D. Morris[4], S.I. Kim[9], J.Y. Kim[9], H. Lee[10], K. Rinker[11]. *[1]University Hospital of South Manchester NHS Foundation Trust, Faculty of Biology, Medicine and Health, Manchester, United Kingdom; [2]Syantra Inc., Product Development, Calgary, Canada; [3]Alberta Health Services, Alberta Cancer Research Biobank, Calgary, Canada; [4]Alberta Health Services, Oncology, Calgary, Canada; [5]University of Calgary, Radiology, Calgary, Canada; [6]University of Manchester, Radiology, Manchester, United Kingdom; [7]University of Manchester, Surgical Oncology, Manchester, United Kingdom; [8]Mercy Health retired, Oncology, Oklahoma, USA; [9]Yonsei University College of Medicine, Surgery, Seoul, South Korea; [10]Yonsei University Wonju College of Medicine, Internal Medicine, Wonju, South Korea; [11]University of Calgary, Biomedical Engineering, Calgary, Canada*

Background: Breast cancer is detected after stage I for many women, particularly women with dense breast tissue and those under 50, due to screening mammography performance and program participation. This report provides data for a new CE-marked blood test currently available in Canada. The test uses a non-fractionated blood sample and involves analysis of a gene expression panel (12 targets) using custom reagents and machine-learning informed software for identification of an active breast cancer signature that has been validated through a retrospective clinical study.

Methodology: Blood samples (2.5 ml) were collected from women aged 25 to 80 near the time of a screening mammogram (BI-RADS 1–2) or negative physical exam, or with a BI-RADs 3–5 score in secondary care but pre-biopsy, as part of the ongoing Identify Breast Cancer (IDBC) prospective study (NCT04495244). Participants' (n = 1107: 240 asymptomatic breast cancer, 867 normal) blood was analyzed in a facility with ISO 13485:2016 certification. Machine learning-based model development was conducted on 132 cancer and 251 normal samples, and blind independent testing was performed on 724 samples (103 cancer, 621 normal). Analytical performance characteristics were evaluated, and clinical performance metrics reported with 99.5% confidence intervals (CI) computed through an exact binomial test.

Results: Interim clinical analysis yielded an inferred accuracy of 92.2% (CI: 88.9%–94.6%) with a specificity of 94.3% (CI: 91.0%–96.4%) and sensitivity of 79.2% (CI: 65.5%–88.4%). For women under 50 (Table 1), a specificity of 99.0% and a sensitivity of 91.7% were achieved. This analysis showed most (84%) cancers were stage 1 or 2 (59% Stage 1), lymph node negative (73.5%), and hormone receptor positive (75%; 10% HER2+, 5% TN). The median tumor size was 18.0 mm. Importantly, results also showed that small tumors (<10 mm; n = 19) and participants with negative lymph nodes were detected by the test. Linearity and reportable range of targets, analytical specificity, interference, sample and reagent stability, repeatability, and reproducibility of the assay were defined, evaluated, and established.

Conclusions: Interim data shows strong analytical and clinical performance of the test for detection of active breast cancer as well as identification of those negative for breast cancer particularly women under 50 and those with small tumors and disease-free lymph nodes, supporting a potential role of the test as a screening option to supplement imaging approaches.

Table 1: Clinical Performance Metrics

Age	Participants (n)	Accuracy	Specificity	Sensitivity
<50	Normal: 192	98.5% (CI: 93.8%–99.7%)	99.0% (CI: 94.2%–99.8%)	91.7% (CI: 51.1%–99.1%)
	Cancer: 12			
Entire cohort	Normal: 599	92.2% (CI: 88.9%–94.6%)	94.3% (CI: 91.0%–96.4%)	79.2% (CI: 65.5%–88.4%)
	Cancer: 96			

Conflict of interest:
Ownership: Kenneth Fuh, Robert Shepherd and Kristina Rinker are co-founders and partly own Syantra Inc.
Board of Directors: Robert Shepherd and Kristina Rinker are members of Syantra's Board of Directors.

22 (PB-022) Poster Spotlight

An individualized breast cancer risk assessment model for women attending screening in BreastScreen Norway

J. Louro[1], S. Sagstad[2], M. Román[1], C. Flåt[2], M. Larsen[2], N. Moshina[2], X. Castells[1], S. Hofvind[2]. *[1]Hospital del Mar Medical Research Institute, Epidemiology, Barcelona, Spain; [2]Cancer Registry of Norway, Breast Cancer Screening, Oslo, Norway*

Background: The results of the effectiveness of population-based screening are controversial in terms of the balance between mortality reduction and adverse effects. In order to improve it, studies have proposed personalized screening strategies based on woman's individual breast cancer (BC) risk. There is, therefore, a need to create individual risk prediction models through the analysis of large population-based databases. We developed a model that could be used to classify women targeted for mammography screening according to individual BC risk.

Methods: We conducted a retrospective cohort study of 57,411 women screened in 4 counties of BreastScreen Norway between 2007 and 2019,

and followed up until 2022. We used partly conditional Cox regression to estimate the adjusted hazard ratios (aHR) and the 95% confidence intervals (95%CI) for age, breast density, family history of BC, body mass index (BMI), age at menarche, alcohol habit, exercise, pregnancy, hormone replacement therapy (HRT) and benign breast disease (BBD). We calculated the 4-year absolute BC risk estimates, we validated the model using bootstrap resampling by means of the Expected-to-Observed ratio (E/O) and the area under the ROC curve (AUC) and we plotted the effect of each variable in the risk estimation.

Results: Our results showed that all the variables included in the model explained part of the variability in BC risk. The 4-year BC risk varied between 0.22% and 7.43% with a median of 1.10%. The model slightly overestimated the risk with an E/O of 1.10 (95%CI: 1.09–1.11) and the AUC was 62.9% (95%CI: 60.8%–65.2%). Breast density was the variable that had a higher effect in the model.

Conclusion: We developed and validated a risk prediction model to estimate the 4-year risk of BC in women eligible for mammography screening. All the ten variables used were found to significantly explain part of the variability in the BC risk. The model slightly overestimated the risk and had a similar discriminatory power than the usual BC risk prediction models. The model could be used to create individualized screening strategies aimed at improving the risk-benefit balance of mammography screening programs.

	aHR (95%CI)
Age	1.01 (1.00–1.03)
BMI	1.06 (1.04–1.08)
Age at menarche	0.95 (0.91–1.00)
Breast density (VDG)	
1	0.59 (0.51–0.69)
2	Ref.
3	1.37 (1.20–1.56)
4	1.71 (1.33–2.20)
Family history of BC	
No	Ref.
2nd degree	1.17 (0.98–1.41)
1st degree	1.34 (1.10–1.63)
Benign breast disease	
No	Ref.
Self-reported	1.55 (1.31–1.83)
Clinician-reported	1.42 (1.02–1.98)
Alcohol habit/month	
No	0.94 (0.76–1.16)
<6 units	Ref.
6–10 units	1.06 (0.88–1.28)
>10 units	1.14 (0.96–1.36)
Exercise/week	
No	Ref.
<1 h	0.80 (0.67–0.96)
2– 3h	0.83 (0.70–0.97)
>4 h	0.65 (0.51–0.83)
Pregnancy	
No	1.10 (0.88–1.38)
1 o 2	Ref.
>3	0.91 (0.79–1.04)
HRT	
No	Ref.
Yes	1.30 (1.13–1.48)

No conflict of interest.

23 (PB-023) Poster Spotlight

The effect of behavioral graded activity on physical activity level, health-related quality of life, and symptom management in cancer patients and survivors: systematic review and meta-analysis

A. Lahousse[1,2], I. Reynebeau[1], J. Nijs[1,3], D. Beckwée[1,4], C.P. Van Wilgen[1,5], C. Férnandez-de-las-Penas[6], E. Roose[1], L. Leysen[1]. *[1]Vrije Universiteit Brussel, Department of Physiotherapy, Human Physiology and Anatomy, Faculty of Physical Education and Physiotherapy, Brussels, Belgium; [2]Research Foundation, Flanders FWO, Brussels, Belgium; [3]University of Gothenburg, Institute of Neuroscience and Physiology, Gothenburg, Sweden; [4]University of Antwerp, Department of Rehabilitation Sciences and Physiotherapy, Faculty of Medicine and Health Sciences, Wilrijk, Belgium; [5]Transcare, Transdisciplinary Pain Management Centre, Groningen, Netherlands; [6]Universidad Rey Juan Carlos, Department of Physical Therapy Occupational Therapy, Physical Medicine and Rehabilitation, Madrid, Spain*

Background: In past years, behavioral graded activity (BGA) has demonstrated positive effects on debilitating symptoms, physical functioning, and pain in chronic pain populations, and appears foremost in cognitive behavioral therapy or other psychological informed practices (PIP). Up to now, no systematic review has been published about the effect of BGA on different biopsychosocial outcomes within cancer populations. Therefore, this systematic review and meta-analysis determined the effectiveness of PIP with BGA compared to (1) waitlists (WL), (2) usual care (UC), (3) PIP alone, or (4) BGA alone in cancer patients and survivors (CPaS).

Material and methods: PubMed, Web of Science, and Embase were systematically screened for randomized controlled trials encompassing BGA (e.g., graded activity, graded exercise, operant conditioning) and PIP (e.g., acceptance commitment therapy, behavior strategies, cognition therapy, cognitive behavioral therapy) in CPaS. Effect sizes were inventoried for outcomes regarding physical activity, quality of life (QoL), and debilitating symptoms. The quality of the evidence was classified by the GRADE approach. Subgroup analyses were undertaken based on the methodological quality and quality of the given BGA to reduce heterogeneity (I^2 > 50%).

Results: Thirty-three studies were found eligible (n = 4,330). Significant effects of PIP+BGA comparing to WL were found for anxiety (SMD:−1.29 [−1.71;−0.86], I^2 = 0%), fatigue (SMD:−0.86[−1.18;−0.54], I^2 = 61%), depression (SMD:−0.79[−1.10;−0.48], I^2 = 0%), functional impairment (SMD:−0.72[−0.95;−0.50], I^2 = 0%), psychological distress (SMD:−0.58 [−0.82;−0.34], I^2 = 51%), physical activity (self-reported SMD:−0.58[−0.84; −0.32], I^2 = 47% and objectively measured SMD:−0.51[−0.90;−0.13], I^2 = 0%), QoL (SMD:−0.38[−0.68;−0.09], I^2 = 51%), social impairment (SMD: −0.33[−0.58;−0.08], I^2 = 0%) and only the psychological distress (SMD: −0.89[−1.76;−0.02], I^2 = 82%) remained significantly after 1 to 3 months. When comparing PIP+BGA to UC, significant effects were found for anxiety (SMD:−0.47[−0.88;−0.06], I^2 = 83%), depression (SMD:−0.46[−0.84; −0.09], I^2 = 82%), fatigue (SMD:−0.35[−0.51;−0.20], I^2 = 48%), and physical activity (SMD:−0.26[−0.41;−0.11], I^2 = 44%). After 1 to 3 months, anxiety (SMD:−1.54[−2.88;−0.21], I^2 = 87%), depression (SMD:−1.43[−2.46; −0.39], I^2 = 89%) and fatigue (SMD:−0.34[−0.58;−0.10], I^2 = 47%) remained significantly. These significant effects were not observed in the meta-analyses of studies comparing PIP+BGA to BGA or PIP alone.

Conclusions: PIP with BGA had a favorable effect on debilitating symptoms, physical activity, and QoL in CPaS when compared to no interventions and usual care. However, further research is needed on 'how' and 'when' BGA should be provided in cancer rehabilitation.

No conflict of interest.

25 (PB-025) Poster Spotlight

Impact of pre-existing cardiometabolic diseases on cancer stage at diagnosis in the EPIC study

A. Jansana[1], V. Viallon[2], C. Biessy[2], E. Fontvieille[2], A. Auguste[3], M. Kvaskoff[3], P. Ferrari[2], H. Freisling[2], EPIC collaborators. *[1]Postdoctoral Researcher, Nutrition and Metabolism Branch NME, International Agency for Research on Cancer IARC, Lyon, France; [2]International Agency for Research on Cancer IARC, Nutrition and Metabolism Branch, Lyon, France; [3]Institut Gustave Roussy, Exposome, Heredity, Cancer and Health, Paris, France*

Background: Evidence suggests that participation in cancer screening may be lower among individuals with type 2 diabetes (T2D) or cardiovascular diseases (CVD) diagnosed prior to cancer compared to individuals with cancer without cardiometabolic diseases. Therefore, cardiometabolic diseases may lead to late cancer detection and advanced stage at diagnosis. This study aimed to investigate whether pre-existing cardiometabolic diseases are associated with stage at cancer diagnosis.

Material and methods: Within the European Prospective Investigation into Cancer and Nutrition cohort (EPIC), incident localised and metastatic cancers were diagnosed between 1992 and 2012. Participants with incident diagnosis of cardiometabolic diseases, including CVD and T2D, prior to cancer were identified. Multi-variable adjusted logistic regression was used to estimate odds-ratios (OR) and 95% confidence intervals (CI) of diagnosis of metastatic cancer according to the presence of CVD, T2D, both or no cardiometabolic disease among EPIC participants diagnosed with cancer. Analyses were carried out for all cancers combined and separately for screened cancers (breast and colorectal cancer) and non-screened cancers

(all cancers except breast and colorectal cancer) based on the availability of population-based cancer screening programs in Europe.

Results: Of the 11,945 incident cancers,4.8% were diagnosed with CVD, 7.1% with T2D and 1.3% were diagnosed with both CVD and T2D. When we excluded screenable cancer sites from our sample, we observed that individuals with T2D more likely to be diagnosed with metastatic cancer at diagnosis compared to individuals with neither T2D nor CVD (OR 1.26, 95% CI 1.04–1.55).

Conclusions: These findings suggest an increased risk of advanced tumour stage at diagnosis, particularly for non-screenable cancers, among individuals with pre-existing T2D. The results underline the importance of encouraging participation of the eligible population in screening programmes by healthcare professionals and pay special attention to individuals with pre-existing cardiometabolic diseases.

Table 1: Association of pre-existing cardiometabolic comorbidities and cancer stage at diagnosis

	N (localized)	N (metastatic)	OR	95% CI
Screened cancers				
Breast cancer (N = 2823)				
No comorbidities	1824	806		ref
CVD	41	12	0.71	(0.35–1.41)
T2D	90	41	0.88	(0.59–1.33)
T2D & CVD	5	4	1.15	(0.68–2.52)
Colorectal cancer (N = 1722)				
No comorbidities	793	688		ref
CVD	45	33	0.69	(0.42–1.13)
T2D	74	59	0.93	(0.63–1.38)
T2D & CVD	20	10	0.68	(0.29–1.59)
Non-screened cancers (N = 7400)				
No CM comorbidities	243	565		ref
CVD	30	65	1.07	(0.85–1.34)
T2D	26	41	1.26	(1.04–1.55)
T2D & CVD	4	16	1.18	(0.78–1.78)

No conflict of interest.

POSTER SESSION **16 November 2022**

Follow up

30 (PB-030) Poster

Oncophone20 study: Patients' perception of telemedicine in the COVID-19 pandemic during follow-up visits for gynecological and breast cancers

E. Picardo[1], M.G. Bau[2], A. Mondino[1], A. Surace[3], F. Gallo[4], C. Anatrone[1], S. Danese[1], M. Mitideri[1]. *[1]AOU Città della Salute e della Scienza di Torino, Breast Unit, Torino, Italy; [2]AOU Città della Salute e della Scienza di Torino, Breast Unit, Turin, Italy; [3]University of Turin, Surgical Sciences, Torino, Italy; [4]Local Health Authority 1, Epidemiology Unit- Health Direction, Cuneo, Italy*

Objective: To analyze oncological patients' perception of telemedicine during theCOVID-19 pandemic.

Methods: A total of 345 women, of whom 267 experienced breast cancer and 78 experienced a gynecological cancer, were enrolled. Specific questionnaires about their experiences and feelings about telemedicine in the COVID-19 era were collected.

Results: In the breast group, "enhanced care" showed moderate positive perception (mean 4.40) among less-educated women that was slightly lower among better-educated women (mean 4.14) with a significant difference (P = 0.034). "satisfaction" had an opposite pattern: a mean of 3.99 for a lower level of education and 4.78 for a higher level of education, with a strong significant difference (P < 0.001). "privacy and discomfort" approached neutrality for less-educated women, while for higher-educated women the lower mean of 2.93 indicted a more positive perception (P = 0.007). In the pelvic group, younger women had a better perception towards telemedicine for "telemedicine as a substitution" (mean 3.68) compared to older women (mean 3.05). The privacy and discomfort subscale was in favor of better-educated women (mean 2.57) compared to less-educated women (mean 3.28; P = 0.042).

Conclusion: Telemedicine was generally well accepted, not only among younger and higher-educated women but also by women needing intensive care, in both cancer groups.

No conflict of interest.

31 (PB-031) Poster

Routine and interval detection of locoregional breast cancer recurrences and risk of subsequent distant metastasis: a population-based study

A. Eijkelboom[1], L. de Munck[1], M. de Vries[2], A.B. Francken[3], M. Hendriks[4], L. Strobbe[5], A. Witteveen[6], M. van Maaren[1], S. Siesling[1]. *[1]Netherlands comprehensive cancer organisation IKNL, Department of Research and Development, Utrecht, Netherlands; [2]University of Twente, Department of Health Technology and Services Research- Technical Medical Centre, Enschede, Netherlands; [3]Isala Clinics, Department of Surgical Oncology, Zwolle, Netherlands; [4]Northwest Clinics, Department of Medical Oncology, Alkmaar, Netherlands; [5]Canisius Wilhelmina Hospital, Department of Surgical Oncology, Nijmegen, Netherlands; [6]University of Twente, Department of Biomedical Signals and Systems- Technical Medical Centre, Enschede, Netherlands*

Background: The benefits of routine visits, i.e. planned surveillance visits, remain debatable for breast cancer survivors. Therefore, the current study aimed to compare the severity of the locoregional recurrence (LRR) (tumor size, grade, and number of positive lymph nodes) and the subsequent risk of a distant metastasis (DM) between LRRs detected at routine and interval visits.

Methods: Women diagnosed with early breast cancer (T1-3NanyM0) between 2003 and 2008 in one of the 15 participating hospitals, and who developed a LRR as first event after primary treatment, were selected from the Netherlands Cancer Registry (n = 222, cohort A). Chi-squared tests were used to compare the severity of routine- and interval-detected local recurrences (LR) and regional recurrences (RR). Data on the development of subsequent recurrences after a first LRR was available for a subset of patients (n = 127, cohort B). Cohort B was used to calculate cause-specific hazard ratios (HR) and 95% confidence intervals (CI), estimating the association between way of LRR detection and risk of a subsequent DM. Cause-specific HRs take the development of competing events (i.e. death, second primary cancer, or second LRR) into account. Patients were censored at the development of a competing event or at the date of last observation. The analysis was adjusted for size, grade, number of positive lymph nodes, and type of surgery of the primary tumor, and grade and number of positive lymph nodes of the LRR.

Results: A total of 109 patients had a routine-detected LRR (49.1%) and 113 patients had an interval-detected LRR (50.9%). Interval-detected LRs were more often smaller than routine-detected LRs, although not significant (p = 0.06). Tumor grade did not differ between interval-detected LRs and routine-detected LRs (p = 0.84). Tumor grade and number of positive lymph nodes did not differ between interval-detected RRs and routine-detected RRs (p = 0.32, p = 0.67, respectively). In cohort B, median time between diagnosis of the primary tumor and diagnosis of the LRR was 3.8 years (IQR: 2.1–6.3) for routine-LRR patients and 3.3 years (IQR: 2.3–6.0) for interval-LRR patients. Median time from diagnosis of the LRR to a DM, competing event, or last observation was 2.8 years (IQR: 1.2–5.4) for routine-LRR patients and 2.9 years (IQR: 0.9–5.8) for interval-LRR patients. After adjustment, way of detection of the LRR was not associated with the risk of developing a subsequent DM (HR: 1.22; 95% CI: 0.49–3.06).

Conclusions: We found no association between way of detection of the LRR and severity of the LRR or the risk of a subsequent DM. It could therefore be suggested to reduce the number of follow-up visits. However, reduction in the number of surveillance visits should always be done in shared decision with the patient and should be accompanied by self-examination instructions.

No conflict of interest.

33 (PB-033) Poster

Change in Shoulder range of motion, strength and the disabilities of the arm, shoulder, and hand (DASH) within 6 months after breast cancer surgery: A Prospective Observational Study

J. Ryu[1], J. Min[2], S. Yeon[1], J.Y. Kim[3], S.I. Kim[3], S. Park[3], O. Oyama[1], D.H. Park[1], J.Y. Byeon[1], J.Y. Jeon[1]. *[1]Yonsei University, Department of Sport Industry Studies, Seoul, South Korea; [2]Yonsei University Wonju College of Medicine, Department of Convergence Medicine, Wonju, South*

Korea; [3]Yonsei University College of Medicine, Division of Breast Surgery, Department of Surgery, Seoul, South Korea

Background: Within 6 months after surgery, breast cancer patients experience the most frequent and significant shoulder morbidities due to surgery and adjuvant therapy. However, the extent of shoulder impairment, as well as patterns of recovery within 6 months after surgery, is not fully understood. More importantly, variances in shoulder range of motion (ROM) and strength according to the types of surgery are not yet fully understood. Therefore, we aimed to investigate the pattern of recovery shoulder ROM, strength, and the disabilities of the arm, shoulder, and hand (DASH) after breast cancer surgery for up to 6 months.

Material and methods: A total of 70 breast cancer patients were observed seven times from the day before surgery to 6 months post-surgery participants [1st: the day before surgery (baseline), 2nd: Post operate day (POD)1, 3rd: POD7-10 (1st outpatient visit), 4th: POD14-20 (2nd outpatient visit), 5th: POD 21–30 (3rd outpatient visit), 6th: 3 months after surgery (4th outpatient visit), 7th: 6 months after surgery (5th outpatient visit)]. At each observation, we measured shoulder function (ROM and strength in both arms), DASH.

Results: The ROM in the affected side was significantly reduced immediately after surgery and gradually recovered. However, ROM recovered only up to 87% and 89% of pre-surgery levels at 3 months and 6 months after surgery, respectively. On the other hand, the shoulder strength of both affected and unaffected arms was changed regardless of surgery type. The affected side was significantly reduced immediately after surgery and gradually recovered, while the opposite side continually declined over 6 months. In addition, The DASH score was significantly increased after surgery (8.5 ± 13.0 at baseline vs. 36.6 ± 15.5 at POD 10; $p < 0.001$) and gradually declined (13.5 ± 15.0; p between baseline<0.001). When the DASH score was analyzed according to types of surgery, participants who underwent TM showed a tendency to increase their DASH score more rapidly than participants who underwent PM, but there was no interaction between surgery type and time.

Conclusion: These results provide preliminary evidence for understanding the recovery pattern of shoulder function after breast cancer surgery. Our findings suggest that rehabilitation exercises should be implemented in both upper limbs.

No conflict of interest.

34 (PB-034) Poster

The effectiveness of personalised surveillance and aftercare in breast cancer follow-up: a systematic review

M. van Maaren[1], J. van Hoeve[1], J. Poorthuis[2], J. Korevaar[3], C. Drossaert[2], S. Siesling[1]. *[1]Netherlands Comprehensive Cancer Organisation IKNL, Department of Research and Development, Utrecht, Netherlands; [2]University of Twente, Department of Health Technology and Services Research, Technical Medical Centre, Enschede, Netherlands; [3]Netherlands Institute for Health Services Research NIVEL, Department of Research, Utrecht, Netherlands*

Background: Currently, breast cancer follow-up significantly differs among hospitals, varying from one-size-fits-all to more personalised approaches. Before starting a prospective study on the effect of personalised breast cancer follow-up in the Netherlands on cancer worry and cost-effectiveness, we performed a systematic review to get insight in existing evidence on its effectiveness.

Methods: Scopus (including Medline and keywords of Embase) and Cochrane (reviews) were searched for relevant publications between 1 January 2010 and 8 April 2021. The inclusion population consisted of non-metastatic breast cancer patients ≥18 years after completing curative treatment. The search included all synonyms of 'breast cancer', 'personalised', 'follow-up' and 'survivor'. We only included individualised interventions designed for use in the entire period after treatment (except endocrine therapy). Studies investigating short-term dietary, physical interventions or cognitive therapy were therefore excluded. We also excluded studies on diagnostic accuracy or feasibility, patient experiences and studies without a control group. Two reviewers independently screened all publications on title and abstract. In case of doubt, the publication was included. One reviewer extensively reviewed the included publications while consulting the second reviewer in case of doubt.

Results: In total, 2343 publications were obtained from Scopus, and 26 reviews from Cochrane. We included 36 publications for full text analysis. Six studies (al randomised trials) were deemed useful for review. Using the Cochrane risk-of-bias tool, four studies were judged low risk, one high risk and one with concerns. All studies varied in populations, intervention and outcomes. Two studies found improved QoL after patient navigation or individualised follow-up, while one study found no significant differences in both QoL and patient satisfaction. The latter showed a lower number of consultations in the intervention group. One study found that survivorship care plans led to improved survivor knowledge, while another showed that these plans did not lead to changes in number of redundant examinations. One study showed that integration of online questionnaires with remote review facilitated symptom reporting. None of the studies analysed cancer worry or cost-effectiveness. Moreover, none evaluated numbers of recurrences when the number of visits changed and none included information on the organisation of follow-up.

Conclusions: Many studies underlined the need for personalised follow-up, but its effect on cancer worry, follow-up visits, recurrences and cost-effectiveness is still unclear. A prospective study with at least three year follow-up, including both patient-reported and qualitative outcomes, which provides attention to the organisation of follow-up, will provide better insights in its effectiveness.

No conflict of interest.

35 (PB-035) Poster

Factors affecting Quality of Life among breast cancer survivors

A. Fatima[1]. *[1]Shaukat Khanum Cancer Hospital, Surgical Oncology, Lahore, Pakistan*

Backgrounds: Many breast cancer patients experience various levels of distress immediately following the completion of primary treatment. Women who report low levels of quality of life (QOL) early in this phase of transitional survivorship tend to experience diminished long-term adjustment. However, the studies related to QOL of women during the end of primary treatment have been found insufficient. This study aimed to identify determinants of QOL in women with breast cancer immediately following the completion of treatment.

Methods: A cross-sectional study was conducted on 195 disease-free breast cancer patients who had completed therapy in the past 1 month. Functional Assessment of Cancer Therapy-Breast (FACT-B), Memorial Symptom Assessment Scale-Short Form (MSAS-SF), Self-Efficacy Scale for Self-Management of Breast Cancer (SESSM-B), and Interpersonal Support Evaluation List-12 (ISEL-12) scales were used to assess predictors and QOL. The data were analyzed using the Pearson correlation, t-test, ANOVA, and hierarchical multiple regression.

Results: The mean score of QOL for breast cancer survivors was 97.23 (±20.01). Chemotherapy and perceived economic status were significantly associated with QOL in terms of sociodemographic and disease/treatment-related characteristics. Physical and psychological symptoms and social support had a significant association with QOL. The regression analyses showed that physical and psychological symptoms and belonging support were statistically significant in predicting the QOL of breast cancer survivors.

Conclusions: The variables of symptom experience and social support must be acknowledged when improving women's QOL immediately after their completion of primary breast cancer treatment. Greater focus on the reduction of symptom distress and increasing a sense of belonging could improve QOL among breast cancer survivors. We propose conducting a follow-up study to evaluate QOL according to the level of interaction between the treatment regimen and symptom experience in patients with breast cancer immediately after the completion of primary treatment.

No conflict of interest.

36 (PB-036) Poster

Second primary cancer risks for female and male breast cancer survivors in England

I. Allen[1], T. Rahman[2], A. Bacon[3], C. Knott[2], S. Jose[2], S. Vernon[3], H. Hassan[1], C. Huntley[4], L. Loong[4], Y. Walburga[1], K. Lavelle[3], E. Morris[5], S. Hardy[3], B. Torr[4], D. Eccles[6], C. Turnbull[4], M. Tischkowitz[7], P. Pharoah[1], A.C. Antoniou[1]. *[1]University of Cambridge, Department of Public Health and Primary Care, Cambridge, United Kingdom; [2]Health Data Insight CIC, Health Data Insight, Cambridge, United Kingdom; [3]NHS Digital, National Disease Registration Service, Leeds, United Kingdom; [4]Institute of Cancer Research, Division of Genetics and Epidemiology, London, United Kingdom; [5]Big Data Institute, University of Oxford, Nuffield Department of Population Health, Oxford, United Kingdom; [6]University of Southampton, School of Cancer Sciences- Faculty of Medicine, Southampton, United Kingdom; [7]National Institute for Health Research- Cambridge Biomedical Research Centre, University of Cambridge, Department of Medical Genetics, Cambridge, United Kingdom*

Background: Second primary cancer (SPC) incidence is significantly increased following breast cancer (BC) diagnosis, but the magnitudes of these risks remain unclear. We estimated SPC risks following BC separately for males and females based on comprehensive data from linkage of National Cancer Registration and Analysis (NCRAS) and Hospital Episode Statistics (HES) electronic health records in England.

Material and methods: The retrospective cohort contained 873 292 females and 5824 males who were first diagnosed with BC in England between 1995 and 2019, excluding those diagnosed by death certificate only. We calculated overall and site-specific SPC standardised incidence ratios (SIRs) by comparing observed and expected SPC counts among the cohort. The study participants were followed from BC diagnosis until the first of a SPC diagnosis (excluding ipsilateral breast and non-melanoma skin cancers), death, migration, and study end. Follow-up for bladder, breast, colon, ovarian, prostate, rectum or uterine primaries was also censored one year after certain surgeries. Expected SPC counts were calculated using cancer incidence rates in the general English population, accounting for calendar year, cancer site, age, and sex. Observed counts were divided by expected counts to obtain the SIRs. We stratified the SIRs by age group at BC diagnosis, sex, and SPC site.

Results: There were 80 070 and 909 incident SPCs following BC among females and males respectively. There was a significant increase in the risk of all cancers combined following BC in women (SIR: 1.08, 95%CI: 1.07–1.09). The most increased SPC risks were for contralateral breast (SIR: 1.57, 95%CI: 1.55–1.59) and uterine (SIR: 1.56, 95%CI: 1.53–1.60) cancers. However, there was wide variation in SPC risks by age. The risk at all sites combined was higher for women first diagnosed with BC before the age of 50 (SIR: 1.56, 95%CI: 1.53–1.59) compared to women diagnosed with BC aged 50 or over (SIR: 1.02, 95%CI: 1.01–1.03). For women diagnosed under age 50, contralateral breast (SIR: 2.69, 95%CI: 2.62–2.76), uterine (SIR: 1.58, 95%CI: 1.48–1.68) and ovarian (SIR: 1.57, 95%CI: 1.45–1.68) cancer risks were the most elevated. Men diagnosed with BC were at increased risk of SPCs at all sites combined (SIR: 1.12, 95%CI: 1.05–1.19). There were increased risks of contralateral BC (SIR: 42.47, 95%CI: 29.58–59.06) and prostate cancer (SIR: 1.40, 95%CI: 1.25–1.56).

Conclusions: This is the largest study to date to assess SPC risks following BC in either men or women. Both males and females were at significantly increased risk of SPCs following BC, both in combination and at specific sites. These findings could help guide clinical management after BC diagnoses. Further analysis is underway to look at the effects of chemotherapy, radiotherapy, hormonal therapy, comorbidities, or BC germline susceptibility on SPC risks.

No conflict of interest.

37 (PB-037) Poster

Effect of nodal status before and after neoadjuvant chemotherapy on prognosis in breast cancer: a Dutch population-based study

S. De Wild[1,2], L. Koppert[3], M.J. Vrancken Peeters[4,5], S. Siesling[6,7], M. Smidt[1,2], J. Simons[8]. *[1]Maastricht University Medical Centre+, Department of Surgery, Maastricht, Netherlands; [2]GROW, School for Oncology and Reproduction, Maastricht, Netherlands; [3]Erasmus Medical Centre, Department of Surgery, Rotterdam, Netherlands; [4]Netherlands Cancer Institute, Department of Surgery, Amsterdam, Netherlands; [5]Amsterdam University Medical Centre, Department of Surgery, Amsterdam, Netherlands; [6]Technical Medical Centre- University of Twente, Department of Health Technology and Services Research, Enschede, Netherlands; [7]Netherlands Comprehensive Cancer Organisation IKNL, Department of Research and Development, Utrecht, Netherlands; [8]Erasmus Medical Centre, Department of Radiotherapy, Rotterdam, Netherlands*

Background: Neoadjuvant chemotherapy (NAC) is increasingly applied in breast cancer. NAC can downstage the nodal status, and can even result in a pathological complete response (pCR, ypN0). Since nodal status is an important prognostic factor, this challenges staging and treatment strategies. This Dutch population-based study was conducted to determine the prognostic effect of nodal status before and after NAC.

Materials and methods: Women with invasive breast cancer, no distant metastases, and treated with NAC and surgery of the breast and axilla, were selected from the Netherlands Cancer Registry if diagnosed between January 1, 2005, and December 31, 2019. They were assigned to one of three groups based on nodal status before NAC: node negative (cN0), node positive (cN+) based on sentinel lymph node biopsy (SLNB), or cN+ based on biopsy (i.e., fine needle aspiration or core needle biopsy). We performed Kaplan-Meier survival analyses to assess 5-year overall survival (OS) for each group, taking into account nodal status after NAC (i.e., ypN-status), and the log rank-test to compare the outcomes.

Results: A total of 22.298 patients were included. Median follow-up was 5.2 years [IQR 3.3–7.9]. The cN+(biopsy)-group (N = 11.851) had a statistically significant worse 5-year OS (81.5%, 95%-CI 80.7–82.2) compared to the cN0-group (N = 9.073, 93.2%, 95%-CI 92.6–93.7, $p < 0.0001$) and cN+(SLNB)-group (N = 1.374, 92.6%, 95%-CI 91.1–93.9, $p < 0.0001$). Within each group, nodal residual disease after NAC (i.e., ypN+) resulted in a statistically significant worse OS compared to ypN0, as presented in Table 1. The cN+(biopsy)/ypN0-subgroup had a statistically significant worse 5-year OS (89.7%, 95%-CI 88.7–90.7) compared to the cN0/ypN0-subgroup (94.5%, 95%-CI 93.9–95.0, $p < 0.0001$) and cN+(SLNB)/ypN0-subgroup (96.3%, 95%-CI 92.7–98.1, $p < 0.003$).

Table 1: Five-year OS per cN/ypN-subgroup

	5-year OS [95%-CI]	ypN0 vs ypN+, *p*-value*
cN0 (N = 9.073[#])	94.5 [93.9–95.0]	
ypN0 (N = 7.800[$])	85.5 [83.2–87.5]	<0.0001
ypN+ (N = 1.273)		
cN+(SLNB) (N = 699[#])	96.3 [92.7–98.1]	
ypN0 (N = 215)	89.1 [85.9–91.6]	0.003
ypN+ (N = 484)		
cN+(biopsy) (N = 11.851)		
ypN0 (N = 4.335)	89.7 [88.7–90.7]	<0.0001
ypN+ (N = 7.516)	76.9 [75.9–77.9]	

CI, confidence interval; N, number of patients
[#]If no axillary surgery was performed after NAC, patients were excluded from the ypN-analyses.
[$]As an exception, patients with cN0 breast cancer based on a negative SLNB before NAC were included in the ypN0 subgroup
**Log rank-test, p-value <0.05 was considered statistically significant*

Conclusion: In this study, residual nodal disease after NAC had a statistically significant negative effect on OS in both cN0 and cN+ breast cancer.

No conflict of interest.

POSTER SESSION **16 November 2022**

Local Regional Treatment - Surgery

38 (PB-038) Poster

Breast cancer axillary dissection a "lost procedure, sometimes still necessary…" how to prevent the lost of a surgical technique using cadaver body and Simlife

M.G. Bau'[1], S. Gemmiti[2], M. Carosso[2], C. Breque[3], J.P. Richer[3], M. Mitideri[4], A. Surace[5], E. Picardo[4], C. De Sanctis[1], M.P. Mano[6], A. Mondino[1], J.P. Faure[3], A. Vercelli[7]. *[1]A.O. Città della Salute e della Scienza di Torino, Breast Unit, Turin, Italy; [2]University of Turin, Obstetrics and gynaecology, Turin, Italy; [3]University of Poitiers, Surgery, Poitiers, France; [4]A.O. Città della Salute e della Scienza di Torino, Obstetrics and gynaecology, Turin, Italy; [5]Ospedale of Verduno, Gynaecology, Verduno, Italy; [6]University of Turin, Epidemiology, Turin, Italy; [7]University of Turin, Anatomic Science, Turin, Italy*

Background: Sentinel lymphonodal biopsy (SLB) is nowadays regarded has a standard procedure in breast cancer surgical treatment. Moreover some authors are investigating the option to omit SLB in tumor less than two cm. On the other hand axillary dissection has become a "rare" indication for breast cancer surgery, thus decreasing surgeon performance and the possibility of learning this procedure among young surgeons. To utilize cadaver body for learning is a valuable tool for surgery competence acquisition. Sim- life is a patented device helping cadaver body utilization for learning process.

Material and methods: We analyze the ideal steps to learn axillary dissection, for young breast cancer surgeon throughout an individual experience of a trainee. The doctor attended the fourth year specialization school in Gynecology, with a dedicated time (8 months) at the breast cancer treatment at the University of Turin (Breast cancer Unit around 1000 cases per yr). The learning process developed throughout five steps for eight months duration: the first at the master of senology helping teacher in preparing anatomical lesson. The second as assistant in 20 surgical breast cancer procedures. The third as first operator in 20 breast cancer surgical procedures including SLB and starting with treating the axilla (axillary dissection) in a gradual manner. The fourth phase included a cadaver-lab course at University center of Poitier together with the senior tutor for two

days, utilizing Sim- life patented device (revitalized cadaver system) and performing 4 complete axillary dissections (both sides per cadaver). In the fifth step the trainee performed two axillary dissections on patients under senior tutor assistance. The trainee had to fill a form developed to describe time of different surgical procedures, surgical difficulties and competences acquisition.

Results: Both timing criteria and surgical items increases during the training period of 8 months with a decrease in time performing SLB of 50% ($p = 0.005$) and increase of more than 80% ($p = 0.04$) in competence acquisition in identifying anatomical structures during axillary dissection procedure in a statistically significant manner. Trainee self- confidence was also increased together with satisfaction even from a psychological point of view (data registered with a questionnaire).

Conclusions: Programmed learning/tutoring process through pre-defined steps, in association with cadaver-lab, Sim-life device and hands-on practice improve surgical competences acquisition permitting practice also surgery that nowadays remains necessary, even though more rarely than in the past according to clinical indications, such as axillary dissection.

No conflict of interest.

39 (PB-039) Poster

Oncologic outcome of Immediate Breast Reconstruction after mastectomy in breast cancer patients: A Systematic reviews and Meta-Analysis

H.Y. Kim[1], J. Chang Wan[2]. [1]*Pusan National University- Yangsan Hospital, Department of Surgery, Yangsan-si, South Korea;* [2]*Good Gang-an hospital, Chief of Breast Center, Busan-si, Republic of Korea*

Background: We performed a comprehensive systematic review of the literature and a meta-analysis of the oncologic outcome of immediate breast reconstruction (IBR) after mastectomy and mastectomy only. The aim of this study was to analyse the impact of IBR on the prognosis of patients with breast cancer.

Material and Methods: A systematic search of MEDLINE and EMBASE was performed using the key words of breast cancer, mastectomy, IBR. Inclusion criteria was studies reporting survival data of patients after mastectomy only and mastectomy with IBR.

Event-free survival (EFS), Breast cancer specific survival (BCSS) and overall survival (OS) were considered markers of oncologic outcome. The impact of IBR on survival was measured by the effect size of hazard ratio (HR). Data from each study were analysed using Review Manager.

Results: Sixteen studies with 22833 cases of IBR and 60266 cases of mastectomy were included this study. The pooled HR for EFS was 0.83 (95% confidence interval [CI]; 0.63–1.09, $p = 0.18$). Patients who underwent IBR after mastectomy had similar EFS. Furthermore, patients receiving IBR had better BCSS (HR = 0.68; 95% CI : 0.61 to 0.76, $p < 0.001$) and OS (HR = 0.68; 95% CI : 0.57 to 0.80, $p < 0.001$) as those of mastectomy only patients.

Conclusion: There data provided that IBR after mastectomy has a similar EFS and better BCSS, OS than mastectomy only, Our meta-analysis suggested IBR is a feasible and safe treatment option for patients with breast cancer

No conflict of interest.

40 (PB-040) Poster

Mesh-Pocket Supported Prepectoral Direct-to-Implant Breast Reconstruction: Preliminary Results of a Prospective Analysis

S. Paepke[1], E. Klein[1], A. Andrulat[2], C. Ankel[3], L. Bauer[4], A. Faridi[5], V. Fink[6], C. Gerber-Schäfer[7], D. Gschwantler-Kaulich[8], J. Heil[9], S. Kümmel[10], R. Ohlinger[11], M. Thill[12]. [1]*Klinikum rechts der Isar, Technical University of Munich, Department of Gynecology and Obstetrics, Munich, Germany;* [2]*Rotkreuz Klinikum Munich, Department of Gynecology, Munich, Germany;* [3]*DRK Hospitals Berlin Westend, Senology, Berlin, Germany;* [4]*GRN Klinikum Weinheim, Department of Gynecology and Obstetrics, Weinheim, Germany;* [5]*University hospital Bonn, Department of Gynecology, Bonn, Germany;* [6]*University hospital Ulm, Department of Gynocology, Ulm, Germany;* [7]*Vivantes hospital am Urban, Department of Gynecology, Berlin, Germany;* [8]*University hospital of Vienna, Department of Gynecology, Vienna, Austria;* [9]*University hospital of Heidelberg, Department of Gynecology and Obstetrics, Heidelberg, Germany;* [10]*Evang. Kliniken Essen-Mitte, Breast Centre- Senology, Essen, Germany;* [11]*University hospital Greifswald, Department of gynecology and obstetrics, Greifswald, Germany;* [12]*Agaplesion Markus Hospital, Department of Gynecology and gynecologic oncology, Frankfurt, Germany*

Background: Safety and breast aesthetics of direct-to-implant techniques are well recognized. Pre-pectoral techniques add a new dimension supported by the next generation of titanized mesh-pockets.

Material and Method: A prospective international, multicentre observational investigation (PRO-Pocket-Trial CLINICALTRIALS.GOV NCT03868514 and DRKS00016673) is performed in 12 clinical centres in Germany and Austria to obtain data regarding patient reported outcome, cosmetic outcome and complications after TiLOOP® Bra Pocket supported prepectoral breast reconstruction up to the 24 months Follow-Up.

Results: From 06/2019 until 02/2021, 313 patients with TiLOOP® Bra Pocket supported breast reconstructions were included. Age of the patients was between 23 and 80 years. The mean of the BMI was 24.5 ± 4.5 kg/m^2. The most frequent indication for surgery was invasive ductal carcinoma followed by increased breast cancer risk. Unilateral surgery was performed in about 40%. The most frequent incision technique was an inframammary incision followed by inverted T-technique and hockey stick incision. About 70% of the breast implants were of anatomic shape; textured surface was also reported in about 75% of the reconstructions. None of the reported complications was unexpected; currently, 1 dysesthesia, 6 wound healing disturbances, 11 hematomas, 4 capsular fibrosis, 5 infections, 6 necrosis, and 15 seromas are documented.

Discussion: Use of TiLOOP® Bra Pocket enables a new standard of pre-pectoral reconstructive techniques preserving the natural anatomy, thereby avoiding adverse effects associated with submuscular reconstruction, minimizing postoperative pain, risk of bleeding and the lack of animation deformity like “jumping breast phenomenon.” Pocket-supported reconstructive techniques become more valuable in times of changing to implants with smooth surface due to the excellent stabilization of implant position.

Conflict of interest:
Advisory Board:
Stefan Paepke: board member pfm medical AG
Sherko Kümmel: Member of advsiory Board (past 36 months):Novartis, Roche pharma, Genomic Health, Pfizer,Lilly, Amgen, MSD, pfm medical, Celgene, Astra Zeneca, Daiichi Sankyo, Somatex, Sonoscape,Seagen, Exact Science, Gilead as well as honoraria for presentations
Ralf Ohlinger: member of advisory board: pfm medical AG
Marc Thill: member of advisory board pfm medial AG
Corporate-sponsored Research:
Christine Ankel: honoraria for lecture and or consulting as well as travel reimbursements from pfm medical
Andree Faridi: honoraria for workshops from pfm medical AG, Cologne and DZIG, Berlin

41 (PB-041) Poster

Underestimated risk of involved margins in Skin (SMM)- and Nipple Sparing Mastectomies (NSM) – Data and Multimodal Approach for Improvement

S. Paepke[1], A. Andrulat[2], C. Ankel[3], L. Bauer[4], K. Baumann[5], J.U. Blohmer[6], A. Faridi[7], V. Fink[8], C. Gerber-Schäfer[9], D. Gschwantler-Kaulich[10], J. Heil[11], S. Kümmel[12], C. Mau[13], A. Kossmann-Meiré[14], R. Ohlinger[15], M. Thill[16]. [1]*Klinikum rechts der Isar, Technical University of Munich, Department of Gynecology and Obstetrics- Senology, Munich, Germany;* [2]*Rotkreuz Klinikum, Department of Gynecology- Senology, Munich, Germany;* [3]*DRK Kliniken Berlin Westend, Breast centre, Berlin, Germany;* [4]*GRN Klinikum Weinheim, Gyneoclogy and obstetrics, Weinheim, Germany;* [5]*University hospital Schleswig Holstein, Breast Centre, Lübeck, Germany;* [6]*Charité, Department of Gynecology with Breast centre, Berlin, Germany;* [7]*University hospital Bonn, Department of Senolgy, Bonn, Germany;* [8]*University hospital Ulm, Breast Centre, Ulm, Germany;* [9]*Vivantes hospital Urban Berlin, Department of Gynecology, Berlin, Germany;* [10]*University hospital Vienna, Department of Gynaecology and gynaecological oncology, Vienna, Austria;* [11]*University Hospital Heidelberg, Department of Gynecology and gynecologic oncology, Heidelberg, Germany;* [12]*Evang. Hospital Essen-Mitte, Breast Centre, Essen, Germany;* [13]*Helios hospital Berlin, Senology, Berlin, Germany;* [14]*St. Elisabeth hospital, Breast centre, Cologne, Germany;* [15]*University hospital Greifswald, Department of gynecology- senology, Greifswald, Germany;* [16]*Agaplesion Markus Hospital, Department of gynecology and gynecologic oncology, Frankfurt, Germany*

Background: SSM and NSM with immediate implant reconstruction with synthetic mesh support is well established in clinical routine and recommended since 2011. As well as in breast conserving surgery involved margins in SSM and NSM demanding on revision surgery have a remarkable burden for patients and health economics.

Material and Method: Data from 2 prospective international, multicentre observational trials (PRO-Bra-Trial (2013–2017) clinicaltrials.gov:

NCT01885572, DRKS00005342; PRO-Pocket-Trial (2017–2020) clinicaltrials.gov: NCT03868514, DRKS00016673) were performed in eight and 12 clinical centres, respectively, in Germany and Austria to obtain data regarding patient reported and cosmetic outcome as well as complications. Rates of involved margins were analysed.

Results: In the PRO-Bra trial with subpectoral implant placement; the R1-rate of 362 breasts (269 patients) was 12,4% (n = 45). In the PRO-Pocket trial with pre-pectoral implant placement, the R1-rate in 436 breasts (311 patients) was 3,9% (n = 16).

Discussion: Although the rate of involved margins is remarkably decreased over time with anatomically guided gland resection; the burden of revision surgery remains high and new techniques for margin assessment have to be implemented also in patients with subcutaneous mastectomies. First of all intraoperative resection guidance with ultrahigh frequent sonography (high frequency transducer, 18–22 MHz; Aplio i700 prism, Canon, Japan) and intraoperative margin MRI-assessment (ClearCoast, Clear Cut Medical, Tel Aviv, Israel) will be implemented – we will report the technique and early results.

Conflict of interest:
Advisory Board:
Stefan Paepke: member of advisory board pfm medical AG
Ralf Ohlinger: member of advisory board: pfm medical AG
Marc Thill: member of advisory board: Amgen, AstraZeneca, Aurikamed, Becton/Dickinson, Biom' Up, Celgene, ClearCut, Clovis, Daiichi Sankyo, Eisai, Exact Sciences, Gilead Science, Lilly, MSD, Norgine, Neodynamics, Novartis, Onkowissen, Pfizer, pfm Medical, Pierre-Fabre, Roche, RTI Surgical, Seagen, Sysmex
Sherko Kümmel: Member of advsiory Board (past 36 months):Novartis, Roche pharma, Genomic Health, Pfizer,Lilly, Amgen, MSD, pfm medical, Celgene, Astra Zeneca, Daiichi Sankyo, Somatex, Sonoscape, Seagen, Exact Science, Gilead as well as honoraria for presentations
Corporate-sponsored Research:
Andree Faridi: Honoraria for workshops by pfm medical AG, Cologne und DZIG, Berlin
Christine Ankel: received honoraria for lecture and or consulting as well as travel reimbursements from pfm medical
Christine Mau: honoraria for presentations from Lilly, Roche, MVZ München, Pfizer

42 (PB-042) Poster

Comparison of Technetium (Tc)- and SPIO-guided Sentinel Lymph Node Biopsy (SLNB) in Patients with Neoadjuvant Chemotherapy in Early Breast Cancer – first retrospective data

B. Munawwar[1], E. Klein[1], G.P. Schmidt[1], L. Rief[1], F. Heinemann[1], M. Kiechle[1], S. Paepke[1]. *[1]Klinikum rechts der Isar, Technical University of Munich, Department of gynecology and obstetrics, Munich, Germany*

Background: Super-paramagnetic iron oxide particle (SPIO)-techniques are reasonable alternatives to Technetium-(Tc)-localization of SLNB/TAD in early breast cancer with a similar detection rate but superiority in logistics. These results have to be confirmed in a neoadjuvant setting (PST).

Material and Method: SLNB with 1 ml SPIO (Magtrace®, MT) was implemented into clinical routine at our site beside Tc-localization. A retrospective analysis was done in 55 (29 MT/26 Tc) patients treated with PST, with breast conserving surgery (BCS) 42 (18 MT/24 Tc), mastectomy (M) 6 (5 MT/1 Tc) or nipple-sparing mastectomy (NSM) in 7 patients (6 MT/1 Tc). Data focused on patient demographics, indication, feasibility and detection rate. Tc was injected subcutaneously and MT peri-/intratumoral (BCS) or periareolar (M/NSM) about 15 mm depth under the skin – in general > 24 h before surgery.

Results: Age of the patients was 24–80 years. SLN-detection rate was 96.6% for MT and 85.2% for Tc. Number of removed lymph nodes was for MT in median 2 (min.1, max.9); for Tc in median 3 (min.1, max.13). Staining is reported 6 of 29 patients (no severe staining using injection techniques not directly subcutaneously).

Conclusions: SPIO-guided SLNB was easy to handle; successful independent on PST and TAD. MT is well established in clinical routine as an alternative to Tc- and ICG-procedures and implemented in the AXSANA-Registry of EUBREAST. Our analysis provides further evidence that the SPIO-technique is non-inferior to Tc and can be performed easily and safely independent from nuclear medicine units, avoiding radiation exposure. The use of SPIO in a PST-setting is simplifies the coordination and logistics of patients' treatment. Additionally, MT allows dual marking by providing a magnetic signal and visual orientation by staining.

Conflict of interest:
Ownership:
Marion Kiechle: shareholder Therawis
Advisory Board: Stefan Paepke: board member pfm medical AG

43 (PB-043) Poster

Use of Arista™ AH Absorbable Hemostat in breast surgery – analysis of seroma volumes and duration of drainage

E. Klein[1], V. Beckert[1], G.P. Schmidt[1], M. Kiechle[1], S. Paepke[1]. *[1]Klinikum rechts der Isar, Technical University of Munich, Department of gynecology and obstetrics, Munich, Germany*

Background: Novel hemostatic agents such as Arista™ AH have been widely adopted in surgical procedures as the application is easy and direct to the bleeding site. Microporous polysaccharide hemospheres are a powder hemostat made from purified plant starch.

Material and Method: In our monocentric retrospective evaluation we analysed the application of Arista™ AH (1–5 g) in 114 patients (pts.) receiving breast surgery. The evaluation period was from 10/20 until 10/21.

The groups were analysed using the t-test for independent samples and Levene's Test of equality of variances.

Results: Mean age was 63 years. 55 patients received Arista™ AH and 59 did not receive the powder hemostat. When analysing the type of operation, results are as follows: 79 breast conserving surgeries (BCS) with 32 patients with Arista™ AH and 47 patients without. 35 modified radical mastectomies (MRM) with 23 with Arista™ AH vs. 12 without.

Seroma/Drainage volumes and drainage duration was analysed for the total cohort and separately for the type of operation.

In BCS drainage volumes were significantly lower in the Arista™ AH group than in the non hemostat group (median 132 ml vs. median 226 ml; p = 0.037, 95% CI: −182.02, −5.85). Also drainage duration was shorter in the BCS Arista™ AH group than in the non hemostat group (median 2.31 days vs. median 3.4 days; p = 0.001, 95% CI: −1.7, −0.48).

In the MRM drainage volumes were significantly lower in the Arista™ AH group than in the non hemostat group (median 239 ml vs. median 485 ml; p = 0.002, 95% CI: −394.57, −95.9). When analysing the drainage duration in the MRM statistical significance was not reached (median 3.3 days vs. median 4.42 days; p = 0.056, 95% CI: −2.25, 0.03).

Conclusion: Using MPH hemostatic powder for post-procedural hemostasis in breast surgery showed a significant reduction of seroma volumes and shorter drainage duration.

Conflict of interest:
Ownership:
Marion Kiechle is shareholder of Therawis

44 (PB-044) Poster

A multicenter cohort of breast cancer patients with long-term 125I targeted axillary dissection

F. Munck[1], I. Andersen[2], I. Vejborg[3], M. Gerlach[4], C. Lanng[1], N. Kroman[1], T. Tvedskov[1]. *[1]Herlev-Gentofte Hospital, Department of Breast Surgery, Hellerup, Denmark; [2]Viborg Regional Hospital, Department of Breast Surgery, Viborg, Denmark; [3]Herlev-Gentofte Hospital, Department of Breast Examinations, Hellerup, Denmark; [4]Herlev-Gentofte Hospital, Department of Pathology, Herlev, Denmark*

Background: Targeted axillary dissection (TAD) is increasingly used for axillary staging in breast cancer. In TAD, the metastatic lymph node is marked before neoadjuvant chemotherapy (NACT). In case of axillary pCR (pathological complete response) in the marked lymph node (MLN) and sentinel node, axillary dissection can safely be omitted as this will not benefit the patient. Several marking methods for TAD exist, most using re-marking before surgery. Feasibility, learning curve, and identification rate (IR) varies. Marking with ^{125}I seed before NACT makes re-marking at surgery redundant, possibly increasing feasibility and IR. We evaluate TAD with ^{125}I seed in a Danish multicenter cohort.

Methods: Patients staged with ^{125}I TAD in Denmark between 1.1.2016–31.08.2021 were included. Patients were identified in radioactivity-emitting implant registries at the Departments of Radiology and from the Danish Breast Cancer Group database. Data were extracted from patients' medical records and stored in a REDCap database. Exclusion criteria was a history of ipsilateral invasive disease or axillary surgery, less than four cycles of NACT or no attempt at TAD. Histo-/cytopathological confirmation of lymph node involvement before NACT was mandatory. Information on age, treatment year, histological diagnosis, receptor status, number and size of suspicious axillary lymph nodes, time interval between marking and surgery, ^{125}I seed batch and activity, neoadjuvant regimen, success rate of surgical removal

and complications associated with removal, number of SNs removed and whether the MLN was an SNs was registered. Histopathological status of MLN and SN and whether ALND was performed was registered as well. Data was analyzed with R statistical software. Primary outcome was identification rate of MLN at surgery and secondary outcome was feasibility of the procedure and rate of axillary pCR.

Results: In total, 187 patients were identified. After exclusion, 142 patients were eligible for analysis. In one patient, it was uncertain whether the MLN was found because only fibrotic tissue remained at the iodine seed site. This resulted in an IR of 99.3%. Minor challenges in marking and removal of the MLN were noted in only three patients. In 66.2% of the patients, the MLN was also a sentinel node. Overall, 43.0% had axillary pCR.

Conclusion: TAD with ^{125}I seed marking before NACT is an easy and feasible procedure without re-marking at surgery, resulting in a high IR with few difficulties at surgery, and might outperform other marking methods. Staging with TAD can spare nearly half of breast cancer patients an axillary dissection after NACT.

No conflict of interest.

45 (PB-045) Poster

MINIVAB trial: Minimally invasive breast cancer excision using vacuum assisted biopsy under ultrasound guidance

W. Sanderink[1], R. Mann[1,2], MINIVAB study team. *[1]Radboud University Medical Center, Medical Imaging, Nijmegen, Netherlands; [2]Netherlands Cancer Institute, Radiology, Amsterdam, Netherlands*

Background: In this abstract we present the design of the MINIVAB trial, which aims to assess whether it is feasible to remove small breast cancers completely using vacuum assisted biopsy (VAB) under ultrasound (US) guidance.

Material and Methods: Women with non-lobular invasive carcinomas ≤15 mm in diameter based upon US and MRI measurements, and without mammographic or MRI evidence of more extensive disease (e.g. micro-calcifications, extensive architectural distortion, or non-mass enhancement) will be asked to participate. The tumor will be removed under local anesthesia using the VAB system (also called a vacuum assisted excision, VAE) with US guidance, through a small skin incision (<0.5 cm). A localization marker will be placed in the biopsy cavity, to help determine the cavity location. After 3 weeks, breast conserving surgery is performed, excising the VAE cavity and a ≥1 cm of surrounding tissue, as deemed appropriate by the attending breast surgeon. A sentinel node biopsy will be performed in the same surgical procedure.

Results: MINIVAB is a European multi-center, translational clinical phase II study. Centers within the Netherlands, Spain and Sweden are planned to participate. In total 170 women will be included. The main endpoint of this study is the incidence of successful complete or focally involved tumor excision by VAE based on the surgical specimen. Secondary endpoints are patient, tumor, and histopathological related predictive factors for complete resection, sentinel node status, quality of life, complications and pain experience score.

Conclusion: Our study tests the feasibility of an innovating approach to remove small breast cancer, with a thorough evaluation of adverse events or possible complications. Study outcomes may pave the way to minimally invasive treatment in an outpatient setting for a selection of women with small invasive breast cancers.

No conflict of interest.

46 (PB-046) Poster

Impact of axillary disease extent on baseline 18F-FDG PET/CT in clinically node-positive breast cancer patients on the accuracy of axillary surgical staging after NCT

C.M. De Mooij[1], J.M. Simons[1], C. Mitea[2], P.J. van Diest[3], P.J. Nelemans[4], F.M. Mottaghy[2], C.C. van der Pol[5], E.J.T. Luiten[6], L.B. Koppert[7], M.L. Smidt[1], T.J.A. van Nijnatten[2], RISAS Study Group. *[1]Maastricht University Medical Centre+, Surgery, Maastricht, Netherlands; [2]Maastricht University Medical Centre+, Radiology and Nuclear Medicine, Maastricht, Netherlands; [3]University Medical Centre Utrecht, Pathology, Utrecht, Netherlands; [4]Maastricht University Medical Centre+, Epidemiology, Maastricht, Netherlands; [5]University Medical Centre Utrecht, Surgical Oncology, Utrecht, Netherlands; [6]Amphia Hospital Breda, Surgery, Breda, Netherlands; [7]Erasmus Medical Centre, Surgery, Rotterdam, Netherlands*

Background: Clinically node-positive (cN+) breast cancer patients increasingly undergo axillary surgical staging after neoadjuvant chemo(targeted) therapy (NCT). The RISAS-procedure combines the sentinel lymph node biopsy (SLNB) with the excision of axillary lymph nodes pre-NCT marked with a radioactive iodine seed (MARI) after NCT. The impact of axillary disease extent on ^{18}F-FDG PET/CT prior to NCT on the false negative rate (FNR) and negative predictive value (NPV) of the RISAS-procedure is investigated.

Methods: After NCT, pathologically confirmed cN+ patients underwent axillary surgical staging with the RISAS-procedure (i.e. combined SLNB and MARI) followed by a completion axillary lymph node dissection. The FNR and NPV of the SLNB, MARI-procedure and RISAS-procedure were compared between patients with limited and advanced axillary disease (1–3 vs ≥4 suspicious axillary lymph nodes) on baseline ^{18}F-FDG PET/CT prior to NCT by means of Fisher's exact test.

Results: Axillary pathologic complete response occurred in 55/185 patients. Prior to NCT, 116 patients had limited and 69 advanced baseline axillary disease. The FNR of the RISAS-procedure (1.3% vs 7.8%, P = 0.077), MARI-procedure (6.8% vs 9.8%, P = 0.739), and SLNB (16.4% vs 27.0%, P = 0.213) is lower, and the NPV of the RISAS-procedure (97.4% vs 81.8%, P = 0.056), MARI-procedure (87.5% vs 77.3%, P = 0.307), and SLNB (73.3% vs 63.0%, P = 0.431) higher, in limited baseline axillary disease compared to advanced baseline axillary disease.

Conclusion: Stratification of baseline axillary disease extent on ^{18}F-FDG PET/CT insignificantly influences the accuracy of the RISAS-procedure in cN+ patients after NCT.

No conflict of interest.

47 (PB-047) Poster

Analysis of factors with impact on duration of hospitalisation for patients operated for breast cancer during COVID 19 pandemic

Z. Maksimovic[1], A. Curcic[2], R. Ljubisavljevic[1], I. Zarev[1], I. Simovic[1], M. Misic[3], S. Mitrovic[3], Z. Mihajlovic[3], S. Bursac[3], J. Vukasinovic[3], D. Kosic[3], E. Maljevac[4], D. Bihorac[4], S. Vatricevic[5], Z. Babic[3], N. Rsovac[5], A. Azanjac[6], D. Aleksandrovic[7], J. Tanasijevic[7], N. Kostic[7]. *[1]Health center Studenica Kraljevo, Surgery, Kraljevo, Serbia; [2]Health center Studenica Kraljevo, Surgery, Serbia; [3]Health center Studenica Kraljevo, Radiology, Kraljevo, Serbia; [4]Diagnostic center Eho Mc, Radiology, Novi Pazar, Serbia; [5]Health center Studenica Kraljevo, Patology, Kraljevo, Serbia; [6]Polyclinic Materna, Gynecology, Cacak, Serbia; [7]Health center Studenica Kraljevo, Oncology, Kraljevo, Serbia*

Background: Short-stay hospitalization of the patient in units for breast cancer surgery is recognized as a measure of quality of organization and work, certainly without compromising the quality of treatment. The aims of this paper is to point out the factors that influenced the duration of hospitalization during the Covid 19 pandemic and to show the results in the surgical treatment of breast cancer during the Covid 19 pandemic achieved in an general hospital.

Materials and Methods: We analyzed duration of hospitalization in days for 102 patients operated due to breast cancer in the General hospital Studenica Kraljevo, from 15.03.2020.to 20.06.2021. For that purpose it was examined the influence of: the extent of surgery on the breast-conserving or mastectomy, the extent of surgery on the axilla-SLNB or ALND, distance of the patient's place of residence (urban or rural area, distant places more than 50 km), age, comorbidity, previous neoadjuvant approach. The source of data were medical history cases and discharge lists.

Results: Among 102 operated patients69% had mastectomy,31% had sparing surgery, negative SLN had 38%, ALND had 53%,43% were from rural areas,7% were younger than 40,6% were 81 or older and 87% were 41–80 years old. Significant comorbidities had 9% and after neoadjuvant Th were 11%. Reoperation was done in 7%. One day of hospital stay, discharge on the same day after surgery, had 16%,75% of them had sparing surgery,25% mastectomy,50% SLNB with negative findings and 25% had ALND. The place of residence was very distant for 31% of these patients,20% of them had a pronounced comorbidity. There were 25% under 40 years and 20% those older than 80 years. Neoadjuvant therapy was previously performed in 20%. Two days of hospital stay, discharge the day after the operation, had 65%,while 30% of them had sparing surgery, mastectomy 70%,SLN with negative findings had 36%, ALND had 61%, distant with place of residence were 52%,younger than 40 years were 5% and 3% were older than 80. Comorbidity existed in 9% and neoadjuvant therapy was administered in 12%. Data were analyzed and a statistically significant difference was found that short hospitalizations of only 1 day were more common in smaller operations, less distance from the place of residence, the youngest and oldest patients. There were no complications related to the condition of the operative wound that would be the reason for repeated hospitalization, but in 7 patients (7%) reoperation occurred after a definite PH finding that indicated positive margins or metastases in SLN.

Conclusions: Well-organized breast cancer units under extraordinary situations such as the covid 19 pandemic maintain a high level of quality as measured by length of hospitalization, with impact of the decisive factors

such as extent of breast and regional lymph node surgery, distance of place of residence, age and comorbidity.

No conflict of interest.

48 (PB-048) Poster

Sentinel node mapping in patients with biopsy-proven metastatic axillary lymph nodes and upfront surgery: preliminary results of the Multimodal Targeted Axillary Surgery (MUTAS) trial

P. Masó[1], M. Jiménez[2], S. Vidal-Sicart[3], R. Alcantara[4], N. Argudo[2], P. Nicolau[1], M. De Miguel[5], A. Martínez[2], Y. Aguilar[6], L. Rubio[6], R. Valhondo[6], N. Arenas[4], M. Pitarch[4], I. Vázquez[7], L. Comerma[7], J. Sanz[8], M. Algara[8], A. Noguera[9], M. Vernet-Tomas[10]. *[1]Hospital del Mar, Breast Unit-Gynaecology, Barcelona, Spain; [2]Hospital del Mar, Breast Unit- General Surgery, Barcelona, Spain; [3]Hospital Clínic, Nuclear Medicine, Barcelona, Spain; [4]Hospital del Mar, Breast Unit- Radiology, Barcelona, Spain; [5]Hospital del Mar, General Surgery, Barcelona, Spain; [6]Hospital del Mar, Nuclear Medicine, Barcelona, Spain; [7]Hospital del Mar, Breast Unit-Pathology, Barcelona, Spain; [8]Hospital del Mar, Breast Unit- Radiation Oncology, Barcelona, Spain; [9]Hospital del Mar, Breast Unit- Epidemiology, Barcelona, Spain; [10]Hospital del Mar, Breast Unit, Barcelona, Spain*

Background: Some studies have suggested that the patients included in the Z0011 trial may have represented only patients with ultrasound-negative axillary nodes and axillary invasion diagnosed by sentinel node biopsy. Nevertheless, the NCCN guidelines recommend sentinel node mapping if 1 or 2 suspicious lymph nodes are identified on axillary ultrasound. The aim of this preliminary phase of the MUTAS trial was therefore to establish the accuracy of sentinel node mapping in patients with axillary involvement undergoing upfront surgery.

Material and methods: We recruited patients with proven metastatic axillary nodes and upfront surgery. We performed sentinel node mapping in these patients before the surgical intervention. During the intervention, the biopsy-proven metastatic node, sentinel nodes and the remaining axillary nodes were excised and identified separately. Sentinel node status was considered representative of the status of the remaining axillary nodes. We calculated the sensitivity, specificity, negative predictive value and positive predictive value of the sentinel node, overall and in patients with palpable nodes, in those with non-palpable nodes and an ultrasound diagnosis of axillary involvement, in those with 1 or 2 suspicious nodes on axillary ultrasound, and in patients with a single suspicious node on axillary ultrasound.

Results: We included 25 patients in this preliminary phase. The false-negative rate of sentinel node mapping was 28% overall, 21.42% for patients with palpable nodes, 36.36% for patients with non-palpable nodes and an ultrasound diagnosis of axillary involvement, 28.75% for those with 1 or 2 suspicious nodes on axillary ultrasound, and 15.38% in patients with a single suspicious node on axillary ultrasound. Negative predictive value was highest in patients with a single suspicious node on axillary ultrasound (75%).

Conclusion: In this study, sentinel node mapping was not reliable in patients with biopsy-proven metastatic axillary nodes and upfront surgery, either overall or for any of the subgroups studied, as the false negative rate was above 10%. Consequently, it is doubtful that the sentinel node adds any valid information in patients with 1 or 2 suspicious axillary lymph nodes on ultrasound, even if lymph nodes are non-palpable. NCCN recommendations regarding these patients seem inadequate from our point of view.

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No conflict of interest.

49 (PB-049) Poster

Locoregional lymph node metastasis from occult breast cancer: Treatment options and prognosis in Denmark

A.W. Nærum[1], E.V. Holm-Rasmussen[2], I. Vejborg[3], A.S. Knop[4], A.V. Lænkholm[5], N. Kroman[1], T.F. Tvedskov[1]. *[1]Herlev-Gentofte Hospital, Department of Breast Surgery, Copenhagen, Denmark; [2]Rigshospitalet, Department of Plastic Surgery and Burns Treatment, Copenhagen, Denmark; [3]Herlev-Gentofte Hospital, Department of Breast Examinations, Copenhagen, Denmark; [4]Rigshospitalet, Department of Oncology, Copenhagen, Denmark; [5]Zealand University Hospital, Department of Surgical Pathology, Roskilde, Denmark*

Background: Occult breast cancer (OBC) is a rare condition. Due to the small number of patients in previous studies, the benefits of treatment with mastectomy are still discussed. This study aims to determine the clinicopathological characteristics, treatment and prognosis of OBC patients presenting with locoregional lymph node metastasis (LNM).

Material and methods: This study included patients registered in the national Danish Breast Cancer Group (DBCG) database between 2001 and 2015, with locoregional LNM as well as a bilateral negative mammography, ultrasonography, and physical examination of the breasts. Overall survival (OS) and invasive disease-free survival (IDFS) were compared by treatment groups (ALND+RT: axillary lymph node dissection and radiotherapy or ALND+MAST ± RT: axillary lymph node dissection, mastectomy with or without radiotherapy).

Results: In total, 56 patients were included in the study, of which 37 were treated by ALND+RT, 16 by ALND+MAST±RT, and the remaining three patients receiving different treatments. The median follow-up for the 53 OBC patients sorted by treatment group was 12.2 years (interquartile range: 10.1 years; 15.3 years). There was no significant difference in OS or IDFS between the treatment groups, except for a subgroup of 46 (out of 53) patients without verified *in situ* lesions before treatment, where ALND+RT treatment showed an improved OS (log-rank $p = 0.05$).

Conclusions: Treating OBC patients with ALND and radiotherapy resulted in a similar prognosis as treatment with ALND and mastectomy. This supports omission of mastectomy in favor of radiotherapy of the breast in these patients.

No conflict of interest.

50 (PB-050) Poster

Alternative breast cancer localisation techniques in Wales: an early experience

A. Warren[1], S. James[2], R. Foulkes[2], M. Rees[2]. *[1]Cardiff University, Medicine, Cardiff, United Kingdom; [2]ABUHB, General Surgery, Newport, United Kingdom*

Background: Accurate peri-operative localisation of breast tumours is an important component of breast conserving surgery. While radiologically inserted hook-wires have been the cornerstone of breast localisation for many years, newer techniques are now available. Some of these techniques have several advantages over traditional wire-guided procedures, including greater flexibility in terms of when the localisation procedure can be performed prior to the patients operation, avoiding the need for radiology support on the day of surgery. Our unit have recently adopted the use of the Hologic® LOCalizer™ as our localisation technique of choice and present our initial data and experience of the technique here.

Materials and methods: Data from all patients who underwent a localised wide local excision using the Hologic® LOCalizer™ device was collected over the initial 6 months immediately after obtaining the equipment. Data collected included: patient demographics, BMI, indication for surgery, pre-operative radiological findings, tumour characteristics, pathological margins and post-operative complications.

Results: A total of 54 patients underwent surgery using the Hologic® LOCalizer™ during the study time-frame (January–June 2021). The median patient age was 62 years (37–73 years), mean BMI was 30.1Kg/m² (21–41Kg/m²) and the majority of patients had lesions detected through breast screening (n = 33, 61%). Most patients were undergoing surgery for an invasive breast cancer (n = 44, 81%) and the mean tumour size detected via mammogram and ultrasound was 16.5 mm (4–62 mm) and 11.6 mm (4–58 mm) respectively. The RFID was inserted an average of 12 days prior to the patients surgery (0–44 days) and circumferential excision margins were complete (>1 mm) in 86% (n = 57) of cases. Complications following surgery occurred in 5 patients (7%), primarily due to post-operative wound infection (n = 3, 4%). In 2 cases, the RFID TAG was dislodged during the surgical procedure, although successful surgical excision of the lesion was still possible. In both cases the TAG was placed superficially within the breast and was also placed on the same day as the patients surgery.

Conclusions: The Hologic® LOCalizer™ appears to be a safe and clinically valid alternative to wire-guided localisation of impalpable breast lesions. Despite the "learning curve" phenomenon associated with the use of any new technique, post-operative results appear satisfactory in terms of an acceptable complication and re-excision rate, despite the patient population being of higher than average BMI. Caution should however be taken when using the technique to localise lesions deep within the breast of patients with a higher than average BMI and the authors would also recommend avoiding RFID TAG placement on the day of surgery itself, to minimise the risk of TAG displacement during the surgical procedure.

No conflict of interest.

51 (PB-051) Poster

SPECT/CT lymphoscintigraphy can accurately localize the sentinel lymph nodes and the clipped node in breast cancer patients undergoing targeted axillary dissection after neoadjuvant chemotherapy

E. Dilege[1], B. Celik[1], S. Toprak[1], S. Sucu[1], O. Agcaoglu[1], O. Falay[2], N. Kapucuoglu[3]. *[1]Koc University- School of Medicine, General Surgery, Istanbul, Turkey; [2]Koc University- School of Medicine, Nuclear Medicine, Istanbul, Turkey; [3]Koc University- School of Medicine, Pathology, Istanbul, Turkey*

Background: Targeted axillary dissection (TAD) after neoadjuvant chemotherapy (NAC) for breast cancer has proven safety and led to de-escalation of axillary surgery with low false negative rates (FNR). When the sentinel lymph node (SLN) is not the clipped node, retrieval of the clip might be challenging. Single Photon Emission Computed Tomography with integrated CT (SPECT/CT) is used for SLN identification in various diseases, providing information about the anatomical location of SLNs. In this study we aimed to show whether SPECT/CT could guide TAD by localizing where the SLN and clipped nodes are, and its reliability assisting surgery.

Patients and methods: We reviewed the medical records of locally advanced breast cancer patients, diagnosed between September 2017 and June 2022. Sixty-two female breast cancer patients had biopsy-confirmed axillary nodal metastases and had NAC followed by breast surgery with TAD. Each patient had a metallic clip placed in the sampled lymph node prior to NAC. After completion of treatment the patients had breast surgery and sentinel lymph node biopsy (SLNB) with or without axillary lymph node dissection (ALND). All of the patients had SPECT/CT lymphoscintigraphy on the day of surgery. Periareolar 99mTechnetium-nanocolloid intradermal injection followed by dynamic, planar and SPECT/CT images were taken. The images were interpreted in workstation by the nuclear medicine specialist to assist the surgeon. We localized the sentinel node and the clips on CT images, before surgery. Depending on the surgeons choice blue dye (isosulphane-blue) was also administered. Removal of the clip was confirmed by specimen radiographs or macroscopic evaluation on table.

Results: Sixty-two patients with T1-4, N1-2 breast cancers were enrolled in this study. The median age was 46.5 (25–74). The mean number of SLNs were 2.5 (range 1–6). Thirty-four (55.7%) patients had confirmed metastases intraoperatively and had further ALND; whereas 27 (44.3%) had SLNB only. SPECT/CT identified 1–5 (mean 1,8) SLNs in each patient. In 54 (88.5%) patients clipped node was the SLN. In 3 (4.9%) patients the clip was found in the nonSLN. In the remaining 4 patients the clips were neither localized by SPECT/CT nor during surgery. In all of the patients (100%) SPECT/CT correctly localized the clipped lymph node (Table 1). Overall the false negative rate of TAD was 3.33%. There is no axillary relapse seen in follow up of median 25 months (2–59months).

Table 1:

	SPECT/CT (n)	SURGERY (n)
Clips in the SLNs	54	54
Clips in the non-SLNs	3	3
Clips not identified	4	4
Accuracy	100%	

Conclusion: SPECT-CT lymphoscintigraphy accurately localizes the SLN and the clips in the axilla, which can be reliably used to guide TAD in breast cancer surgery after NAC.

No conflict of interest.

52 (PB-052) Poster

Surgical outcomes after neoadjuvant systemic therapy in patients with lobular carcinoma

A. Van Hemert[1], A. van Loevezijn[1], A. Bosman[2], M.J. Vrancken Peeters[1], F. van Duijnhoven[1], I. van der Ploeg[1]. *[1]Netherlands Cancer Institute - Antoni van Leeuwenhoek, Department of Surgical Oncology, Amsterdam, Netherlands; [2]Noordwest Ziekenhuisgroep, Department of Surgery, Alkmaar, Netherlands*

Background: Breast cancer patients with invasive lobular carcinoma (ILC) have an increased risk of positive margins and show limited response to neoadjuvant systemic therapy (NST). Although magnetic resonance imaging is the most specific tool to assess response to NST, residual disease can be underestimated due to its diffuse growth pattern, resulting in tumor-positive margins. Re-excision as a result of tumor-positive margins may delay administration of adjuvant treatment and may have a negative effect on cosmetic outcome. Therefore, we aimed to investigate surgical outcomes in patients with ILC treated with NST.

Methods: We selected all breast cancer patients with ILC treated with NST who underwent surgery at the Netherlands Cancer Institute from 2010 to 2019. Patients with mixed type ILC in pre-NST core biopsies were excluded if the lobular component was not confirmed in the surgical specimen. Main outcome parameters were tumor-positive margins and re-excision rate. Associations between baseline characteristics and tumor-positive margins were assessed, as was locoregional recurrence rate (LRR), recurrence free survival (RFS) and overall survival (OS).

Table 1: Surgical outcomes in patients treated with BCS or mastectomy (n = 191)

	BCS (*n* = 107)		Mastectomy (*n* = 84)	
Tumor-positive margins	55	(51%)	12	(14%)
Focal	18	(17%)	5	(6%)
>Focal	37	(35%)	7	(8%)
Tumor-positive margins requiring re-excision	35	(33%)	4	(5%)
Definitive surgery				
Breast conserving surgery	82	(77%)	–	
Mastectomy	25	(33%)	84	(100%)
Tumor size (ypT in mm)	20	(9–40)	37	(17–50)

Numbers are in *n* (%) or median (IQR)

Results: We included 191 patients. After NST, 107 (56%) patients had breast conserving surgery (BCS) and 84 (44%) patients underwent mastectomy. In total, 67 (35%) patients had tumor-positive margins: 55 (51%) in the BCS and 12 (14%) in the mastectomy group (p-value <0.001). Re-excision was performed in 35 (33%) patients with BCS and in 4 (5%) patients with mastectomy (Table 1). BCS was preserved in 77% (*n* = 82) of patients that initially underwent BCS and in 33% (*n* = 25) a mastectomy was deemed necessary. Tumor-positive margins were associated with cT≥3 status (OR 4.62, 95% CI 1.26–16.98, *p*-value 0.021) in the BCS group. Five-year LRR (4.7%), RFS (80%) and OS (93%) was not affected by type of surgery after NST.

Conclusion: Although positive margins after NST in patients with ILC required re-excision in 33% of patients with BCS, it is considered safe given that five-year RFS remained excellent and LRR and OS did not differ between BCS or mastectomy.

No conflict of interest.

53 (PB-053) Poster

Targeted axillary dissection or sentinel node biopsy after neo-adjuvant treatment in clinically node positive patients – the West of Scotland experience

L. Romics[1], A. Ingham[2], S. Sophia[3], J. Mansell[1], L. Arthur[4], J. Campbell[4], A. Seth[3], J. Reid[5], J. Loane[6], C. Wilson[1], J. Doughty[1]. *[1]Gartnavel General Hospital, Surgery, Glasgow, United Kingdom; [2]University of Glasgow, Academic Department of Surgery, Glasgow, United Kingdom; [3]Gartnavel General Hospital, Radiology, Glasgow, United Kingdom; [4]Royal Alexandra Hospital, Surgery, Paisley, United Kingdom; [5]University Hospital Crosshouse, Surgery, Kilmarnock, United Kingdom; [6]Queen Elizabeth University Hospital, Pathology, Glasgow, United Kingdom*

Background: For patients with node positive disease who are exceptional responders for neo-adjuvant treatment (NAT), targeted axillary dissection (TAD) or sentinel node biopsy (SNB) with removal of minimum three nodes may be offered for staging. We compared clinicopathological outcomes of patients treated with TAD/SNB to ANC after NAT for node positive disease and describe clinicopathological outcomes after TAD with magseed localisation (TADm), wire localisation or no preoperative localisation (TAD) or SNB in three units in the West of Scotland.

Patients and methods: Node positive patients receiving NAT were identified from the prospectively collected West of Scotland Managed Clinical Network database, cross referenced with CRIS and electronic case note review was carried out to collect further clinicopathological outcomes. Chi-square and Mann-Whitney tests were used for statistics in SPSSv25.

Results:150 patients were treated either with TAD/SNB (n = 52; of these 11 had completion ANC) or ANC (n = 98) between February 2017 and October 2021. The rate of clinically palpable nodes (TAD/SNB: 83% (34/41) vs ANC/cANC: 73% (80/109)) and sonographically abnormal nodes (≥3;

TAD/SNB: 51% (21/41) vs 46% (53/109) were comparable, but more triple-negative and HER-2 positive cancers were in the TAD/SNB group (61% (25/41) vs 45% (49/109); p = 0.08). Significantly less radiologically abnormal node was detected after NAT in TAD/SNB (($\geq$3; 2.4% (1/41) vs 21.4% (23/109); p = 0.005). Less nodes were removed during TAD/SNB (4 (1–10) vs ANC (12 (5–23); p < 0.001), and less nodes were involved macroscopically on pathology after TAD/SNB (0.5 (0–4) vs cANC: 2 (1–4); p < 0.001) vs ANC: 3.5 (0–19); p < 0.001). Postoperative complication rate was low following TAD/SNB: 4.9% (2/41), but high after ANC: 27.5% (27/98), and cANC: 45.4% (5/11) (p = 0.001). Of the 52 patients treated with TAD, 14 underwent magseed, 3 underwent wire localisation, 24 had patients had no localisation and clipped node removal was confirmed on intraoperative imaging, while 11 patients had SNB without previous clipping of the biopsied metastatic node. Less than three nodes were removed in 8 patients (15.4%). 11 patients underwent completion axillary clearance (cANC), but no further metastasis was found in 5. Clip was placed in at the time of biopsy in 22 of 41 patients (TADm,TAD). The clipped node was retrieved in 39 of 41 patients and in 29 of 41 cases the localised node was the sentinel node. Median number of lymph nodes removed were the same (n = 4) in TADm, TAD or SNB. Magseed was found in the clipped node in 13 of 14 pts.

Conclusions: Radiological response provides reliable guidance for selection for TAD/SNB. TAD/SNB is less invasive in comparison to ANC and carries significantly less morbidity. Magseed localisation of the clipped node did not decrease the removed lymph node number when compared to TAD with no localisation.

No conflict of interest.

54 (PB-054) Poster

Superior survival after breast conserving therapy versus mastectomy – a multicenter Asian cohort study of 3655 patients

F. Leong[1,2], G. Kusumawidjaja[3], R. Sultana[4], H.M. Ishak[3], F.Y. Wong[3], V.K.M. Tan[2,5,6], B.K.T. Tan[1,2,5,6], Y. Sim[2,5,6], G.H. Lim[7], S.H. Lim[7], S.M. Tan[8], S. Ngaserin[1,2]. *[1]Sengkang General Hospital, Surgery, Singapore, Singapore; [2]SingHealth Duke-NUS, Breast Centre, Singapore, Singapore; [3]National Cancer Centre, Radiation Oncology, Singapore, Singapore; [4]Duke-NUS Medical School, Centre for Quantitative Medicine, Singapore, Singapore; [5]National Cancer Centre, Breast Surgery, Singapore, Singapore; [6]Singapore General Hospital, Surgery, Singapore, Singapore; [7]KK Women's and Children's Hospital, Breast Centre, Singapore, Singapore; [8]Changi General Hospital, Surgery, Singapore, Singapore*

Background: Recent cohort studies from the West have demonstrated improved survival after breast conserving surgery with radiotherapy (BCS +RT) compared to mastectomy (Mx). However, mastectomy rates remain high amongst Asian women. Therefore, in this retrospective multi-institutional study we aim to review our Asian women with early breast cancer undergoing Mx versus BCS+RT to evaluate if similar survival outcomes are seen.

Material and methods: We identified all female patients with newly diagnosed early breast cancer (stage I or II) in our prospectively collected Joint Breast Cancer Registry database in Singapore from 2002–2016. The cohort was divided into 3 groups: BCS+RT, Mx, and BCS alone. Pattern of disease recurrence, overall (OS) and disease-free survival (DFS) between the three groups were analysed.

Results: 3655 patients were included in the analysis. 1943 (53%) patients underwent BCS+RT, 1596 (44%) Mx and 116 (3%) BCS alone. Median age at diagnosis was 53 years. Median follow up was 9.45 years (IQR: 5.92–20.02). 5-year OS of BCS+RT vs Mx vs BCS cohort were 96.5% vs 91.0% (HR 2.43, 95% CI 2.03–2.90, compared with BCS+RT) vs 75.8% (HR 4.94, 95% CI 3.43–7.11). 5-year DFS of BCS+RT vs Mx vs BCS cohort were 90.3% vs 82.5% (HR 1.76, 95% CI 1.54–2.01, compared with BCS+RT) vs 52.9% (HR 4.70, 95% CI 3.52–6.27, compared with BCS+RT).

Overall, 10.5% (n = 214) of BCS+RT patients had relapse, compared to 17.2% (n = 288) in Mx and 24.1% (n = 33) in BCS alone. Distant relapse was the most common first failure in both BCS+RT (n = 113) and Mx (n = 180) groups, accounting for 52.8% and 62.5% of all recurrences respectively. Local relapse was most common first failure in the BCS alone cohort (n = 23), accounting for 70% of all recurrences. Multivariate analysis showed that surgery type (favouring BCS+RT), grade 1, early stage, and receiving systemic therapy were significantly associated with improved survival.

Conclusions: Similar to their Western counterparts, Asian women with early-stage breast cancer who underwent BCS+RT had superior overall and disease-free survival outcomes compared to those who underwent Mx. This disparity should be taken into consideration when counselling them for breast cancer surgery.

No conflict of interest.

55 (PB-055) Poster

Tumour characteristics and radiological response are better predictors than tumour extent of axillary pathological complete response after neoadjuvant systemic therapy

S. Du De Xuan[1], S. Bek[1], Q.T. Tan[2], R. Sultana[3]. *[1]National University of Singapore, Yong Loo Lin School of Medicine, Singapore, Singapore; [2]KK Women's and Children's Hospital, Breast Surgery, Singapore, Singapore; [3]Duke-NUS Medical School, Clinical Research, Singapore, Singapore*

Background: Management of the axilla in breast cancer patients with nodal metastases after pre-operative systemic therapy has been progressing towards de-escalation of surgery. Options include axillary lymph node dissection (ALND) and increasingly targeted axillary dissection (TAD). TAD aims to accurately stage the post treatment axilla with reduction in morbidity associated with ALND. However not all patients achieve pathological complete response in the axillary lymph nodes (LNpCR). We aim to identify pre-operative demographics, radiological and clinicopathological factors determining which patients are most likely to achieve LNpCR and benefit from TAD.

Materials and methods: 109 cases of breast cancer with axillary nodal metastasis treated with neoadjuvant chemotherapy and surgery between 2006 to 2017 in our hospital's database were retrospectively identified. Demographic, radiological and clinicopathological factors between patients who achieved LNpCR and those who did not (nLNpCR) were analysed. Variables influencing LNpCR were further investigated using univariable and multivariable analyses.

Results: Age, race, number of abnormal axillary lymph nodes, radiological size of abnormal lymph nodes, pre-chemotherapy stage, tumour type and focality were not found to be significantly different between the two groups while pre-chemotherapy tumour size, post-chemotherapy radiological response to chemotherapy, grade, estrogen receptor (ER), progesterone receptor (PR) and Her2 status, and presence of lymphovascular invasion (LVI) were significantly different.

Univariate analysis showed statistical significance for post-chemotherapy complete radiological response of tumour (p = 0.0054), post-chemotherapy complete radiological response of axillary lymph nodes (p = 0.0019), post-chemotherapy overall (tumour and axillary lymph nodes) complete radiological response (p = 0.0020), grade 3 (p = 0.0022), ER negativity (p = 0.0005), PR negativity (p = 0.0097), Her2 positivity (p = 0.0006), LVI negativity (p = 0.0010). Multicentricity but not multifocality was found to be significant (p = 0.043 vs p = 0.429).

Multivariable analysis demonstrated statistical significance for grade (p = 0.0395, OR = 2.605 [95% CI: 1.047 to 6.482]), Her2 status (p = 0.0008, OR = 4.82 [95% CI: 1.921 to 12.095]) and LVI (p = 0.0059, OR = 0.219 [95% CI: 0.074 to 0.646].

Conclusion: Receptor status and post-chemotherapy radiological response are better predictors of LNpCR than tumour size or size and number of radiologically abnormal axillary lymph nodes. Patients who demonstrate complete radiological response, have ER negative, PR negative and, in particular, Her2 positive and grade 3 tumours are more likely to achieve lymph node pCR and should be given greater consideration for targeted axillary dissection after neoadjuvant systemic therapy.

No conflict of interest.

56 (PB-056) Poster

Predictive factors of macrometastasis in sentinel lymph node in invasive lobular carcinoma

C. Julià[1], R. Sanchez Mateos[2], C. Capó[1], A. Rodríguez[3], G. Tena[1], A. Petit[4], C. Falo[5], M.J. Pla[2], A. García[2]. *[1]Hospital de Viladecans, Gynecology, Viladecans, Spain; [2]Hospital Universitario de Bellvitge-Instituto Catalán de Oncología, Gynecology, Hospitalet de Llobregat, Spain; [3]Hospital Universitario de Bellvitge, Nuclear Medicine, Hospitalet de Llobregat, Spain; [4]Hospital Universitario de Bellvitge-Instituto Catalán de Oncología, Anatomical Pathology, Hospitalet de Llobregat, Spain; [5]Hospital Universitario de Bellvitge-Instituto Catalán de Oncología, Medical Oncology, Hospitalet de Llobregat, Spain*

Background: The axillary impact of invasive ductal carcinoma (IDC) has been extensively studied. But, invasive lobular carcinoma's (ILC) lower prevalence, its tumor biology and its poor axillary disease translation in imaging tests, results in a greater lack of knowledge about its influence at the axillary level.

The aim of this study is to evaluate whether the axillary involvement of ILC in patients with cN0 is similar to the IDC described in the AMAROS trial, and analyze the risk factors (RF) associated with macrometastasis in sentinel lymph node (SLN).

Material and methods: An observational, retrospective and bicentric study of patients diagnosed of cT1-T3 ILC between 2007–2020 who underwent to primary surgery and SNL biopsy (SLNB).

Table 1:

Univariate Analysis	pN0 (n = 166)	pN+ (n = 59)	P value
Age, mean ± SD	58 ± 10	54 ± 9	<0.01
Menopausal status, n (%)			
Menopause	124 (77%)	36 (23%)	0.03
Premenopause	42 (65%)	23 (35%)	
cT, n (%)			
T1	102 (85%)	18 (15%)	<0.01
T2	51 (59%)	35 (41%)	
T3	10 (62%)	6 (38%)	
Mammography size (mm), mean ± SD	18.1 ± 13.7	24.3 ± 17.0	0.03
MRI size (mm), mean ± SD	22.6 ± 13.2	30.5 ± 19.3	0.01
Lymphovascular invasion, n (%)			
Yes	8 (47%)	9 (53%)	0.02
No	143 (75%)	48 (25%)	
Histological subtype, n (%)			
Pleomorphic	235 (6%)	18 (44%)	<0.01
Classic	130 (76%)	40 (24%)	
Signet-ring cells	4 (100%)	0 (0%)	
Type of surgery, n (%)			
Conservative	126 (77%)	37 (23%)	0.04
Mastectomy	40 (65%)	22 (35%)	

We compared our results with those published in AMAROS trial in the axillary lymph node dissection (ALND) group, considering that our hospital avoids ALND in patients with macrometastasis in SNLB since 2012.

To identify the RF of macrometastasis, patients with micrometastasis and isolated tumor cells (ITC) were grouped with negative SLN. A uni- and multivariate analyses (logistic regression) of the most relevant diagnostic variables were performed.

Results: 225 patients were evaluated. 59 had macrometastasis, 41 micrometastasis, 13 ITC and 112 negative SLN. ALND was performed in 37/59 (63%) of macrometastasis. In our serie, a 19% (7/37) of ALND had > 4 additional positive lymph node compared with the 8% (52/672) described in the AMAROS trial (p = 0.02), in a sample of 80% of IDC.

The RF associated with the presence of macrometastasis in SLN in the univariate analysis are described in Table 1. In the multivariate analysis remains as RF: age (OR 0.94 IC95% 0.9–0.98), T (T2 OR 2.49; 95%CI 1.0–6.0), tumor's size by MRI (OR 1.0; 95%CI 1.0–1.1) and histological subtype (pleomorphic OR 2.8; 95%CI 1.1–7.2).

Conclusions:

- The axillary involvement of ILC may be distinct from the IDC which suggests that the management of these tumors could be different.
- In our population of ILC, the predictive factors of macrometastasis in SLN are the younger age, the pleomorphic subtype, bigger tumor's size by MRI and the stage T2.

No conflict of interest.

57 (PB-057) Poster

Role of perioperative tranexamic acid in reducing drain volume in breast cancer patients undergoing axillary lymph node dissection: A randomized controlled trial

S. Deepika[1], P. Jain[1], P. Saha[1], S. G[1], R. K[1], M. Sultania[1], B.M. Padhy[2], B. Behera[3], M. Kar[1], D. Muduly[1]. *[1]AIIMS- Bhubaneswar, Surgical Oncology, Bhubaneswar, India; [2]AIIMS- Bhubaneswar, Pharmacology, Bhubaneswar, India; [3]AIIMS- Bhubaneswar, Anesthesiology and Critical Care, Bhubaneswar, India*

Background: Axillary lymph node dissection (ALND) is the standard of care in the management of the axilla in node-positive breast cancer patients. ALND leads to persistent drainage from the axilla, seroma formation, and lymphedema. The two critical factors linked to seroma production are the formation of inflammatory exudate during the healing process after surgery and leakage from the lymphatics that were cut during the removal of nodes but were not sealed. Low fibrinogen levels and high fibrinolytic activity in the fluid exudate after dissection have increased seroma formation. Tranexamic acid (TA), an antifibrinolytic, has been tried in a few trials to reduce axillary drainage and seroma formation.

Materials and methods: It was designed as an open double-arm randomized controlled trial. A total of 40 patients who underwent ALND were randomized into control and intervention groups. All patients in the intervention arm received a single intravenous dose of TA (15 mg/kg) at induction and oral TA 500 mg twice daily for two days postoperatively. After discharge, patients were assessed for daily drain output and seroma formation after drain removal till day ninety of surgery. Patient and surgical variables were analyzed.

Results: The patient's age, tumor size, distribution of higher BMI patients (>25), stage at presentation, neoadjuvant chemotherapy status, and the total number of lymph nodes harvested were similar in the study and treatment groups. The administration of tranexamic acid reduced the mean cumulative drain output in the intervention group, although not statistically significant (p = 0.1). The incidence of seroma formation was also decreased in the intervention group (40%, n = 8 vs. 20%, n = 4, p = 0.3), which was not significant. The mean duration of the drain was also similar between the two groups. There were no significant side effects with the administration of the drug

Outcome variable	Control group (n = 20)	Intervention group (n = 20)	P value
Mean Drain output (ml)	1280 (=/–630.5)	982 (±526.8)	0.1
Incidence of seroma (%)	40 (n = 8)	20 (n = 4)	0.1
Mean duration of drainage (days ± SD)	14.1 (= /+ 2.7)	13.1 (2.3)	0.2

Conclusion: Tranexamic acid, when used perioperatively, did not result in a statistically significant reduction in drain output and mean duration of drainage. Although the incidence of seroma formation was reduced, this was not statistically significant. Further studies with a higher dose and duration of the drug are required to determine tranexamic acid's effect on drain output reduction.

No conflict of interest.

58 (PB-058) Poster

Breast cancer in elderly patients in a Venezuelan breast center. How we manage the axilla

V. Acosta-Marin[1], V. Acosta Freites[1], A. Ramirez[2], C.E. Marin[2], A. Contreras[1], I. Longobardi[3], O. Martinez[3], V. Maldonado[3], M. Acosta[2], J. Perez Fuentes[3]. *[1]Ceclines, Breast Surgery, Caracas, Venezuela; [2]CECLINES, Breast Pathology, Caracas, Venezuela; [3]CECLINES, Breast Radiology, Caracas, Venezuela*

Objective: Axillary management in elderly patients with early breast cancer and clinically negative axillary nodes is controversial. This study aimed to evaluate clinico-histopathological and survival data in breast cancer patients aged 80 years or older with a negative axillary clinical and ultrasound examination not undergoing axillary lymph node investigation

Patients and Method: A retrospective study of 36 patients who met the following inclusion criteria: aged 80 years or more, with a diagnosis of early breast cancer and clinically and ultrasound node negative breast cancer, and in a state of complete physical, mental well-being. The patients were treated surgically without axillary dissection. Clinico-histopathological, treatment and survival characteristics were evaluated.

Results: A total of 36 patients were studied with an average age of 83.5 years (range, 80–91 years), and a median follow-up of 39.7 months (range: 0.5–168 months). Of these, 1 patient had bilateral breast cancer. Most patients were treated with partial mastectomy (64.9%). Almost all of the patients received adjuvant hormonal therapy (91.7%), almost one third received adjuvant radiotherapy (30.6%). Infiltrating ductal carcinoma represented 62% of the total. Average tumor size of 17.5 mm (range, 2–50 mm). The most frequent molecular subtype was luminal A (54.1%). 8.3% of the patients had a relapse, none in axilla. Disease free survival was found to be a mean of 141.7 months, while five-year disease-free survival rate was 80.9%. The overall survival average time was 95.5months, while the five-year overall survival rate was 57%.

Table 1: Clinical and Histopathological characteristics

Age (years) N = 36 (1 bilateral)	
80–84	24 (66.7)
85–91	12 (33.3)
Media (STD)	83.5 (0.49)
Tumor characteristics	
Tumor size (mm) N = 37	
≤20	29 (78.4)
<20 ≤ 50	8 (21.6)
Media (STD) (range)	17.5(1.52) (5–50)
Histological type N = 37	
IDC	23 (62.2)
ILC	4 (10.8)
Others	10 (27)
Molecular Subtypes N = 37	
Luminal A	20 (54.1)
Luminal B	10 (27)
Luminal B-H	5 (13.5)
HER2	1 (2.7)
Triple negative	1 (2.7)
Type of Surgery N = 37	
BCS	24 (64.9)
TM[£]	13 (35.1)
Treatment N = 36	
Adjuvant Hormonotherapy	33 (91.7)
Adjuvant Radiotherapy	11 (30.6)
Neoadjuvant Hormonotherapy	9 (25)

IDC: infiltrating ductal carcinoma, ILC: infiltrating lobullar carcinoma, Others: muninous carcinoma, papillary carcinoma, cribiform carcinoma, ductal carcinoma in situ. BCS: breast conservative surgery. TM: Total mastectomy. [£]1 patient with bilateral mastectomy

Conclusion: Results from the present investigation suggest that axillary lymph node biopsy could be omitted in women 80 years or older with clinically node negative breast cancer treated with breast surgery and adjuvant therapy.

No conflict of interest.

59 (PB-059) Poster

Validation Sentinel Lymph Node Biopsy Study in post NACT cN0 Axilla using low-cost dual dye technique: Potential Solution for Resource Poor Settings

J. Chavda[1], S. Yadav[2], A. Mishra[3], D. Sharma[3], A. Silodia[3], D. Sharma[4], M. Khandare[3]. *[1]Madhya Pradesh Medical Sciences University, General Surgery, Jabalpur, India; [2]Netaji Subhash Chandra Bose Medical College -Jabalpur, General Surgery, Jabalpur, India; [3]Netaji Subhash Chandra Bose Medical College- Jabalpur, General Surgery, Jabalpur, India; [4]Netaji Subhash Chandra Bose Medical - Jabalpur, General Surgery, Jabalpur, India*

Background: Sentinel lymph node biopsy (SLNB) using radio-pharmaceutical and a blue dye is gold standard for axillary staging in clinically node-negative early breast cancer and increasingly being used for post NACT cN0 axilla as well. High costs and limited availability of radio-pharmaceutical and/or gamma probe are major deterrents in performing SLNB in developing countries. In this study, we evaluated feasibility of SLN identification (SLN-IR) of fluorescein-guided (FG) SLNB in combination with methylene blue dye (MBD).

Methods: This was a prospective cross-sectional non-randomized validation study in patients with post NACT clinically node negative axilla. Patients underwent validation SLNB using fluorescein (and blue LED light) and MBD. Axillary dissection was performed irrespective of SLNB histology. SLIN-IR and False Negative Rate (FNR) were assessed.

Results: The SLNs were identified in 51 out of 56 (91%) post Neoadjuvant Chemotherapy (NACT) patients. The median number of sentinel lymph nodes identified 1 (range 1–3) in post NACT patients. The SLN-IR using MBD was 91%, FD was 85%, and combined MBD FD was 89%. The false negative rate (FNR) was 7.8% (MBD), 8.3% (FD) and 7.8% (MBD+FD)

Conclusions: This prospective validation study showed adequate SLN-IR and FNR using low cost dual dyes in post NACT cN0 patients and can be used in low resource settings.

No conflict of interest.

60 (PB-060) Poster

Evaluation of patient reported outcome measure following periareolar (Benelli) mammoplasty using BREAST-Q: Single centre 5-year experience

F. Rapisarda[1], E. Karel[2], E. Sobczak[1], L. Cook[1], M. Ostrowski[1], R. Bonomi[1], D. Betal[1]. *[1]University Hospitals Sussex NHS Foundation Trust, Western Sussex Breast Care Centre, Worthing, United Kingdom; [2]Brighton & Sussex Medical School, Undergraduate Department, Brighton, United Kingdom*

Background: Periareolar (Benelli) Mammoplasty is a round block onco-plastic volume displacement technique confining the scar to the areolar. The advent of oncoplastic techniques has increased the number of breast conserving surgeries, thereby requiring further assurance of an appropriate balance between oncological safety with acceptable aesthetic outcome. BREAST-Q is a validated, highly reliable patient reported outcome measure and has recently been developed for breast-conserving therapy (BCT).

This aim of the study was to assess patient satisfaction with their health and health-related quality of life following breast conserving surgery (BCS) using BREAST-Q,

Methods: This retrospective study collected BREAST-Q questionnaires from breast cancer patients undergoing Periareolar (Benelli) Mammoplasty between 1 January 2015 and 31 December 2019. Patients were contacted by phone, invited to participate and BREAST-Q questionnaire sent by post.

The BREAST-Q was given post-operatively to measure patient outcome measures using quality of life domains – psychosocial well-being, sexual well-being, physical well-being and satisfaction domains - Rasch Transformed Score was calculated for each domain.

Results: There were 134 patients operated in the study period. The median age was 78 (range 35–91years). Forty-six questionnaires were returned (34%). The results are summarised in the table next to normative scores in the literature of women who have not undergone breast cancer surgery.

The highest score was for psycho-social well-being and satisfaction with breasts compared to a normal population. Physical well-being scored highly but was slightly lower than the general population and may reflect the effects of ongoing adjuvant treatment, although the adverse effects of radiotherapy were relatively low. Sexual well-being scores were low but not much different from the general population. Patient experience with the information and satisfaction with breast surgeon both scored highly.

Question	Number of patients replies to domain (n)	Median (IQR)	Normative Scores
Satisfaction with breast	46	68 (27)	58
Adverse effects of radiotherapy	29	34 (47)	
Psycho-social well-being	46	85 (42)	71
Sexual well-being	36	50 (19)	56
Physical well-being	44	77 (23)	93
Patient Experience: satisfaction with information	42	76 (40)	
Patient experience: satisfaction with breast surgeon	45	100 (0)	

Conclusion: Benelli mammoplasty scores highly on overall satisfaction, psychosocial and physical well-being, the adverse effects of radiotherapy was minimal, but it does not appear to impact sexual well-being. Patients were highly satisfied with their health care providers Data from this study will inform a larger prospective study into this topic and direct further patient support in low scoring domains

No conflict of interest.

61 (PB-061) Poster

Short-term surgical complications of skin-sparing mastectomy and direct-to-implant immediate breast reconstruction in women concurrently treated with adjuvant radiotherapy for breast cancer (2022; archives of plastic surgery (aps))

M. Kooijman[1], J.J. Hage[1], A. Scholten[2], M.J. Vrancken Peeters[3], L. Woerdeman[1]. *[1]Antoni van Leeuwenhoek The Netherlands Cancer Institute, Plastic and reconstructive surgery, Amsterdam, Netherlands; [2]Antoni van Leeuwenhoek The Netherlands Cancer Institute, Radiotherapy, Amsterdam, Netherlands; [3]Antoni van Leeuwenhoek The Netherlands Cancer Institute, Breast Surgery, Amsterdam, Netherlands*

Background: Postmastectomy radiotherapy (PMRT) is allegedly associated with a higher risk of complications of combined nipple-sparing or skin-sparing mastectomy and subpectoral direct-to-implant immediate breast reconstruction ([N]SSM/SDTI-IBR). For this reason, this combination is usually advised against or, even, refused in women who need to undergo PMRT. Because this advice has never been justified, we assessed the short-term complications that may potentially be associated with PMRT after [N]SSM/SDTI-IBR.

Methods: We compared the complications requiring reintervention and implant loss occurring after 273 [N]SSM/SDTI-IBR that were exposed to PMRT within the first 16 postoperative weeks (interventional group) to those occurring in 739 similarly operated breasts that were not (control group). Additionally, we compared the fraction of complications requiring reintervention occurring after the onset of radiotherapy in the interventional group to that occurring after a comparable postoperative period in the control group.

Results: The fraction of breasts requiring unscheduled surgical reinterventions for complications and the loss of implants did not differ significantly between both groups but significantly more reinterventions were needed among the controls ($p < 0.001$). Postmastectomy radiotherapy was administered at a mean of 6.2 weeks following the [N]SSM/SDTI-IBR. Therefore, short-term complications did not postpone the timing of the radiotherapy. The fraction of events after the onset of radiotherapy in the interventional group was higher than the fraction of events after 6.2 weeks in the control group, but not significantly so.

Conclusion: We found no prove for the alleged increase of short-term complications of adjuvant radiotherapy. Therefore, we advise that these should not be considered valid arguments to advice against [N]SSM/SDTI-IBR.

No conflict of interest.

62 (PB-062) Poster

A comparative analysis between vertical rectus abdominis myocutaneous (VRAM) flap and transverse rectus abdominis myocutaneous (TRAM) flap as options for post-mastectomy chest wall reconstruction

A. Bhattacharya[1], D. Maitra[1]. [1]*Medical College Kolkata, General Surgery, Kolkata, India*

Background: Oncoplastic breast reconstruction prevents the chest wall deformities occurring after a mastectomy or occurring after chest irradiation following lumpectomy. It offers lower morbidity, higher quality of life and a more natural aesthetic outcome than traditional breast reconstruction techniques. Free flaps offer great cosmetic results and also prevent donor site morbidity but they require advanced microsurgical techniques that may be difficult in institutions with constraints of resources. In these situations, simple and reliable techniques such as the pedicled Vertical Rectus Abdominis Myocutaneous (VRAM) and Transverse Rectus Abdominis Myocutaneous (TRAM) flaps offer a safe and reliable reconstructive option.

Material and methods: 25 patients with tumours in breast (carcinoma/sarcoma) presented to Medical College Hospital, Kolkata from October, 2020 to September, 2021. All of them underwent mastectomy followed by chest wall reconstruction using oncoplastic techniques. On retrospective analysis, it was found out that 13 patients had undergone chest wall reconstruction using the VRAM flap and 12 patients had undergone chest wall reconstruction using the TRAM flap. These patients were divided into two groups. Group A consisted of patients who underwent chest wall reconstruction using the VRAM flap and Group B consisted of patients who underwent chest wall reconstruction using the TRAM flap. Both groups were compared with respect to initiation of adjuvant therapy, post-operative complications and morbidity, rate of recurrence and tissue coverage post-excision.

Results: Initiation of adjuvant therapy was possible in 92.3% of patients in Group A compared to 50% in Group B. Flap necrosis occurred in 7% of patients in Group A while 50% of patients in Group B developed flap necrosis. Donor-site skin necrosis did not occur in any patient of Group A while 33.3% patients in Group B developed donor-site skin necrosis. Umbilical necrosis did not occur in any patient of Group A while it occurred in 8% of patients in Group B. No patient in Group A complained of any stiffness or limitation in daily activity following the reconstruction, while 8% of patients in Group B complained of the same. With respect to the rate of recurrence and tissue coverage, both the groups had comparable outcome.

Conclusion: Compared to patients who underwent reconstruction using the TRAM flap, earlier initiation of adjuvant therapy was possible in patients who underwent reconstruction using the VRAM flap. Moreover, the post-operative complications and morbidity associated with TRAM flaps were more as compared to VRAM flaps. With respect to the rate of recurrence and tissue coverage post-excision, both the flaps had comparable outcome. Thus, chest wall reconstruction using VRAM flap is superior compared to reconstruction using TRAM flap.

No conflict of interest.

63 (PB-063) Poster

Is sentinel lymph node biopsy without frozen section in early stage breast cancer sufficient in accordance with ACOSOG-Z0011? A retrospective review from King Chulalongkorn Memorial Hospital

N. Treeratanapun[1], B. Lerttiendamrong[1], M. Vongsaisuwon[1], V. Vacharathit[1], K. Tantiphlachiva[1], S. Manasnayakorn[1], P. Vongwattanakit[1], Mawin Vongsaisuwon[1]. [1]*King Chulalongkorn Memorial Hospital, Surgery, Bangkok, Thailand*

Background: In 2021, there is an increased global trend for sending sentinel lymph node biopsy (SLNB) specimens for permanent section (PS) without intraoperative frozen sections (FS). ACOSOG Z0011 revealed that re-operation of axillary lymph node dissection (ALND) was not necessary in patients with 1 or 2 nodal metastases. Permanent section alone was thought to be sufficient for sentinel lymph node (SLN) diagnosis. This pilot study conducted in Thailand determines the re-operation rate for SLNB without FS.

Material and Method: We retrospectively reviewed 239 SLNB cases without FS at King Chulalongkorn Memorial Hospital from April 2016 to April 2021. The patients were diagnosed with primary invasive breast cancer with clinically negative nodes. The clinical nodal status was assessed from physical examination radiographic findings on ultrasonography and mammography. The re-operation rate was determined by the number of positive SLNs; where 3 more nodal metastases were subjected to a second surgical procedure.

Result: Between April 2016 and April 2021, 239 patients who had undergone SLNB in accordance with ACOSOG Z0011 criteria with PS alone was enrolled. A total of 975 SLNs were removed from these 239 patients, with an average of 4.15 nodes per patient. Out of 239 patients, 21 (8.8%) and 6 (2.5%) had metastatic disease in 1 and 2 nodes, respectively. The remaining 212 (88.7%) patients had no nodal metastasis. None of the patients were subjected to a second surgical procedure.

Conclusion: We conclude that the implementation of SLNB with PS analysis alone in patients who satisfy the ACOSOG Z0011 criteria, with a re-operation rate of 0%, does not have outcomes that would be altered by the standard of care additional FS analysis. With omission of FS analysis, operation cost, operative time and anesthetic side effects are projected to decrease.

Table 1: Distribution of retrieved sentinel lymph nodes and presence of metastatic disease

Total SLNs	Patients (N)	No. of patient with no nodal metastasis	No. of patient with 1 nodal metastasis	No. of patient with 2 nodal metastases
1	22	21	1	–
2	45	41	3	1
3	55	48	6	1
4	36	29	5	2
5	24	22	2	–
6	36	32	3	1
>6	31	29	1	1
975 (4.15)	239	212	21	6

Values are represented as number or number (mean). SLNs, sentinel lymph nodes.

No conflict of interest.

64 (PB-064) Poster

Borderline phyllodes tumors do not require wide resection margin

K. Yoon[1]. [1]*Seoul National University Bundang Hospital, Surgery, Seongnam, South Korea*

Background: Phyllodes tumor (PT) is a rare fibroepithelial neoplasm of the breast that can be classified as benign, borderline, or malignant. Conventionally, surgical margins of greater than 1 cm are recommended for all types of PT; however, the optimal extent of margin is still under debate. This study aims to investigate the optimal surgical margin to prevent recurrence after surgery for PT and to evaluate risk factors for local recurrence (LR).

Material and methods: Retrospective analysis of a prospective cohort database was performed. Patients who underwent curative surgery for PT at Seoul National University Bundang Hospital between July 2003 and February 2022 were reviewed. Patients without available medical records were excluded from analysis. Surgical margin was defined as either negative ($\geq$0.1 cm from tumor) or close/involved (<0.1 cm from tumor).

Results: Of the 452 patients included, 311 (68.8%) were benign and 141 (31.2%) were borderline. Local recurrence rates for benign and borderline tumors were 3.5 (11/311) and 7.8 (11/141), respectively. The median follow-up was 27.5 months. For benign tumors, 5-year local recurrence-free survival (RFS) was similar between margin negative and close/involved groups (92.9% vs. 90.9%, P = 0.2). In borderline PT, there was statistically significant difference in 5-year local RFS according to margin status (negative 93.0% vs. close/involved 73.4%, P = 0.023). In univariate analysis, surgical margin (hazard ratio (HR) 0.385, P = 0.027) and mitotic count (HR 1.945, P = 0.046) were independent risk factors for local recurrence. Further multivariate analysis found only surgical margin (HR 0.341, P = 0.022) to be prognostic.

Conclusions: In benign PT, resection margin is not a prognostic factor for LR as long as the tumor is encapsulated. However, securing a resection margin of more than 0.1 cm is required to reduce LR in borderline PT.

No conflict of interest.

65 (PB-065) Poster

Quality of life and patient satisfaction after nipple sparing mastectomy versus skin sparing mastectomy and immediate one stage versus two stages breast reconstruction

E. Angelidou[1]. [1]*Euromedica General Clinic Dodecanese, Breast Unit-Gynecological Department, Rhodes, Greece*

Background: Nipple Sparing Mastectomy (NSM) and Skin Sparing Mastectomy (SSM) are oncologically safe procedures compared to classical modified radical mastectomy. This study evaluates whether NSM patients are more satisfied and have better quality of life than matched SSM patients and assesses patients' quality of life after immediate one stage breast reconstruction with prepectoral permanent implants (IBR) compared to a matched group undergoing two stages breast reconstruction with expander and later with permanent implant.

Material and methods: Women who underwent NSM or SSM as IBR or two stages procedure in our breast unit completed a postoperative BREAST-Q survey at least one year after surgery and completing of their treatment and their prospectively collected database was reviewed.

Results: Overall 260 patients were included. 160 had NSM and 100 SSM at least 1 year prior to BREAST- Q survey completion. 100 of the NSM category had IBR with permanent implant, whereas 60 had two stages reconstruction. 55 patients of the SSM category had IBR, whereas 45 had two stages procedure. BREAST- Q Psychosocial and Sexual Well-Being scores were significantly higher in NSM patients compared with SSM patients, but there was no statistically significant difference between the IBR and the two stages reconstruction subgroups. Satisfaction with the breasts was significantly higher in NSM patients compared with SSM patients, but there was no statistically significant difference between the IBR and the two stages reconstruction subgroups. Radiation therapy, BMI >30 and nicotine abuse were independent risk factors for complications and dissatisfaction with the breasts. No patient experienced local recurrence or distant metastasis with a follow up of at least 36 months.

Conclusions: Women who are candidates for NSM should be offered these method either with IBR or with two stages reconstruction, with high rates of patients' satisfaction. IBR is a highly acceptable method for women requiring mastectomy.

No conflict of interest.

66 (PB-066) Poster

Healthcare providers' perceptions of the surgical treatment for male breast cancer: Time to add surgical options other than mastectomy to the discussion

N. Levin Dagan[1], T. Menes[2], N. Herman[3], N. Baum[1]. [1]*Bar Ilan University, The Louis and Gabi Weisfeld School of Social Work, Ramat Gan, Israel;* [2]*Sheba Medical Center, Department of General and Oncologic Surgery, Ramat Gan, Israel;* [3]*Sheba Medical Center, Department of General Surgery B, Ramat Gan, Israel*

Background: The most common surgical treatment offered to male breast cancer (MBC) patients remains mastectomy. One possible explanation is healthcare providers' perceptions of men's experience and needs, and their limited knowledge of the surgery's effect on men. This study explores healthcare providers' perceptions of the surgical management of MBC, its effects on men, and the extent to which these are considered in medical decision-making.

Methods: Semi-structured interviews were conducted with healthcare providers treating breast cancer. Purposive sampling was directed to identify diverse interviewees. Data collection concluded when data saturation was reached. The thematic analysis method guided data analysis.

Results: Nineteen healthcare providers from five public hospitals participated in this study including surgeons, oncologists, and nurses.

Analysis of the interview transcripts suggests that healthcare providers are aware of men's psychological distress caused by mastectomy, however still fail to offer procedures other than simple mastectomy. This is rationalized by medical considerations that preclude the use of breast conservation surgery in MBC. Findings also reveal that male breasts are perceived as unimportant, hence cosmetic considerations and plastic surgeon consultation are not considered for men undergoing mastectomy.

Conclusions: Findings imply that although healthcare providers are aware of men's difficulties with mastectomy, these are not considered in the surgical treatment offered to men.

Medical teams should be aware of and address the emotional aspects of mastectomy in MBC. Surgical solutions, such as breast conservation or nipple reconstruction should be discussed when medically possible.

No conflict of interest.

67 (PB-067) Poster

Ultrasound measurement of the distance between the breast tumor and the skin: a cut-off value for safe skin preservation. Diagnostic accuracy study

R. Brandão[1], S. Elias[2], Â.F.L. Waitzberg[3], G. Facina[4], A.C.P. Nazário[5]. [1]*Federal University of São Paulo, Gynecology, Jundiaí, Brazil;* [2]*Federal University of São Paulo, Gynecology Department- Mastology Discipline, São Paulo, Brazil;* [3]*Federal University of São Paulo, Pathology Department, São Paulo, Brazil;* [4]*Federal University of São Paulo, Gynecology, São Paulo, Brazil;* [5]*Federal University of São Paulo, Gynecology-Mastology Discipline, São Paulo, Brazil*

Background and purpose: In superficial tumors of the breast, it is necessary to plan the thickness of surgical skin flaps, and whether skin can be preserved for esthetics results. Ultrasound scans allow the evaluation of the tumoral size and location, and its relationship with adjacent structures such as the skin. However, because the patient is usually lying down with the arms extended behind the head during the exam, the breast may be flattened, and the distance measured by ultrasound may be different than the same measurement on a surgical or pathological specimen. This study aimed to find an ultrasound measured cut-off distance between tumor and skin (TSD) that allows patients to have the skin over the tumor spared.

Methods: This is a diagnostic accuracy study comparing preoperative ultrasound TSD with pathological TSD and the thickness of the skin flaps. We recruited all consecutive women diagnosed with breast cancer between January 2017 and December 2019 whose surgical planning allowed to have the tumor and overlying skin to be removed in bloc (reconstruction procedures, situations where skin removal would not lead to esthetic problems and superficially located tumors). We excluded patients who would not have the tumor removed surgically together with the adjacent anterior skin (either because this would not be needed or for aesthetical reasons), patients with carcinoma in situ and with non-nodular lesions (such as microcalcifications and architectural distortions). Measurements were made: preoperatively (by ultrasound), during surgery (using a metal caliper to obtain the thickness of surgical skin flap) and after surgery (pathological). A pathological tumor-skin distance greater than surgical skin flap thickness would indicate preservation of skin above the tumor.

Results: We evaluated 95 consecutive patients with 102 lesions. The average surgical flap thickness was 5.5 mm (3–10 mm). In 27 (44.3%) patients, the value was greater than 5 mm and in 34 (55.7%), it was lower. The ultrasound-measured cut-off TSD of 2.1 mm obtained 96.0% accuracy in predicting free anterior margin, considering a 5-mm thick surgical flap. The ROC curve has shown that the cut-off point of 2.1 mm in the ultrasound measurement is associated with with a sensitivity of 96.7% and specificity of 90.9% of a case with skin preservation possibility. The measurement made by the pathologists (TSD-PAT) was always larger than the ultrasound value (TSD-USG). The average rate between TSD-PAT and TSD-USG was 2.64.

Conclusion: In breast superficial tumors, a cut-off distance of 2.1 mm or more measured preoperatively by ultrasound allows safe preservation of the skin above the tumor. Future studies need to follow up for longer the women submitted to skin preservation surgeries, especially those not undergoing radiotherapy.

No conflict of interest.

68 (PB-068) Poster

Papillary carcinoma of breast – Clinicopathological characteristics, management, and survival

B. Rehman[1], J. Sarfaraz[2], A. Mumtaz[1], B. Sajjad[1], N. Urooj[1], A.I. Khan[1], Z. Chaudhary[1], A. Parvaiz[1]. *[1]Shaukat Khanum memorial cancer hospital and research center, Breast and Oncoplasty, Lahore, Pakistan; [2]Royal Free NHS London, UK*

Objective: To study clinic-pathological features and treatment strategies of papillary carcinoma and to see its prognosis in term of survival.

Material and Methods: Data of 58 patients was reviewed retrospectively from January 2010 to December 2016. Four types of papillary carcinoma (on final resected specimen) were included i.e., Invasive papillary ca (IPC), Intracystic (encapsulated) papillary ca (EPC), solid papillary ca (SPC), papillary DCIS (Ductal carcinoma in situ). Various features in all four types were observed and compared.

Results: Out of total 58 patients, 08 were males (13.7%). The mean age at presentation was 61 years, while mean tumor size was 33 mm. Frequency of each histological type was; IPC (n = 22/38%), EPC (n = 22/38%), SPC (n = 12/20.6%), papillary DCIS (n = 2/3.4%). Only 02 patients were ER negative (Both IPC). HER-2 Neu was positive in 3 patients only, out of which 2 died of progressive disease (one EPC & one IPC). LN metastasis was present in 03 (5%) patients (one in each of 1st three types), only one died of bone metastasis who was also HER-2 Neu positive. All patients underwent upfront surgery except two patients who had synchronous IDC on contralateral side. Breast conservation surgery (BCS) was performed in 34 (58.6%) and Mastectomy in 22 (37.9%) patients. 13 patients did not undergo invasive axillary staging, the rest of 43 (74%) patients did. (32 SLNB, 11 ALND) Chemotherapy was given to 18 patients (31%), mostly to IPC (n = 12). Only 02 patients had bone metastasis (One was IPC & one EPC). Cancer related death was observed in 03 patients.

For all groups combined, 5 years OS was 98% and DFS was 92%.

Conclusion: Overall, Papillary carcinoma of breast has very good prognosis, even though lesser intense treatment modalities were used. Although it is still difficult to define the optimum management and to avoid over-treatment, given the limited data in literature.

No conflict of interest.

69 (PB-069) Poster

Selective pectoralis major muscle denervation in retro-pectoral implant based breast reconstruction reduces capsular contracture rate. Long-term single institution prospective case-control study

M. Bernini[1], S. Sordi[1], C. Tommasi[1], L. Tofani[2], A. Salerno[1], I. Meattini[3], D. De Benedetto[4], G. Bicchierai[4], F. Di Naro[4], J. Nori Cucchiari[4], L. Livi[5], L. Orzalesi[1]. *[1]Careggi Hospital Florence, Breast Surgery Oncology Department, Florence, Italy; [2]University of Florence, Department of Statistic Computer Science, Florence, Italy; [3]Careggi Hospital Florence, Radiation Oncology- Oncology Department, Florence, Italy; [4]Careggi Hospital Florence, Diagnostic Senology Unit, Florence, Italy; [5]Careggi Hospital Florence, Radiation Oncology, Florence, Italy*

Background: Implant-based breast reconstruction (IBBR) continues to be the most used technique for breast reconstruction worldwide. Until few years ago the gold standard was to place the device in a retro-pectoral position but, recently, pre-pectoral breast reconstruction has gained a general success, due to better aesthetic outcomes and lower capsular contracture (CC) rates. Unfortunately, not all patients are good candidates for pre-pectoral IBBR and, in these cases, retro-pectoral technique remains a right choice. CC is a well-recognized complication following IBBR and represents a cause of discomfort, pain, poor cosmetic result and sometimes requires revision surgery especially in the retro-pectoral approach. The Pectoralis Major Muscle (PMM) selective denervation, in the retro-pectoral approach, is an innovative technical modification to avoid some pitfalls of the retro-pec IBBR.

Material and methods: We prospectively selected a group of denervated retro-pec IBBR patients and compared them with not denervated patients. Group 1 included cases with selective PMM denervation and Group 2 patients without denervation performed in the same time span. In a previous study we analyzed the subjective opinion on the reconstruction outcomes by means of the BREAST-Q postoperative questionnaire, while, recently, we compared the same groups, with a minimum 24 month follow-up, from an objective perspective, evaluating CC rates by Baker scale, through outpatient clinic visits, performed by three independent breast cancer professionals.

Results: The overall median follow-up was 3.35 years and CC rate was significantly lower in Group 1, even adjusting for propensity score.

Conclusions: PMM selective denervation has gained a statistical appreciation by women and seems to significantly reduce CC rate from an objective evaluation in the setting of retro-pectoral IBBR in our single Institution series.

No conflict of interest.

70 (PB-070) Poster

Budget impact model for magnetic tracers in the detection of sentinel lymph nodes for operable breast cancer

I. Belaroussi[1], C. Fabron[2], N. Lotersztajn[1], R. Afriat[1], G. Dietrich[1], E. Sauvanet[1], V. Talon[3], H. Beaussier[4], S. Baffert[2], S. Alran[1]. *[1]Paris Saint-Joseph Hospital Group, Department of Gynecological and Mammary Surgery, Paris, France; [2]CEMKA, Research, Bourg-La-Reine, France; [3]Paris Saint-Joseph Hospital Group, Department of Pharmacy, Paris, France; [4]Paris Saint-Joseph Hospital Group, Department of Clinical Research, Paris, France*

Objective: The aim of this study was to evaluate the excepted budgetary impact of gradually adopting a magnetic tracer (MT) over a radioisotope tracer in the detection of sentinel lymph nodes (SLN) in operable breast cancer ((BC) from the perspective of one French hospital without a nuclear medicine department.

Material and Methods: This study was conducted in a population of patients with operable breast cancer with SLN dissection. A budget impact model based on a prospective study conducted between April 2020 and March 2021 at Saint Joseph Hospital was developed. The model estimates the costs and revenues associated with an increase in the use of the strategy of SLN detection with a MT versus an isotope over a three-year time horizon.

Results: Fifty-four patients were included: 20 in the isotope group and 34 in the MT group. The operating time was not statistically different between the two groups (67 minutes for the MT versus 68 minutes for the isotope, p = 0.89). Secretarial time was higher in the isotope group (25 min more than for the TM group). On the basis of 383 patients who underwent surgery the first year and assuming an increase in activity of 10% per year for the standard-of-care strategy and 11.5% for the innovative strategy, the revenues and costs for the hospital are projected to increase for both strategies. However, the increased use of MT would result in an estimated cost to the hospital of €11,639 (€9.06 per patient undergoing surgery) over a three-year period.

Conclusion: The MT detection method provides autonomy to the surgeon in SNL detection. Its cost must be weighed against the simplification of the preoperative patient journey. Its use during the COVID-19 health crisis helped make patient journeys safer by avoiding visits to nuclear medicine departments, thus limiting the risk of infection.

No conflict of interest.

72 (PB-072) Poster

The value of palpation, US and NMR in staging of axilla in patients with breast cancer in order to avoid unnecessary ALND

Z. Maksimovic[1], A. Curcic[1], R. Ljubisavljevic[1], I. Zarev[1], G. Velicanin[1], M. Misic[2], S. Mitrovic[2], Z. Mihajlovic[2], S. Bursac[2], J. Vukasinovic[2], E. Maljevac[3], D. Bihorac[3], Z. Babic[4], S. Vatricevic[4], N. Rsovac[4], A. Azanjac[5], D. Aleksandrovic[6], J. Tanasijevic[6], N. Kostic[6], D. Petkovic[6]. *[1]Health center Studenica Kraljevo, Surgery, Kraljevo, Serbia; [2]Health center Studenica Kraljevo, Radiology, Kraljevo, Serbia; [3]Diagnostic center EhoMc, Radiology, Novi Pazar, Serbia; [4]Health center Studenica Kraljevo, Pathology, Kraljevo, Serbia; [5]Polyclinic Materna, Gynecology, Cacak, Serbia; [6]Health center Studenica Kraljevo, Oncology, Kraljevo, Serbia*

Background: Even carefully done, ALND carries the risk for late complications and SLNB have to be performed in modern breast cancer surgery as a conditio sine qua non. We want to point out the insufficiency of palpation as a traditional method of axillary examination and importance of radiological, primarily US, findings of ipsilateral axillary lymph nodes.

Materials and Methods: The analysis included 173 patients with breast cancer operated in the General Hospital "Studenica" Kraljevo, from 10.03.2017. to 04.08.2019. Axillary examination was performed in all by palpation, in 151 by palpation and US (87%) and in 43 by palpation, US and NMR (25%). Preoperative findings were compared with the definitive PH findings of SLN or axillary dissects. The results were presented in a contingency table. The PPV, NPV, sensitivity and specificity were determined.

Results: By itself, the palpation had a false positive finding in 53%, a false negative in 36%, PPV 47%,NP 64%,sensitivity 49%, specificity 61%. Axillary US by itself had a false positive finding in 3%, a false negative in 25%, PPV

97%, NPV 75%, sensitivity 50%, specificity 99%. Breast NMR, although not a standard in axillary examination, showed extremely high validity with no false positive findings, false negative in 18%, PPV 100%, NPV 82%. Palpation and axillary US together was 4% false positive, 34% false negative, PPV 96%, NPV 66%, sensitivity 48% and specificity 98%. In this group, a part of patients with different palpation and US findings stands out. Thus, in 7 patients the positive palpation was confirmed by PH, although the US was negative, so in 11% of the patients disease was less staged with the US. In 33 patients (43%) the palpation was positive, the US was negative and the PH examination did not find metastases in the axillary lymph nodes. In 8 patients (13%) the palpation was negative, the US was positive, and the PH finding was also positive. There were no patients with negative palpation, negative US and PH confirmed metastase in axillay lymph nodes. The combination of palpation, US and NMR had no false positive,17% had a false negative result, PPV 100%, NPV 83%, sensitivity 33% and specificity 100%. Palpation as an individual, stand-alone method was accompanied by a high percentage of false-positive findings for cN1 axillary status, 53% in our series. 36 patients initially selected as cN1 by palpation were translated into cN0 thanks to US of axilla and SLNB was performed in them, with def, PH findings without metastases in SLN. Thus, 24% of unnecessary axilla disections were avoided.

Conclusions: Palpation is individually the most inaccurate method in axillary staging. US of axilla must be a necessary and indispensable part of diagnostic procedure. Breast NMR if performed can contribute to the same purpose. In case of significant discrepancy between palpation and US findings, the method of choice is US-guided biopsy suspected lymph node (FNAB/CNB).

No conflict of interest.

73 (PB-073) Poster

Margin status and Survival outcomes following breast conservation surgery: a metaanalysis

N. Bundred[1], J.R. Bundred[2], S. Michael[3], R. Cutress[4], B. Holleczek[5], K. Beckmann[6], J. Dahlstrom[7], B. Stuart[8], D. Dodwell[9]. *[1]University Hospital of South Manchester NHS Foundation Trust, Faculty of Biology, Medicine and Health, Manchester, United Kingdom; [2]Leeds Institute of Emergency Surgery, Leeds, United Kingdom; [3]Manchester Foundation Trust, Manchester, United Kingdom, Academic Surgery, Manchester, United Kingdom; [4]Southampton University, Surgery, Southampton, United Kingdom; [5]German Cancer Research Center DKFZ- Saarland Cancer Registry, Heidelberg, Germany; [6]ACT Pathology, Canberra Health Services and Australian National University Medical School, Pathology, Adelaide, Australia; [7]Australian National University Medical School, Pathology, Canberra, Australia; [8]Southampton University, Medical Statistics, Southampton, Australia; [9]Nuffield Department of Population Health, Nuffield Department of Population Health, Oxford, United Kingdom*

Background: International guidelines state any post-surgical tumour margin wider than tumour on ink (TOI) following breast conserving surgery (BCS) for early-stage invasive breast cancer is acceptable to prevent local recurrence (LR). The aim of this review was to determine if margin involvement is associated with distant recurrence (DR) and secondarily to determine the required margin to minimize both LR and DR.

A prospectively registered systematic review of literature was conducted according to PRISMA guidelines. The association between pathological margin status, DR and LR were considered using random effects modelling. Where applicable we categorised margins as TOI (tumour on ink = involved), close (no TOI but <2 mm), and negative (≥2 mm).

Data sources: MEDLINE (PubMed), Embase and Proquest online databases. Unpublished data were sought from authors.

Eligibility Criteria: Eligible studies reported on 1) Patients undergoing curative BCS (for stages I-III breast cancer), 2) allowed an estimation of outcomes in relation to margin status and 3) followed up patients for a minimum of 60 months. Patients with DCIS only or treated with neoadjuvant chemotherapy or by mastectomy were excluded.

Results: Sixty-eight studies comprising 112 140 breast cancer patients were included. Across all studies, 9.4% of patients had TOI and 17.8% had TOI or a close margin(<2 mm). Of studies with a minimum follow up of 60 months, patients with TOI margins had a pooled overall DR and LR risk of 25.4% (95%CI:14.5 to 40.6) and 15.9% (95%CI:10.5 to 23.2) respectively, whilst patients with tumour at or close to margins had a DR and LR risk of 8.4% (95%CI: 4.4 to 15.5) and 8.8% (95%CI: 6.3 to 12.4) respectively. Patients with negative margins had a DR and LR risk of 7.4% (95%CI:3.9 to 13.6) and 3.9%% (95%CI: 3.0 to 4.9) respectively. Compared to negative margins, TOI margins were associated with increased DR (Hazard ratio (HR): 2.10, (95% Confidence interval (CI) 1.65 to 2.69, $p < 0.001$)) and LR (HR: 2.04, (95%CI: 1.75 to 2.38), $p < 0.001$).

Close margins (no TOI to 2 mm) were associated with increased DR compared to negative margins (HR: 1.38, 95%CI: 1.13 to 1.69, $p < 0.001$), after adjusting for receipt of adjuvant chemotherapy. In 5 studies published since 2010, TOI margins were associated with increased DR (HR:2.41 95% CI:1.81 to 3.21, $p < 0.001$) as were TOI or close margins compared to negative margins (HR:1.44, 95% CI:1.22 to 1.71, $p < 0.001$).

Conclusions: Involved or close pathological margins after breast conserving surgery for early-stage invasive breast cancer are associated with increased DR and LR. These data suggest surgeons should aim to achieve a minimum clear margin of at least 1 mm. On the basis of current evidence, international guidelines should be revised.

Systematic Review Registration: PROSPERO: CRD42021232115

No conflict of interest.

74 (PB-074) Poster

The positive predictive value of breast lesions of uncertain malignant potential, their correlation with radiologic findings and their follow-up on a large single-institution series

M. Bernini[1], F. Spolveri[2], I. Meattini[3], A. Salerno[1], C. Tommasi[1], L. Tofani[4], D. De Benedetto[5], G. Bicchierai[5], F. Di Naro[5], C. Bellini[5], D. Morrone[6], J. Nori Cucchiari[5], S. Bianchi[7], L. Livi[3], L. Orzalesi[1]. *[1]Careggi University Hospital- Breast Surgery- Breast Unit- Oncology Department, Florence, Italy; [2]San Jacopo Hospital, Breast Surgery- Breast Unit, Pistoia, Italy; [3]Careggi University Hospital, Radiation Oncology- Breast Unit- Oncology Department, Florence, Italy; [4]University of Florence, Department of Statistic- Computer Science- Applications, Florence, Italy; [5]Careggi University Hospital, Diagnostic Senology Unit, Florence, Italy; [6]Villa Donatello Clinic, Diagnostic Senology Unit, Florence, Italy; [7]Careggi University Hospital, Pathology-Department of Surgery and Translational Medicine, Florence, Italy*

Background: Up to 10% of histological diagnoses following needle core biopsy (NCB) or Vacuum-Assisted Breast Biopsy (VABB) are lesions of uncertain malignant potential (B3). This study aimed to investigate the most appropriate therapeutic approach based on the association between each subtype of B3 lesions and malignancy.

Methods: Histopathological reports from 228 patients who received a diagnosis of B3 lesion following NCB or VABB between 2009 and 2016, were retrospectively collected and analyzed. All patients underwent excisional surgery. Mammogram findings were virtually measured and compared with surgical specimens. Thereafter, the correlation between NCB/VABB diagnosis and cancer risk was calculated by simple logistic regression. In addition, the association [sp1] between malignancy upgrade and type of mammographic findings was investigated. Patients without a cancer diagnosis after surgery underwent a 9-years median follow-up.

Results: A total of 226 patients were included. Mean diameter of mammographic lesions was 1.8 ± 1.5 cm while for surgical specimen was 5.9 ± 2.9 cm; ($p < 0.01$). The histopathology report showed 171 (75.6%) benign and 55 (24.3%) malignant lesions. In detail 111 (49.1%) atypical ductal epithelial proliferation (ADH), 40(17.7%) lobular intraepithelial neoplasia (LINs), 36 (15.9%) flat epithelial atypia, 19 (8.4%) radial scars, 9 (3.9%) phylloid tumors and 9 (3.9%) papillary lesions. PPV of B3 patients referred to surgery was 24.3% ($p < 0.05$) including 31 (13.7%) ductal carcinoma in situ (DCIS), 24 (10.6%) invasive carcinoma, and 1 (0.4%) malignant phylloid tumor. Relevant upgraded lesions were ADH with an overall upgrade rate of 34.2% (21.6% to DCIS and 12.6% to invasive carcinoma, $p < 0.05$) and LINs with an overall upgrade rate of 27.5% (15% to invasive carcinoma and 12.5% to DCIS, $p < 0.05$). The morphology of mammographic microcalcifications and tumor at operative histology were correlated ($p < 0.05$). After a 9-year median follow-up, 15 (8.9%) patients without tumor post-surgery were diagnosed with carcinoma and 7 (4%) with a new B3 lesion.

Table 1: Positive predictive value (PPV) of malignancy in B3 lesions by comparing post operative diagnosis with CNB/VABB diagnosis.

CNB/VABB	n (%)	Tumor	PPV (%)	Malignity Odds (95% CI)	p value
FEA	36 (15.93)	2	6.8	(1.9–21)	–
LIN	40 (17.70)	11	27.5	5.380 (16–44)	<0.05
ADH	111 (49.12)	38	34.23	7.229 (26–44)	<0.005
RS	19 (8.41)	0	2.5	0.354 (0.1–31)	0.51
Phylloid tumor	9 (3.98)	1	15	2.435 (2.8–52)	0.43
Papillary lesion	9 (3.98)	3	35	7.431 (12–68)	<0.05
Other	2 (0.88)	0	17	2.758 (0.5–89)	0.61
Total	226 (100%)	55	24.34	(19–30)	<0.05

Conclusions: According to the results of this study, ADH and LINs still require surgical excision for their significant PPV of malignancy. For other histological lesions, significance has not been reached, or the confidence intervals were too wide to confirm the utility of surgical excision.

No conflict of interest.

75 (PB-075) Poster

The place of videos illustrating the techniques of breast surgery in the procedural training of residents in gynecology

B. Bannour[1], R. Bannour[2]. [1]*Chu Farhat Hached, Obstetrics and Gynecology, Sousse, Tunisia;* [2]*University Hospital Farhat Hached of Sousse, Obstetrics and Gynecology, Sousse, Tunisia*

Background: In Tunisia, breast cancer is the leading cancer in women representing 30% of all female cancers. Mastery of breast surgery techniques is one of the objectives of the overall training of gynecology residents and one of the main skills required of medical specialists in gynecology.

The acquisition of this technical skill is not based exclusively on the psychomotor domain, but requires skills in the cognitive domain as well. The main model used in procedural training is observation theory.

The aim of the study was to assess the impact of video-based learning on learning new procedures and updating surgical skills among residents in gynecology; as well as the criteria for choosing these videos.

Material and methods: This is a descriptive cross-sectional study among gynecology residents of the maternity center of Sousse, Tunisia.

Were included Residents of gynecology who practice or have practiced in the maternity center of Sousse and who accepted to answer our anonymous questionnaire.

Data collection was carried out via a pre-established anonymous questionnaire sent by personal e-mail to residents.

Results: A total of 43 residents answered the questionnaire. The majority of respondents (76.7%) were and 19 respondents (44.2%) were in their terminal year of residency. Overall, 36 residents (83.7%) answered that they had already used videos to prepare for breast surgery. The main video sources used were youtube (69.4%) and Medtube (11.1%). The characteristics of the most appreciated video were presence of narration (21.6%), presence of illustration for didactic purpose (18.9%); image quality (16.2%), real time surgery videos (16.2%) and breast surgery done by a renowned surgeon (13.5%). The frequency of video use was once or twice a month in (26.8%) of cases, once a week (36.6%), several times a week (19.5%). the optimal time for viewing the video was the day before the operation (34.2%), throughout the residency period (52.6%) or after participation in the operation for better memorization (13.2%).

Finally 100% of residents recommend to their colleagues the use of videos for self-education in breast surgery.

Conclusion: Video-based learning seems to be a preferred method of surgical preparation among residents. Based on these findings we believe that the creation of quality and scientifically accurate videos appears to be the future landscape for video-based learning.

No conflict of interest.

76 (PB-076) Poster

The effect of intra-operative margin assessment during breast conserving surgery for breast cancer in a Dutch cohort

S. Wooldrik[1], E. Van de Voort[1], T. Klem[1]. [1]*Stichting Borstkankeronderzoek Rotterdam, Franciscus Gasthuis & Vlietland, Surgery, Rotterdam, Netherlands*

Background: In the Netherlands, 60% of all breast cancers are screening detected and not palpable on physical examination. Pre-operative tumour localisation is therefore essential to perform an oncological complete resection while preserving healthy breast tissue and good cosmesis. Intraoperative digital specimen mammography (IDSM), in which a 2-view mammography of the specimen without compression is made in the operation room, is an alternative to conventional specimen radiography (CSR) that has the benefit of providing immediate specimen evaluation and potentially decreasing operation time. Additionally, IDSM can reduce positive margins and re-excision rates. IDSM was implemented in our hospital in 2017. The objective of this study was to evaluate if the use of IDSM has measurable advantages over CSR.

Materials and methods: This is a monocentre retrospective cohort study with two groups: before and after implementation of IDSM. The primary outcome was mean duration of surgery. Secondary outcomes were number of re-excisions, number of positive margins, specimen weight and number of shaves. An unpaired t-test was used to compare duration of surgery and specimen weight between the two groups. A Chi-square test was used to compare the number of re-excisions and positive margins in both groups.

Results: A total of 1053 lumpectomies were included in this study: 552 in the before cohort and 503 in the after cohort. There was no significant difference in operation time: 62.63 min (SD1.284) in the before cohort vs. 61.22 min (SD 1.246) in the after cohort ($P = 0.429$). The number of re-excisions did not differ significantly: 8.2% in the before cohort vs. 10.1% in the after cohort ($p = 0.342$). There was no significant difference in number of positive margins: 4.3% in the before cohort vs. 6.2% in the after cohort ($p = 0.34$). Weight of the specimen did not differ significantly: 46.9gr (SD 2.49) in the before cohort vss 42.73gr (SD 2.6) in the after cohort ($p = 0.8$).

Conclusions: There was no significant difference in duration of surgery after implementation of IDSM. A possible explanation could be that the sentinel node procedure is frequently performed during the waiting period of the radiology result and that the radiology department was within 4 minutes walking distance from the OR. The number of re-excisions and the number of positive margins did not differ between both cohorts. This may be because these numbers were already quite low in our hospital. Further analyses will follow.

No conflict of interest.

77 (PB-077) Poster

Initial experience with targeted axillary dissection (TAD) guided by ultrasound in early-stage node positive breast cancer patients undergoing upfront surgery

C. Siso[1], J. Rivero[1], C. Morales[1], J. De la Torre[1], I. Vives[1], A.M. Rodriguez-Arana[1], I. Miranda[1], M.N. Rus[1], M. Espinosa-Bravo[1]. [1]*University Hospital Vall Hebron, Breast Cancer Unit, Barcelona, Spain*

Background: Since publication of ACOSOG Z0011 trial, the standard of care of early-stage breast cancer patients with 1–2 positive sentinel lymph nodes (SLN) is to avoid completion of node dissection, assuming the risk of leaving additional positive non-SLN in 27% patients without a detrimental effect on their disease free survival (DFS) or overall survival (OS).

The National Comprehensive Cancer Network (NCCN) in recent editions of their clinical guidelines recommended to extent this indication to patients that present with biopsy proven positive disease if only 1 or 2 suspicious nodes are found on imaging and the other eligibility criteria from the Z0011 study are otherwise met. This recommendation is based on an expert consensus and no prospective study has yet ascertain if it is the optimal method to stage the axilla in this patient population with risk of higher nodal disease load and extracapsular invasion.

Material and Methods: Between February 2019 and July 2022 patients with estrogen receptor positive (ER+) early-stage breast cancer (cT1–2) with limited nodal disease by ultrasound (cN1), defined as only 1 or 2 suspicious nodes confirmed by biopsy, were included. Once neoadjuvant systemic treatment was ruled out by medical oncologist, upfront surgery was proposed performing a TAD including removal of SLN and metastatic lymph node biopsied, which previously was marked with an ultrasound visible marker (hydromark™). SLN and clipped node retrieval were performed using radioactive dye (Tc99) ± blue dye and intraoperative ultrasound guided surgery, respectively. Completion node dissection (CND) was not mandatory, but recommended if the clipped positive node or SLN were not removed.

Results: A total of 13 patients were included. Except one patient, all were postmenopausal women with a median age of 72 years. Most frequent histology was invasive ductal carcinoma (10/13) and luminal A like subtype (10/13). SLN and clipped node were successfully retrieved in 10/13 and 13/13, respectively. Clipped node was confirmed to be positive in all cases (13/13), but SLN was reported as negative in 3/10 patients. None of the patients reported 3 or more positive nodes with TAD. However, CND was performed in 8/13 patients finding additional positive nodes in node dissection in 5/8 patients, of which 2 were upstaged to pN2a.

Conclusions: Early-stage clinically node positive breast cancer patients seem to have a higher node disease burden than patients with metastases found incidentally in SLN biopsy. Prognostic impact of this residual node disease, taking into account systemic therapy and radiotherapy, remains unknown. Retrieval of clipped node by ultrasound guided surgery has been shown to be a feasible and confident technique.

No conflict of interest.

78 (PB-078) Poster

The Impact on Management and Outcomes of Benign and High-Risk Breast Lesions After the Introduction of Vacuum Assisted Excision

S. Wooldrik[1], E. Van de Voort[1], T. Klem[1], G. Struik[1], E. Birnie[2], R. Sinke[3], M. Macco[4], K. Verhoef[5]. [1]*Stichting Borstkankeronderzoek Rotterdam, Franciscus Gasthuis & Vlietland, Surgery, Rotterdam, Netherlands;* [2]*Franciscus Gasthuis & Vlietland, Statistics, Rotterdam, Netherlands;* [3]*Franciscus Gasthuis & Vlietland, Pathology, Rotterdam, Netherlands;* [4]*Franciscus Gasthuis & Vlietland, Radiology, Rotterdam, Netherlands;* [5]*Erasmus MC, Surgery, Rotterdam, Netherlands*

Background: For benign lesions up to 3 cm, previous studies have shown that vacuum assisted excision (VAE) is a safe and effective alternative for surgical excision. However, the use of VAE for the management of high-risk lesions is controversial and guidelines are ambiguous. This study describes the impact of the implementation of VAE in terms of management and outcomes.

Methods: A single centre retrospective cohort study with two cohorts: 'before' and 'after' implementation of VAE was conducted. All patients with a benign or high-risk lesion excised by VAE or surgical excision (SE) from 2016 up to 2019 were included. Excision, complication and upgrading rates were compared using Chi-square or Fisher's exact test. Cox regression was used for the evaluation of recurrences and re-excisions.

Results: A total of 103 surgically excised lesions in the before, and 216 lesions in the after cohort (98 SEs, and 118 VAEs) were included. After implementation, Benign lesions were significantly more often managed by VAE (101/164, 62%, $p < 0.001$). Re-excision, recurrence, and complication rates were comparable between the two cohorts (3.9% versus 3.7%, $p > 0.99$; 2.9% versus 1.9%, $p = 0.750$; 4.4% versus 6.7%, $p = 0.595$), also for high-risk lesions separately.

All lesions	Before n (%) n = 103	After (All) n (%) n = 216	P-value[a]	After SE n (%) n = 98	After VAE n (%) n = 118
Complete excision					
Yes	79 (76.7)	190 (88.0)	0.003	89 (90.8)	101 (85.6)
No	18 (17.5)	12 (5.6)		9 (9.2)	3 (2.5)
Not assessable	6 (5.8)	14 (6.5)		–	14 (11.9)
Re-excision					
Yes	4 (3.9)	8 (3.7)	> 0.999[c]	4 (4.1)	4 (3.4)
No	99 (96.1)	208 (96.3)		94 (95.9)	114 (96.6)
Hazard ratio (95% CI)	1.06 (0.32–3.54)		0.924[d]		
Time to re-excision in months, median (IQR)	13.4 (1.8–25.8)	2.6 (1.5–12.7)	0.461[b]	1.6 (1.2–2.5)	12.0 (4.5–20.0)
Recurrence					
Yes	3 (2.9)	4 (1.9)	0.685[c]	–	4 (3.4)
No	100 (97.1)	212 (98.1)		98 (100)	114 (96.6)
Hazard ratio (95% CI)	0.79 (0.18–3.54)		0.754[d]		
Time to recurrence in months, median (IQR)	24.4 (NA)	10.9 (6.9–18.6)	0.057[b]	–	10.9 (6.9–18.6)
Upgrade to DCIS or IC					
Yes	5 (4.9)	3 (1.4)	0.117[c]	2 (2)	1 (0.8)
No	98 (95.1)	213 (98.6)		96 (98)	117 (99.2)
Complications (per procedure)	n = 90	n = 195		n = 82	n = 113
No	86 (95.6)	182 (93.3)	0.595[c]	78 (95.1)	104 (92)
Yes	4 (4.4)	13 (6.7)		4 (4.9)	9 (8)

[a]Chi-square test was used unless indicated otherwise; [b]Mann-Whitney U test, [c]Fisher's exact test, Cox regression. NA: not applicable, the value could not be calculated due to low absolute numbers.

Conclusions: VAE can be implemented safely and effectively for both benign as high-risk breast lesions. After implementation, recurrence, re-excision, upgrade and complication rates remained low even for high-risk lesions excised with VAE. Future studies should focus on larger prospective cohorts with long-term follow-up after VAE to conclude on its the safety an applicability for high-risk lesions.

No conflict of interest.

79 (PB-079) Poster

Ferromagnetic seed in breast surgery (lumpectomy and targeted axillary dissection (TAD)): our experience since 2018

Y.A. Martínez Mateo[1], I. Revollo Revollo[1], J.J. Collado Sánchez[2], F.J. García Mancha[2], M.A. Granados Lastra[3], A. Montero Panadero[3], F. García Izquierdo[1]. [1]*Complejo Hospitalario de Cáceres, General Surgery, Cáceres, Spain;* [2]*Complejo Hospitalario de Cáceres, Radiology, Cáceres, Spain;* [3]*Complejo Hospitalario de Cáceres, Gynecology, Cáceres, Spain*

Background: In the last decades the lumpectomy is the most frequent surgery in breast cancer and in non-palpable breast tumors we need a guide. In the last years a lot of kind of seeds are used to guided breast surgery, one of them the ferromagnetic seed called Magseed®

In our hospital we start to use Magseed® in 2018 and we present in this paper our experiences using Magseed® in lumpectomy and TAD.

Material and methods: We have analyzed all the breast surgeries guided by ferromagnetic seed since November 2018 to July 2022, that mean: 253 patients, 282 ferromagnetic seeds, 235 lumpectomies using 246 ferromagnetic seeds and 36 TAD.

Also, radiologists and surgeons filled a questionnaire about the use of ferromagnetic seed in the first 43 patients.

Results: 100% of ferromagnetic seeds were removed in lumpectomies and TAD.

Negative margins were achieved in 220 patients (86.95%) Breast cancer type in patients who need a second surgery were: 1 lobular carcinoma + intraductal carcinoma, 6 invasive ductal carcinoma, 5 invasive ductal carcinoma + intraductal carcinoma, and 21 intraductal carcinoma.

Of 33 patients with Magseed® marking an axillary lymph node, 3 were more than 10 mm from the lymph node, to removed this three nodes in 2 patients were guide by ultrasonography.

3 radiologists made the questionnaire comparing the use of wire and magnetic seed, an all of them consider that the implantation of magnetic seed were easier than wire implantation using mammographic X-ray, but using ultrasound were no differences.

7 surgeons made the questionnaire comparing wire guided lumpectomy versus magnetic seed guided lumpectomy and 6 of them consider the magnetic seed guided lumpectomy easier, and one of them answered that both surgeries were similar.

Also it was analyzed the duration of surgery and this was shorter using the magnetic seed (20.37 min. Magseed® guided vs 25.06 min. wire guide surgery).

Conclusion: The use of magnetic seed in breast surgery has good results.

Its implantation is easy and sure and it can make more than 30 days before surgery.

The whole surgery is shorter using the magnetic seed.

No conflict of interest.

Other Substantive Relationships: Registration to EBCC 13 sponsored by Sysmex.

80 (PB-080) Poster

Nipple-sparing mastectomy with primary breast reconstruction: Breast cancer local recurrence according to molecular subtype

D. Golijanin[1,3], Z. Radovanovic[1,3], D. Radovanovic[2,3], A. Djermanovic[1], M. Djuric[1,3], S. Zahorjanski[2,3], D. Lukic[1], M. Kresoja Ignjatovic[1,3], M. Protic[1,3]. [1]*Oncology Institute of Vojvodina, Department of Surgical Oncology, Sremska Kamenica, Serbia;* [2]*Oncology Institute of Vojvodina, Department of Anesthesiology, Intensive Therapy and Care, Sremska Kamenica, Serbia;* [3]*University of Novi Sad, Faculty of Medicine, Novi Sad, Serbia*

Background: The purposes of this study were to assess local recurrence in breast cancer patient after nipple-sparing mastectomy with primary reconstruction relative to 1) Ki67 values and molecular subtypes of the initial lesions and 2) size of the initial tumor and size of the implant.

Materials and Methods: 156 breast cancer patients mean age of 51.5 years (26–75) who underwent nipple sparing mastectomy (NSM) with primary implant breast reconstruction were analyzed. Mean follow up was 59 months (17–85). Molecular subtypes, Ki67 values, estrogen receptor (ER), progesterone receptor (PR) and Her2 status were recorded for each patient. Additionally, information regarding the size of implant and initial tumor size were collected. The information was used to assess for local recurrence. For univariate analyses of risk factors Chi-square and t test for independent samples were used. For the multivariate analyses, a Cox proportional-hazards model was used.

Results: NSM was primary treatment for breast cancer in 122/156 (78.2%) patients while 34/156 (21.8%) patients received neoadjuvant chemotherapy followed by surgery. Luminal B was the most frequent molecular subtype detected in 82/156 patients (52.6%). Luminal A was detected in 37 (23.7%) patients while HER2 enriched subtype was detected in 17/156 (10.9%) patients. Ki-67 expression was low in 13/156 (8.3%) patients, medium expression was detected in 78/156 (50%), while high expression was present in 58/156 (37.2%) patients. Local recurrence was noted in 17/156 (10.9%) patients. Lower ER ($p = 0.043$) and PR ($p = 0.018$) expression were significant risk factors for local recurrence.

Conclusions: In this patient cohort low ER and PR expression were risk factors for local recurrence of breast cancer. Ki67 status and molecular subtype were not statistically significant risk factors for local recurrence.

Additionally, size of the initial tumor and size of the implant were not risk factor for local recurrence. These findings are consistent with the current literature and should be utilized when discussing treatment options and potential clinical outcomes with patients prior to surgical management.

No conflict of interest.

81 (PB-081) Poster

Efficacy of pre-operative axillary ultrasonography in excluding nodal disease – can it replace sentinel lymph node biopsy in early stage breast cancer?

N. Javed[1], E. Iqbal[2], S. Afzal[3], B. Rehman[3], M.A. Parvaiz[3]. *[1]Shaukat Khanam memorial cancer hospital & research centre, Surgical oncology/ breast surgery, Lahore, Pakistan; [2]Sahara Medical College, Surgery, Narowal, Pakistan; [3]Shaukat Khanum Memorial cancer hospital and research centre, Surgical Oncology, Lahore, Pakistan*

Background: We designed this study to determine the false negative rate (FNR), negative predictive value (PPV) and the factors predicting false negativity of pre-treatment axillary ultrasound (AUS).

Materials & methods: We retrospectively selected patients with normal lymph nodes on ultrasound, T1, T2 or T3 tumors, invasive cancer, who underwent sentinel lymph node biopsy (SLNB), between January 2019 and December 2020 at Shaukat Khanum Memorial Cancer Hospital, Lahore, Pakistan. Ultrasound findings were compared with the SLNB results, dividing our study population into False Negative (FN) and True Negative (TN) groups. Clinical, radiological, histopathological parameters and therapeutic strategies were compared between the two groups.

Results: Out of 781 patients, 627 (80.2%) had TN, while 154 (19.7%) had FN ultrasound results, with NPV of 80.2%. On univariate analysis, initial tumor size, histopathology, tumor grade, receptors, timing of chemotherapy, and type of surgery were found to have statistically significant difference between the FN and TN AUS groups. On multivariate analysis, tumor size, grade, Progesterone receptor, and human epidermal growth factor receptor 2 (HER 2 neu) status were found to be the significant predicting factors for FN AUS results. Larger, high grade, PR negative and HER 2 neu positive tumors were found to be associated with lower FNR on AUS.

Conclusion: Axillary ultrasound is effective in ruling out axillary nodal disease especially in patients with high burden axillary disease, aggressive tumor biology, larger tumor size and higher grade. However, we should be especially cautious while interpreting the results of AUS in case of lobular histology.

No conflict of interest.

82 (PB-082) Poster

Time to surgery after completion of neoadjuvant chemotherapy does not negatively impact recurrence and survival outcomes in breast cancer patients

S. Bek[1], S. Du De Xuan[1], R. Sultana[2], Q.T. Tan[3]. *[1]National University of Singapore - Yong Loo Lin School of Medicine, Undergraduate, Singapore, Singapore; [2]Duke NUS Medical School Singapore, Undergraduate, Singapore, Singapore; [3]KK Women's and Children's Hospital Singapore, Breast, Singapore, Singapore*

Background: The effect of time to surgery after completion of neoadjuvant chemotherapy and outcomes in breast cancer patients remains poorly defined and unclear. Acceptable time to surgery has frequently been arbitrarily defined as between four to eight weeks. Various factors including resource limitation, scheduling conflicts, complications after chemotherapy, patient hesitation or interruptions from major events such as the recent Covid-19 pandemic can delay time to surgery, raising concern of an adverse impact on recurrence and survival outcomes. This study aims to ascertain if time to surgery after completion of neoadjuvant chemotherapy impacts disease free survival (DFS) and overall survival (OS).

Materials and methods: This single-institution retrospective study included patients who underwent neoadjuvant therapy and subsequent surgery from 2006 to 2017. Demographic, clinicopathological factors and surgical data from 250 patients were analysed. 105 patients received surgery within 28 days (group 1). 119 patients received surgery within 29 to 56 days (group 2), and 26 patients received surgery after 57 days or more (group 3). DFS and OS among the three groups were compared.

Results: Age, race, pre-chemotherapy stage, tumour type, grade, hormone receptor status, Her2 status, focality, lymphovascular invasion (LVI), radiological response to chemotherapy, type of surgery, pathological response to chemotherapy, and receipt of adjuvant radiotherapy were not significantly different between the three groups. Receipt of adjuvant chemotherapy was statistically significant ($p = 0.0248$) with 39 patients (37.1%) in group 1, 32 patients (26.9%) in group 2 and 3 patients (11.5%) in group 3 receiving further chemotherapy after surgery. Mean follow-up duration was 44.5 months. DFS and OS between the three groups were not found to be significantly different ($p = 0.5920$ and $p = 0.6133$ respectively).

Conclusion: Time to surgery after completion of neoadjuvant chemotherapy did not appear to affect recurrence or survival outcomes. This result was demonstrated despite fewer patients in the group with the longest duration to surgery receiving adjuvant chemotherapy. This may be due to the efficacy of neoadjuvant chemotherapy in decreasing or eliminating micrometastatic disease, an important factor in cancer recurrence and survival. Limitations of this study includes its retrospective nature and small sample size. Findings from this study may allow more flexibility and reduce the burden of scheduling patients for surgery within the usual four to eight week window in centres with resource and scheduling constraints. Further studies examining a larger population over a wide range of time durations could help clinicians better tailor time to surgery after neoadjuvant therapy.

No conflict of interest.

84 (PB-084) Poster

Quality of life and lymphedema incidence after axillary surgery in pN1 breast cancer patients: lymphadenectomy vs. Sentinel lymph node biopsy

J. Jimeno Fraile[1], J. Anchuelo[2], M.J. Sánchez[3], S. Lopez[3], J. Albendea[2], A. Alonso[4], S. Hermana[5], S. Sánchez[6], C. Ruiz-Rueda[7], S. Nombela[7], F. Hernanz[8]. *[1]Hospital Universitario Marqués de Valdecilla, General Surgery. Breast Unit, Santander, Spain; [2]Hospital Universitaro Marqués de Valdecilla, Radiation Oncology, Santander, Spain; [3]Hospital Universitaro Marqués de Valdecilla, Physical Medicine and Rehabilitation, Santander, Spain; [4]Hospital Universitaro Marqués de Valdecilla, General Surgery, Santander, Spain; [5]Hospital Universitaro Marqués de Valdecilla, Pathology, Santander, Spain; [6]Hospital Universitaro Marqués de Valdecilla, Radiology, Santander, Spain; [7]Hospital Universitaro Marqués de Valdecilla, Breast Unit, Santander, Spain; [8]Hospital Universitaro Marqués de Valdecilla, General Surgery, Breast Unit, Santander, Spain*

Introduction: In the last decade, there has been a paradigm shift in axillary management in patients with breast cancer: the possibility of avoiding axillary lymph node dissection (ALND) in a specific group of breast cancer patients with axillary disease, to decrease the axillar surgery-related morbidity.

Objectives: To Assess the impact on the quality of life (QoL) of ALND vs. Sentinel lymph node dissection (SLN) associated with radiotherapy for patients with node-positive breast cancer. To Appraise the incidence of lymphedema after axillary treatment in both groups.

Methods: Retrospective observational study of surgery patients with node-positive breast cancer (pN1), at a university center from 2018 to 2019. In addition, a cross-sectional study was performed between May to July 2022 to assess the incidence of arm lymphedema measured by circometry and appraise QoL. We use the QLQ-BR23 questionnaire to assess the general QoL, and ULL-27 questionnaire to appraise the specific QoL scale in upper limb lymphedema, both for Spanish population.

Results: 114 patients completed the questionnaires and measurements: 68 ALND patients and 46 SLN, with 40.8 months postoperative follow-up. The scores on both questionnaires were similar in all dimensions explored in both groups of patients, without significant clinical or statistical differences. In the lymphadenectomy group, the incidence of lymphedema was higher (32.4% vs 10.9%; $p = 0.006$). The QoL of lymphedema patients were globally similar than no lymphedema patients, but the QoL of symptomatic lymphedema was worse (BR-23: perspective dimension 56.9 vs 72.4, $p = 0.002$; sexual function 61.6 vs 77.9 $p = 0.002$ and ULL-27 (best 0 worse 100): physical dimension 37.8 vs 19.1 $p = 0.003$).

Conclusions. The axillary node dissection does not produce a significant impact on the quality of life of patients with breast cancer and axillary

involvement, despite developing lymphedema more frequently. The symptomatic lymphedema patients have worse quality of life.

No conflict of interest.

85 (PB-085) Poster

Fluorescence guided fully endoscopic axillary dissection for locally advanced breast cancer. A feasible novel technique

E. York[1], J. Guevara[2], J. Gómez[2], R. Corripio[2], C. Zapata[2], M. Recarte[2], J.I. Sánchez[3], I. Larrañaga[4], C. Fondevila[2]. *[1]La Paz University Hospital, General Surgery, Breast Surgery, Madrid, Spain; [2]Hospital La Paz, Surgery, Madrid, Spain; [3]Hospital La Paz, Gynecology, Madrid, Spain; [4]Hospital Mutua Tarrassa, Surgery, Barcelona, Spain*

Background: Axillary dissection for breast cancer has become a less needed procedure during recent years, mainly because of the downstaging reported after neoadjuvant systemic treatment.

However, there is still a few scenarios in which a patient can benefit from a complete axillary dissection, this is the case in high axillary tumor burden (T2-3) or absence of complete radiologic axillary response after neoadjuvant chemotherapy (NAC).

Our group has been performing SLNB with indocianine green (ICG) since 2018, and has also actively developed endoscopic techniques.

Material and methods: We inject 0.5 ml standard concentration ICG into the subdermal periareolar space, then we approach axillary dissection, using 3 balloon trocars in the lateral aspect of the ipsilateral thorax on the subcutaneous layer.

We insufflate low pressure CO2 to open a virtual space in which we are able to identify all the anatomical landmarks, to limit our dissection as we would in open surgery, there are certain differences in the sequence in which we approach these anatomical landmarks, for example, we start by identifying the neurovascular pedicle of the Latissimus Dorsi muscle from its insertion towards the axillary vein, then we dissect the vein medially and look for the long thoracic nerve. During this dissection we also identify and preserve the intercostobrachial plexus, and in the end, we are able to see our fluorescent lymphatic nodes within the axillary fatty tissue that remains on the upper aspect of our surgical field and we proceed to dissect and extract it through the most distal trocar (Hasson) used for the optic. We then place a drain through one of the 5 mm trocar incisions.

Results: From February 2021 to December 2021 we performed 7 procedures, all of the patients had previously received NAC due to locally advanced disease, axillary dissection was indicated due to initial stage N2 or above (2 cases) or absence of complete response after NAC (5 cases). All patients had simultaneous breast preserving surgery on primary tumor (oncoplastic periareolar approach). The average number of lymph nodes dissected was 17 (8–32) with a media of 2 (0–9) affected nodes.

We did not register any complications during follow up, patients refer satisfactory outcomes in terms of upper limb function, pain control and sensibility preservation on internal aspect of the arm, this information was gathered during outpatient follow up of 8–18 months.

Conclusions: Fully endoscopic approach for axillary dissection with ICG is an oncologically safe alternative for locally advanced breast cancer patients who would benefit from this procedure. The experience in terms of recovery and function preservation are promising, and we believe that learning curve and technical aspects need further investigation, as well as long term follow up to assess possible reduction in lymphoedema and other complications.

No conflict of interest.

86 (PB-086) Poster

Magnetic delayed sentinel lymph node dissection in primary systemic therapy. Implications for enhanced axillary mapping (Update)

E. Pantiora[1], S. Eriksson[2], D. Bacovia[3], F. Wärnberg[4], A. Karakatsanis[5]. *[1]Uppsala University, Department for Surgical Sciences, Uppsala, Sweden; [2]Uppsala University, Center of Clinical Research, Västerås, Sweden; [3]Uppsala University, Department of Clinical Pathology, Uppsala, Sweden; [4]Gothenburg University, Department of Surgical Sciences, Gothenburg, Sweden; [5]Uppsala University, Department of Surgical Sciences, Uppsala, Sweden*

Background: Superparamagnetic Iron Nanoparticles (SPIO) have been used for Sentinel Lymph Node Detection in breast cancer with equivalent efficacy to Radioisotope (RI) ± blue dye while facilitating logistics and leading to successful SLND even when injected up to eight weeks before surgery. However, neither the role of SPIO for SLND after primary systemic therapy (PST) nor the maximum timeframe from SPIO administration to successful SLND have been adequately defined.

Methods: Patients originally cN0/1 planned for PST were included. All with cN0 axilla underwent SLND while patients with cN1 who converted to ycN0 received targeted axillary dissection (TAD) with a paramagnetic clip. All patients received SPIO either before PST or before surgery and RI was injected on the day of surgery.

Results: In total, 114 patients were included in the analysis (median age 56 yrs; iqr 45, 68, median BMI 25.1 kg/m^2; iqr 22.9, 28.8), of which 91 (79.8%) received chemotherapy ± targeted therapies and 23 (20.2%) endocrine therapy. SLND was performed in 81 (71.1%) and TAD in 33 (28.9%) of patients. SPIO was injected within a week to surgery in 74 (64.9%) patients and longer than a week before in 40 (35.1%), in a median of 2 days (range 0–248) for the entire cohort. At least one SLN was detected in 97.4% with SPIO and 92.1% with RI ($p = 0.149$) while the combination was successful in 100%. At least one SLN was concordant for SPIO and RI in 83.3% of patients. The median (iqr) lymph node yield was 3 (2,4) for SPIO, 2 (2,3) for RI and 3 (2,4) for the combination ($p < 0.001$). Time from SPIO injection to surgery affected detection (Spearman's rho: 0.194, $p = 0.039$) but not number of SLNs (rho: –0.062, $p = 0.511$) or concordance per patient (rho: –0.057, $p = 0.544$). The addition of SPIO to RI significantly increased overall detection rate (difference 7.9%, $p = 0.008$), but the addition of RI to SPIO did not significantly improve overall detection (difference 2.6%, $p = 0.248$).

In patients undergoing TAD ($n = 33$), detection was 100% for SPIO and 90.9% for RI ($p = 0.248$). The index node was magnetic in 89.3% and radioactive in 64.3% ($p = 0.035$), an outcome not affected by any factors.

A median (iqr) of 1 (1,2) axillary metastases were found in 25 patients (21.9%). SPIO detection was 100% and RI detection was 70.8% ($p = 0.023$). SPIO detected more metastatic SLNs than RI (median[iqr] 1 (1,1) vs 1 (0,1); $p = 0.005$). In completion ALND, additional metastatic nodes were found in one patient (4%).

Conclusions: In this well-defined single-arm cohort study, SPIO performed comparably to RI, but detected more SLNs and had higher detection of metastatic SLNs. Injection before PST is not only feasible, but does not seem to affect concordance with RI. These findings support the use of SPIO in PST patients and motivate more dedicated research in the concept of delayed SLND in this setting.

No conflict of interest.

87 (PB-087) Poster

The role of axillary staging in patients with Ductal Carcinoma In Situ (DCIS) on diagnostic tissue biopsy

U. Jain[1], A. Kothari[1], A. Malhotra[2], H. Hamed[1], A. Purushotham[1,3]. *[1]Guy's and St Thomas' NHS Foundation Trust, Breast Surgery, London, United Kingdom; [2]Guy's and St Thomas' NHS Foundation Trust, Pathology, London, United Kingdom; [3]King's College London, King's Health Partners Integrated Cancer Centre, London, United Kingdom*

Background: There is an inherent risk of overestimating the risk of co-existing invasive disease in patients with DCIS on a diagnostic core needle biopsy. This results in a potential escalation of surgical intervention with the introduction of a diagnostic SLNB for the synchronous staging of the axilla which may result in additional morbidity. Patients with pure low-grade DCIS (LG DCIS) do not benefit from SLNB at the time of their primary surgery as the incidence of upgrade to microinvasion/ invasion is very low. We, therefore, restricted the scope of this study to look at the role of SLNB in Intermediate-Grade DCIS (IG DCIS) and High-Grade DCIS (HG DCIS) only.

Methodology: We conducted a retrospective audit of patients diagnosed with IG DCIS and HG DCIS on image-guided diagnostic needle biopsy from July 2016 to October 2020 at Guys Hospital, UK, a tertiary academic cancer centre. Patient-level data were obtained from electronic hospital records following approval from the Trust Audit Committee. We looked at all patients that underwent either, a wide local excision (WLE) or a mastectomy with SLNB for pure DCIS. Patients with mixed areas of IG and HG DCIS and contralateral invasive breast cancers were excluded. Patients who underwent surgery elsewhere were also excluded.

Results: In all, 81 patients with IG and HG DCIS comprised the whole cohort. After exclusion, a total of 15 with pure IG DCIS and 46 with pure HG DCIS on diagnostic biopsy were included for analysis. Total upgrade rate from IG DCIS to invasion/microinvasion was 20%. SLNBs were performed on 9 patients in the IG DCIS cohort, the total incidence of node positivity was 0%. Total upgrade rate from HG DCIS to invasion/microinvasion was 30.4% (14/46). SLNB was performed in 29 patients in the HG DCIS cohort. In all, 10.3% (3/29) patients had a positive sentinel lymph node, 2 harboured macrometastases (6.8%) and 1 had micrometastasis. The total incidence of node positivity in HG DCIS was 6.5% (3/46). No further axillary surgery was performed on any of these patients. They were considered "low burden" disease as per ACOSOG Z11/ AMAROS criteria and 1 patient had additional tangents of RT to cover mid axilla.

Conclusion: This data demonstrates that there is no role of SLNB in patients with IG DCIS. While the incidence of node positivity was 6.5% for HG DCIS, the surgical management of the axilla did not change further in the 3 patients with a positive SLN. The results of the SENTINOT study are hypothesis-generating with effective use of superparamagnetic iron oxide (SPIO) in identifying SLN at a later stage in women undergoing surgery for DCIS, thus avoiding SLNB in 78.3% patients. We propose conducting larger trials to test the efficacy and safety of SPIO, in patients undergoing mastectomy for HG DCIS due to their risk of invasion which will also avoid morbidity associated with SLNB.

No conflict of interest.

89 (PB-089) Poster

Accuracy of pre-operative axillary US and biopsy in breast cancer patients

S. Hudson-Phillips[1], N. Patel[1], H. Akthar[1], A. Morris[1], L. Noor[1]. [1]*Croydon University Hospital, Department of Breast & Oncoplastic Surgery, London, United Kingdom*

Background: Axillary lymph node status is an important factor in prognosis and treatment decision making of breast cancer. Ultrasound scan (US) is a useful tool in pre operative assessment axilla in patients with breast cancer and plays a pivotal role in the surgical management of axilla, sentinel lymph node biopsy (SLNB) vs axillary lymph node clearance (ALNC). The sensitivity of pre operative axillary US varies widely among centres, however the standard for the identification of metastatic axillary lymph nodes on pre-operative ultrasound and biopsy is 40–50% as per NICE Guidelines. The aim of this study is to assess local adherence to these targets through highlighting positive sentinel lymph node biopsy results in clinically node negative patients.

Material and methods: A retrospective study including all symptomatic patients with biopsy confirmed breast cancer in 1 year time frame, who had axillary US with or without biopsy prior to curative breast cancer surgery at a local breast unit. Data was collected by reviewing digital case records of patients. Radiology, surgery and Pathology reports were reviewed to obtain required information about results of pre operative axillary US ± biopsy, intra-operative assessment of sentinel lymph node biopsy on OSNA and axillary node clearance.

Results: A total of 170 patients had US with or without nodal biopsy for pre operative staging of axilla prior to breast cancer surgery. 131 had normal axillary US while 39 patients with abnormal or indeterminate lymph nodes on US had axillary node biopsy. 14 out of 39 had benign biopsy results while 25 patients with positive nodes proceeded directly to ANC. Out of 145 patients who underwent SLNB procedure, 26 had positive SLNB, 16 macrometastasis and 10 with micrometastasis on OSNA. The sensitivity of pre operative axillary ultrasound nodal found to be 60% and accuracy 90%.

Conclusion: Our local practice for ultrasound sensitivity is 60% which is above guidelines set by RCR and NICE. 25 patients with positive axilla on pre operative ultrasound and biopsy were spared the additional step of SLNB.

No conflict of interest.

90 (PB-090) Poster

Does preservation of intercostobrachial nerve during axillary lymph node dissection in breast cancer have a positive impact on chronic pain, sensory changes, and quality of life?

J.R. Vishnoi[1], A. Sasidhar[1], S. Misra[1]. [1]*All India Institute of Medical Sciences, Jodhpur, Surgical Oncology, Jodhpur, India*

Background: Breast cancer survivors suffer from various survivorship issues, including persistent pain, sensory changes, and poor quality of life, often overlooked in traditional mortality and morbidity indicators. The study's objective was to determine whether intercostobrachial nerve (ICBN) preservation resulted in reduced chronic pain, sensory changes, and improved quality of life in breast cancer survivors.

Material and Methods: A prospective observational study was conducted between 2018 and 2020 among 81 breast cancer patients undergoing axillary lymph node dissection and was divided into two cohorts based on the ICBN preservation or division.

Results: ICBN preserved group had statistically significant less frequent sensory changes at discharge 51.5% vs. 87.5% ($p = <0.001$) which improved at six months 27.3% vs. 72.7% ($p = <0.001$). Clinically significant pain was reduced in the ICBN preservation group by 15.2% vs 84.8% ($p = <0.001$). Similarly, it had significantly better scores in physical and emotional functioning domains in EORTC QoL and fewer scores in symptom scales of pain and fatigue.

Conclusion: Our study shows that preservation of the intercostobrachial nerve is associated with significantly reduced pain in the chest wall, axilla, and arm, lesser sensory changes, and improved quality of life.

No conflict of interest.

POSTER SESSION **16 November 2022**

Screening

91 (PB-091) Poster

Effect of socio-economic status and acculturation on breast cancer screening in Asian American women

D. Stan[1], J. Yang[1], D. Wahner-Roedler[1], M. Venegas-Pont[1], A. Sandhu[2], K. Fischer[3], B. Bauer[1], L. Rutten[4], T. Brockman[4], M. Valdez Soto[4], C. Wi[5], K. Yost[6]. [1]*Mayo Clinic, Internal Medicine, Rochester, USA;* [2]*University of Minnesota, Student, Minneapolis, USA;* [3]*Mayo Clinic, Statistics, Rochester, USA;* [4]*Mayo Clinic, Health Sciences, Rochester, USA;* [5]*Mayo Clinic, Pediatric and Adolescent Medicine, Rochester, USA;* [6]*Mayo Clinic, Epidemiology, Rochester, USA*

Background: Racial groups in the Unites States (US) have lower breast cancer (BC) screening rates than white Americans. Asian Americans groups experienced increasing incidence of BC. Data is limited on BC screening participation in this population.

Aim: To study the effect of socioeconomic status (SES) and acculturation (adaptation to local culture) on: screening mammogram participation, knowledge of BC symptoms/risk factors and on barriers to seeking medical care, in Asian American women of Chinese and Hindi origin from 4 counties around Mayo Clinic, Rochester, Minnesota, USA.

Methods: We identified females older than 39 years of age, without BC, of Chinese and Hindi ethnicity, residing in four counties in Minnesota, in the Rochester Epidemiology Project (REP) database.

We mailed out a survey containing the Suinn-Lew Asian Self-Identity Acculturation (SL-ASIA) scale and the Breast Cancer Awareness Measure (CAM), both in English and Chinese or Hindi translations.

SL-ASIA scores range from 1 (mostly Asian) to 5 (mostly Westernized). The CAM tool surveys mammogram behaviors, BC symptoms/risk factors (score 0–3) and barriers to seeking medical care. Mammogram participation was also derived from the REP database.

SES was measured through the HOUSES index, a measure of the value of the participant's property, derived from the home address and scored as quartiles from 1 to 4 (higher numbers = higher SES).

We performed univariate logistic regression analysis between SES and acculturation with the following outcomes: mammogram participation, BC knowledge, barriers to medical care.

Results: 553 women were eligible, 82 (15%) responded, 53 Chinese and 29 Hindi. Mean age of responders was 55 (57 for non-responders), mean acculturation score was 2.3 for Chinese and 2.6 for Hindi. Of the responders, 5% had HOUSES index = 1, whereas 62% had HOUSES index = 4. The non-responders (N = 471) had a significantly lower SES than the responders, with 26% having a HOUSES index = 1 ($p = 0.0004$).

Of the responders, 86% by self-report and 92% by REP database had a mammogram within the last 1.5 years, representing good screening participation as opposed to 41% of non-responders ($p = <0.001$).

35% had no BC knowledge (score of 0), 64% had some knowledge. 50% identified barriers to medical care.

SES or acculturation level had no significant impact on mammogram participation, BC knowledge or barriers to medical care within responders.

Conclusions: Responders had a very high mammogram participation, despite low BC knowledge and significant number with barriers to medical care. SES and acculturation did not influence these outcomes. Our study is limited by the low response rate (15%), higher SES in responders and significantly lower mammographic participation in non-responders. Interventions to increase BC screening, knowledge and remove barriers to medical care at community level are needed.

No conflict of interest.

93 (PB-093) Poster

Causes and consequences of delayed diagnosis in breast cancer screening; focus on mammographic features and tumour characteristics

E. Van Der Veer[1], J. Lameijer[2], A. Coolen[1], N. Bluekens[1], L. Duijm[3]. *[1]Elisabeth-Twee Steden Ziekenhuis, Radiology, Tilburg, Netherlands; [2]Christchurch Hospital, Radiology, Christchurch, New Zealand; [3]Canisius Wilhelmina Ziekenhuis, Radiology, Nijmegen, Netherlands*

Background: Early detection of breast cancer is associated with more favourable outcomes, concerning tumour characteristics, risk of lymph node metastases and final surgical outcome. However, delay in breast cancer diagnosis is not uncommon. The current study aims to gain more insight in the prevalence, causes and consequences of delayed breast cancer diagnosis by analysing delayed screen-detected cancers as well as interval cancers.

Materials and methods: This retrospective study, using a prospectively obtained database, was performed in women who received biennial screening mammography between January 1, 2009 and June 30, 2019. All mammograms were reviewed by two of the in total four participating screening radiologists. Patients were divided into 3 groups; women with screen-detected breast cancer without a diagnostic delay, women with a primary diagnostic delay (i.e. minimal sign or missed in previous screening round) and women with a delay in diagnostic work-up. Women with a true interval cancer were excluded. Outcome parameters included mammographic and tumour characteristics, lymph node status and surgical treatment.

Results: A total of 423 women experienced a delay of at least 4 months; 394 women with a primary diagnostic delay and 29 women with a delay in diagnostic work-up, respectively. Median time of delay in women with a delay in diagnostic work-up was 8 months (range 4–48) versus 12 months (range 4–97) in women with a primary diagnostic delay. Compared to the control group, women with a delay in diagnostic work-up showed no differences in mammographic and tumour characteristics, nor in final surgical outcome. Causes of delay in this group were mainly a BIRADS 3 routing or incorrect clinical BIRADS classification, resulting in a mean delay of 9 months (range 6–23) and 19 months (range 6–48), respectively.

Women with a primary diagnostic delay had higher breast tissue density ($p < 0.001$) and showed more subtle abnormalities on mammography (i.e. architectural distortion and asymmetries, $p < 0.001$). Moreover, this group comprises larger tumours ($p < 0.001$), more triple-negative tumours and lymph node metastases (respectively $p = 0.04$ and $p < 0.001$). This resulted in more mastectomies ($p = 0.04$).

Conclusions: Screened women with a primary diagnostic delay in breast cancer diagnosis show less favourable tumour characteristics and relatively more mastectomies compared to women with a delay in diagnostic work-up after recall.

No conflict of interest.

94 (PB-094) Poster

Real world evidence from a Breast Screening pilot for the underprivileged: Experiences from Bruhat Bengaluru Mahanagara Palike hospitals

G. Manjunath[1], H. Madhu[2], N. Buggi[3], S. Anasuya[3], M. Revathi[4], K. Lakshmi[5], G. Charitha[5], C. Sathiakar[5]. *[1]Niramai Health Analytix, Data Science, Bangalore, India; [2]Niramai Health Analytix, Products, Bangalore, India; [3]BBMP, Health Department, Bangalore, India; [4]Niramai Health Analytix, Screening Ops, Bangalore, India; [5]NIRAMAI Health Analytix, Clinical Research, Bangalore, India*

Background: In India, less than 5% of women get routine screening for breast cancer due to lack of awareness and the absence of a coordinated national breast cancer screening programme. A community health initiative was launched by Niramai in collaboration with City Health officials in Bangalore as a pilot to increase awareness and make breast health screening available to all. Free breast cancer screening using AI powered Thermalytix test is being offered to all the underprivileged women walking into Bruhat Bengaluru Mahanagara Palike (BBMP) government hospitals from November 14, 2017 till today (after a break for 15 months during COVID).

Materials and methods: This observational study was conducted in 22 BBMP-affiliated primary health centers where outpatient women over the age of 18 years and not pregnant were enrolled. The procedure included a briefing on camp procedures, taking patient consent, identification of eligible candidates, general health education, and conducting the Thermalytix test by a healthcare worker who was trained to use the Thermalytix software tool. Women were triaged using the output generated by Thermalytix 180. Those triaged as red were referred for further detailed imaging investigation in a district hospital using mammography, ultrasound and FNAC/biopsy.

Results: A total of 6935 women underwent Thermalytix screening in 22 BBMP hospitals during Nov 2017 to July 2022. A total of 1687 participants were excluded from the analysis as they did not meet the eligibility criteria. The median age of the 5248 eligible participants was 42 years (range 18–86). Among them, 90 women (1.71%) had previously noticed a lump in their breast, 431 women (8.12%) had breast pain, 16 women had complained of nipple discharge, and 5 women had noticed skin discoloration. When screened, 62 (1.2%) women were detected with abnormalities and triaged positive by Thermalytix. Among them 11 women have so far gone through diagnostic investigations, of which 8 were radiologically positive and were recommended for histopathology correlation. The overall test positivity rate of Thermalytix in this cohort was 1.2% and positive predictive value with radiological positivity as reference was found to be 9/11 = 81.81%. Furhter histological analysis reported 1 DCIS and 8 benign fibroadenoma. The tests were conducted in screening camps and the average cost of conducting the test in the field came to around 6.5 USD per person.

Conclusions: Thermalytix could be a potential automated screening tool for population-level screening in resource constrained settings. The portable equipment enabled easy movement across different PHCs. Since it is a privacy-aware test, there was less refusal to participate in the test. Community mobilization with the help of the local government health officials was crucial to ensure walk-ins.

Conflict of interest:
Ownership: yes
Board of Directors: yes
Corporate-sponsored Research: yes

95 (PB-095) Poster

Evaluation of effect of post-biopsy mammogram on marker clip migration after Stereotactic-Guided Core Needle Breast Biopsy

L. Baker[1]. *[1]University Sussex Hospitals, Breast Care Unit, West Sussex, United Kingdom*

Background: Stereotactic Core Needle Biopsy (SCNB) is a standard technical procedure for the sampling of suspicious lesions, particularly micro-calcifications identified on mammography. A marker clip (HydroMark) is deployed at the site of biopsy to localize the area at future mammograms or future surgery. However, more common than not, clip migration has been reported.

A standard 2-view mammogram is obtained after deployment of the marker clip to document the appropriate position of the marker clip. It has been suggested that the first view obtained of the post-biopsy mammogram should be obtained using the same projection as that used during the biopsy procedure. Thus, the purpose of this retrospective study was to determine if the type of projection used to obtain the first view on the post-biopsy mammogram affects the degree of biopsy marker clip migration.

Objective: The aim of this study was to determine whether the order of projections performed first, for the post-biopsy mammogram, contributed to marker clip migration – same as or orthogonal to the projection used during a stereotactic-guided core needle biopsy.

Methods: This retrospective study collected data from patient pre-recorded quantitative data from patients who required a Stereotactic Core Needle Biopsy (SCNB) for micro-calcification under symptomatic GP referral or NHSBSP assessment recall between June 2020 and June 2021. One marker clip brand/type was used 'HydroMark'.

The SCNB were separated into one of the following groups, depending on which post-biopsy mammogram view was obtained first:

- *Group A = first view on the postbiopsy mammogram obtained in the same projection as that used during the SCNB.*
- *Group B = first view on the postbiopsy mammogram obtained orthogonally to the projection used during the SCNB.*

Results: 150 SCNB cases in total were recorded during the time-period. The mean age was 64 years of age for both group A and B. The range of ages included 50 to 86 years of age.

Group A:

- 78 out of 150 were in group A.
- Group A had 18 cased of migration.
- Group A (18 out of 78) had clip migration distances of = (76.9%, <10 mm; 20.5%, 10–20 mm; and 2.6%, 21–30 mm).

Group B:

- 72 out of 150 were in group B.
- Group B had 60 cases of migration.
- Group B (60 out of 72) had clip migration distances of = (16.7%, <10 mm; 38.8%, 10–20 mm; and 44.4%, 21–30 mm).

The mean displacement distance was 15.3 mm in group A and 19.7 mm in group B. The mean displacement distance was −4.4 mm with a bootstrap confidence interval from 10 mm to 30 mm.

Conclusion: The type of projection used to obtain the first view on the post-biopsy mammogram, relative to that used during the Stereotactic Core Needle Biopsy (SCNB), had a statistical significance to the effect of biopsy marker clip migration.

No conflict of interest.

96 (PB-096) Poster

Update of the European Breast Cancer Guidelines for Screening and Diagnosis: priority questions and new topics

G.P. Morgano[1], E. Parmelli[1], A. Janusch-Roi[1]. [1]*European Commission, Joint Research Centre, Ispra, Italy*

Background: The European Guidelines for Screening and Diagnosis of Breast Cancer are evidence-based and developed within the European Commission Initiative on Breast Cancer (ECIBC). They are developed by a multidisciplinary group (GDG) of selected experts following the 'GRADE' approach and include the use of 'Evidence to Decision' frameworks.

Material and methods: To ensure the provision of up-to-date guidelines' recommendations, the European Breast Guidelines periodically go through a structured updating strategy. This strategy consists of four phases (prioritisation, surveillance, updating, publication), it considers if new evidence may affect existing recommendations and allows the introduction of new Healthcare Questions (HQs).

Results: In December 2020, the GDG started the second round of updating the European Breast Guidelines. Out of the 10 recommendations initially prioritised as relevant for surveillance, 7 required a complete update. Those recommendations pertained to imaging techniques in screening and surgical treatment planning, Decision Aids, and the need for organised screening programmes in women aged 45 to 49. Through online meetings, the GDG evaluated the updated evidence and 5 out of 7 recommendations were unmodified, while the recommendations focusing on Digital Breast Tomosynthesis in women with dense breasts were subject to changes. In addition, new HQs addressing Artificial Intelligence to support the reading of mammograms were also identified as relevant and are currently under development.

Conclusions: In December 2020, the GDG began the second round of updating of the European Breast Guidelines. The updating strategy allowed for a structured identification of priority topics where new impactful evidence is available and the introduction of HQs on emerging technologies. In essence, this means these European Guidelines will not expire or become outdated.

No conflict of interest.

97 (PB-097) Poster

Screen-detected breast cancers have an improved 5-year recurrence free interval compared to interval and non-screened breast cancers: a population-based study

L. de Munck[1], A. Eijkelboom[1], H. Otten[2], M. Broeders[3], S. Siesling[1]. [1]*Netherlands Comprehensive Cancer Organisation IKNL, Department of Research and Development, Utrecht, Netherlands;* [2]*Radboud University Medical Center, Health Evidence, Nijmegen, Netherlands;* [3]*Radboud University Medical Center- Dutch Expert Centre for Screening, Health Evidence, Nijmegen, Netherlands*

Background: Women with screen-detected tumours have an improved overall survival compared to women with interval or non-screened cancers. The development of recurrences in these groups has also been studied, but often in small (hospital based) studies. We aimed to investigate the association between method of detection and risk of recurrence in a nationwide population-based setting.

Materials and methods: We selected women between 50 and 76 years from the Netherlands Cancer Registry (NCR) who were diagnosed with primary invasive non-metastatic breast cancer between 2006 and 2008, and who were surgically treated in a Dutch hospital. After linking the NCR to the Netherlands Breast Cancer Screening Program, 3 groups were defined based on method of detection. 1) Screen-detected cancers included cases diagnosed <24 months after a positive screening result, 2) interval cancers were diagnosed <24 months after a negative result. 3) Non-screened cancers included those diagnosed in women at a screening interval beyond the planned 24 months, or never attended screening. Data on local recurrences (LR), regional recurrences (RR) and distant metastasis (DM) were obtained retrospectively from patient files. Primary outcome was 5-year recurrence-free interval (RFI), defined as being free from any recurrence or metastasis within 5 years after diagnosis. Multivariable cox regression analysis was used to compare RFI per method of detection, correcting for age, tumour grade, tumour size, tumour multifocality, histology (ductal, lobular, mixed or other), and hormone receptor subtype (ER+/PR+ and HER2- ER+/PR+ and HER2+, ER- and PR- and HER2- ER- and PR- and HER2+).

Results: We included 15 176 patients, of whom 8487 had a screen-detected cancer, 3536 an interval cancer and 3153 a non-screened cancer. Of women with screen-detected cancers, 1.2% developed a LR, 0.4% RR, and 4.4% DM. Of women with interval cancers 1.2% developed a LR, 1.1% RR and 10.4% DM. Women diagnosed with non-screened cancers developed a LR in 2.0%, a RR in 1.2%, and a DM in 10.8%. Five year RFI was 94.1%, 87.3%, and 86.0% for patients with a screen-detected, interval cancer and non-screened cancer, respectively ($p < 0.01$). Patients with an interval cancer more often developed a recurrence or metastasis (HR 2.23, 95%CI 1.96–2.53) as were patients with a non-screened cancer (HR 2.53, 95%CI 2.22–2.87). After correcting for confounders, these results remained significant with a $HR_{adjusted}$ 1.25 (95%CI 1.09–1.43) for interval cancers and $HR_{adjusted}$ 1.51 (95%CI 1.32–1.73) for non-screened cancers.

Conclusion: After adjusting for age and tumour characteristics, women with screen-detected breast cancer showed an improved RFI compared to women with an interval cancer or non-screened cancer. These results suggest that patients with screen-detected breast cancer have a better prognosis.

No conflict of interest.

99 (PB-099) Poster

Preoperative MRI in women with newly diagnosed breast cancer: re-excision rates and additional findings

J. Eriksson[1], V. Gonzalez[2], K. Laxander[3], L. Bergkvist[4], S. Eriksson[2]. [1]*Linköping University Hospital/Uppsala University- Centre for clinical research- Västmanland Hospital- Västerås, Department of Surgical Sciences, Västerås, Sweden;* [2]*Region Västmanland- Uppsala University- Centre for Clinical Research- Västmanland Hospital Västerås, Department of Surgical Sciences, Västerås, Sweden;* [3]*Region Västmanland- Uppsala University- Centre for Clinical Research- Västmanlands County Hospital Västerås, Department of Breast Radiology, Västerås, Sweden;* [4]*Region Västmanland- Uppsala University- Centre for Clinical Research- Vastmanland Hospital Vasteras- Department of Surgical Sciences, Västerås, Sweden*

Background: Preoperative breast magnetic resonance imaging (MRI) is controversial as an adjunct to conventional breast cancer workup. Our objective was to analyse the influence of preoperative breast MRI on re-excisions rates in women with breast cancer, to study MRI findings and their impact on surgical management.

Materials and Methods: Women with newly diagnosed breast cancer having preoperative MRI and surgery at Vastmanland County Hospital Breast Unit from January–June 2018 (n = 84) were compared with women not undergoing preoperative MRI from January–June 2016(n = 97). Data were collected from retrospective reviews of patients' medical records.

Results: The re-excision rate was one of 84 in 2018 and three of 97 in 2016. There was no statistically significant difference in re-excision rates. In the MRI cohort, seven patients of 84 had additional malignancy in the ipsilateral and two in the contralateral breast not previously detected by conventional imaging. Findings were more common in women <59 years, and more often resulted in mastectomy.

Conclusions: Preoperative MRI in women with newly diagnosed breast cancer did not reduce the number of re-excisions. Additional malignant findings were more common in women younger than 59 years, influenced surgical management but resulted in no delay of surgery.

No conflict of interest.

100 (PB-100) Poster

Patient-assisted versus standard compression in mammography screening: A randomized trial

J. Louro[1], M. Posso[1], D. Perez-Leon[1], B. Ejarque[2], M. Arranz[2], N. Arenas[2], M. Román[1], R. Alcántara[2], X. Castells[1]. *[1]Hospital del Mar Medical Research Institute, Epidemiology and Evaluation, Barcelona, Spain; [2]Hospital del Mar Medical Research Institute, Radiology, Barcelona, Spain*

Background: In mammographic screening context, interventions to reduce the discomfort caused by the mammogram are key to improve women's adherence, whereas assuring the technical quality of the image. This study aims to evaluate the differences in discomfort and technical indicators of patient-assisted versus standard compression modes.

Methods: We conducted a prospective randomized controlled study from September 2017 to December 2019 at the University Hospital del Mar in Barcelona, Spain. All asymptomatic women aged 50 to 69 years who attended mammography screening, and who were able to understand the self-compression procedure, to provide informed consent and to assess the subjective scale of pain, were invited to participate. Both, the laterality, and the compression mode to start with were randomized across all subjects. For assessing discomfort, we used a validated 11-point numeric rating scale, where 0 indicated no pain and 10 indicated the worst pain. We evaluated the patient's experience with a four items questionnaire. One technical indicator measure per each one of the four mammography views was obtained. The technical indicators were compression force, breast thickness, and average glandular dose. Mann-Whitney U tests were used to test differences of the technical indicators according to the compression mode. Density plots were analyzed.

Results: A total of 448 participants were included. Overall, discomfort score was higher in patient-assisted than standard compression, but it was only significant in right views and showed similar densities. Regarding the patient experience, 63.2% of women agreed or strongly agreed showing their preference in favor of the patient-assisted compression mode. Patient-assisted had a significantly higher compression force than the standard compression. When analyzing density plots, patient-assisted and standard compression had similar breast thickness and average glandular dose. Both variables were significantly lower in patient-assisted compression in craneocaudal and right views.

Conclusion: The discomfort reported by women during the acquisition of the images seems to have similar distributions among the patient-assisted and the standard compression exams. Responses to experience questionnaire revel that women might prefer patient-assisted compression instead of standard exams. Overall, technical indicators were similar among both compression modes, except compression force, which was significantly higher in patient-assisted compression.

	Compression Mode Patient-assisted (n = 448) mean (95%CI)	Standard (n = 448) mean (95%CI)	p-value*
Discomfort score	3.9 (3.7–4.2)	3.7 (3.5–3.9)	0.042
Breast thickness (mm)	56.1 (55–57.2)	57.5 (56.4–58.6)	0.015
Compression Force (N)	99.3 (96.2–102.4)	83.3 (81.7–84.8)	<0.001
Average glandular dose (mGy)	1.3 (1.3–1.4)	1.4 (1.3–1.4)	0.018

*p-value for Mann–Whitney U test.

Conflict of interest:
Corporate-sponsored Research: The study received funding from General Electric (GE Healthcare, Chicago, IL). Results could benefit founding institution. Nevertheless, the funders had no role in study design, data collection and analysis, decision to publish, or preparation of manuscript.

101 (PB-101) Poster

Peripheral blood neutrophil/ lymphocyte ratio as a prognostic factor in triple negative breast cancer

A.S. Mendes[1], E. Muñoz-Couselo[2], J. Simões[1], F. Gonçalves[1], G. Ferreira[1], A. Araújo[1]. *[1]Centro Hospitalar Universitário do Porto, Medical Oncology, Porto, Portugal; [2]Hospital Universitario Vall d'Hebron, Medical Oncology, Barcelona, Spain*

Introduction: The neutrophil/lymphocyte ratio (NLR) is an indicator of systemic inflammation recognized as a poor prognostic factor in patients (pts) with triple negative breast cancer (TNBC). This is an easily available and unexpensive prognostic marker, which may help to define risk groups and predict the response to treatment. The objective of this study is to define prognostic groups based on NLR in pts with triple negative early breast cancer (EBC-TN), define a NLR cut-off at diagnosis and a NLR variations throughout treatment that can predict pathologic complete response (pCR) to neoadjuvant ChT (NAChT).

Material and Methods: Pts with EBC-TN diagnosed between January 2015 and June 2021, who underwent NAChT. Pts and tumour characteristics and assessment of NLR at different moments were evaluated. Statistical significance: $p < 0.05$.

Results: Forty-seven women were evaluated, all women with median age of 53 years old. Almost all had good performance status (ECOG PS 0–1, 95.8%), were post-menopause (66.0%), presented non-specific type (NST) of invasive carcinoma (83.0%) and were diagnosed in the stage IIA (29.8%). The majority received NAChT based on anthracyclines (85.1%) and were submitted to surgery (93.6%) and RT (90.9%). NLR variation between diagnosis and the end of NAChT (Dx-NAChT) was the only moment statistically related to pCR ($p = 0.025$). For a maximum decrease of 0.14, the sensitivity (S) and the specificity (E) were 71.4% and 60.0%, respectively. As for disease progression, it was statistically related to NLR at diagnosis ($p = 0.003$), after surgery ($p = 0.001$) and at 6 months after the end of treatments ($p = 0.012$). The NLR cut-off values were above 1.81 (S = 100%; E = 62.1%), 2.46 (S = 87.5%; E = 82.8%) and 2.29 (S = 87.5%; E = 65.5%), respectively. As for death, it was also statistically related to NLR at diagnosis ($p = 0.040$), after surgery ($p = 0.002$) and with the variation between diagnosis and after surgery (Dx-Surg, $p = 0.022$) and between the beginning of NAChT and after surgery (NAChT-Surg, $p = 0.016$). The NLR cut-off values at diagnosis and after surgery were above 1.81 (S = 85.7%; E = 57.6%) and 2.75 (S = 85.7%; E = 87.9%), respectively. As for variations, between Dx-Surg and NAChT-Surg, the cut-off values were increases greater than 0.73 (S = 85.7%; E = 81.8%) and 0.89 (S = 85.7%; E = 84.8%), respectively.

Conclusions: NLR at diagnosis and after surgery are related to progression and death. Pts with NLR values at diagnosis above 1.81 have worse prognosis, as well as values higher than 2.45–2.75 after surgery, or an increase higher than 0.73–0.89, between Dx-Surg and NAChT-Surg. As for prediction of pCR, we find that pCR was significantly related to a maximum decrease of 0.14 between the Dx-NAChT. These results showed a promised way to the use of NLR as a tool for prognosis prediction in pts with EBC-TN.

No conflict of interest.

102 (PB-102) Poster

SAFE: A Microwave Imaging Device for Breast Cancer Early Screening

I. Akduman[1], A. Janjic[2], O. Buğdaycı[3], M. Cayoren[4], M.E. Aribal[5]. *[1]Istanbul Technical University, Electrical and Electronics Engineering Faculty, Istanbul, Turkey; [2]MITOS Medikal San. tic. A.Ş., Clinical Studies Department, İstanbul, Turkey; [3]Marmara University- School of Medicine, Department of Radiology, İstanbul, Turkey; [4]Istanbul Technical University, Electrical and Electronics Engineering Faculty, İstanbul, Turkey; [5]Breast Health Center- Altunizade Hospital- Acibadem M.M.A. University, Radiology Department, İstanbul, Turkey*

Background: SAFE (Scan and Find Early) is a microwave breast cancer imaging (MBI) device with the protentional for non-invasive and non-ionizing breast cancer early screening. The MBI technology utilizes the difference in dielectric properties of cancerous and healthy tissue to make further clinical predictions. In this study, we assess the ability of the SAFE to accurately detect and classify the existing lesion inside patient's breast.

Materials and Methods: Only patients scheduled for the biopsy were included in the study. The study was approved by the Ethics committee of Marmara University School of Medicine and in accordance with both institutional and national ethical standards in research and with the World Medical Association Declaration of Helsinki. Machine learning (ML) approach, namely Stochastic Gradient Descent (SGD), was used to detect the lesions inside patient's breasts based on the difference in backscattered signals of healthy and lesion affected breasts, while ML Adaptive Boosting (AdaBoost) approach was used to determine the pathology of detected lesions. Due to the limited dataset, stratified 5-fold cross-validation was used to assess the proposed models and test their performance. Localization of detected lesions was assessed based on the inverse scattering algorithm,

namely linear sampling method (LSM), used to reconstruct the image of the patient's breasts.

Results: Dataset included 113 patients, 70 with benign and 43 with malignant findings in one of the patient's breast. The proposed detection model achieved the sensitivity, specificity and accuracy of 80.5%, 81.4% and 81%, respectively. Furthermore, proposed classification model had the accuracy of 82.5%, sensitivity at 84.6% and specificity at 81%. Device correctly localized 83% of the detected lesions.

Conclusion: The study results show that our MBI system is capable to detect, localize and classify majority of breast lesions present. SAFE may have the potential to impact breast cancer early screening positively, due to its non-invasive and harmless nature. Further clinical studies are planned to validate acquired results.

No conflict of interest.

103 (PB-103) Poster

Interhospital variations in diagnostic work-up following recall at biennial screening mammography – a population-based study

F. Rozemond[1], M. Generaal[2], A. Coolen[1], N. Bluekens[1], A. Voogd[2], L. Duijm[3]. *[1]ETZ Tilburg, Radiology, Tilburg, Netherlands; [2]Maastricht University, Clinical Epidemiology, Maastricht, Netherlands; [3]CZW Nijmegen, Radiology, Nijmegen, Netherlands*

Background and aim: Quality control in breast cancer screening itself has been subject of previous studies. Less is known about the work-up after recall, in particular possible interhospital variations regarding work-up. Knowledge about possible differences might aid in further optimizing breast cancer care and is therefore subject of the current study.

Methods: In this retrospective analysis using a prospectively obtained database, we included 17.809 women who experienced a recall in the Dutch national screening program between 2009 and 2019. The diagnostic work-up (e.g. type of additional imaging, frequency and type of biopsy) in seven hospital groups was compared and analyzed using a multivariable logistic regression.

Results: After correction for patient and tumor characteristics, significant differences were found in the diagnostic work-up between the seven hospital groups. Both the number of biopsies and the percentage of problem-solving MRI's performed were significantly different (smallest OR 0.53 95% CI 0.42–0.66, and smallest OR 0.30; 95% CI 0.18–0.51, respectively). No significant difference was found regarding type of biopsy (percutaneous vs. excision) after adjustment for cofounders (smallest OR 0.38 95% CI 0.15–0.97).

Conclusion: The seven hospital groups in our screening region show a significant difference in number of biopsies and percentage of problem-solving MRI's performed in women recalled at biennial screening mammography. A consistency in work-up between different hospitals might further improve the standard of care for screened women. However, additional research on the effects of these differences is needed to make any definite recommendations.

No conflict of interest.

104 (PB-104) Poster

Comprehensive mutation profiling of PIK3CA gene in Indian breast cancer patients

R. Kumar[1], U. Agrawal[2], S. Deo[3], S.R. Mathur[4], A. Gogia[5], P. Tanwar[1]. *[1]All India Institute of Medical Sciences, Laboratory Oncology- Dr. B.R.A. IRCH, New Delhi, India; [2]National Institute of Pathology, Tumor Biology, New Delhi, India; [3]All India Institute of Medical Sciences, Surgical Oncology- Dr. B.R.A IRCH, New Delhi, India; [4]All India Institute of Medical Sciences, Pathology, New Delhi, India; [5]All India Institute of Medical Sciences, Medical Oncology- Dr. B.R.A IRCH, New Delhi, India*

Background: Breast cancer (BC) is the most commonly diagnosed cancer and the leading cause of cancer-related death among women worldwide. It is a complex, heterogeneous disease in which several lifestyle-related and genetic factors are implicated in its pathogenesis. The phosphatidylinositol 3-kinase (PI3 K) is a complex signaling pathway that plays an essential role in cell growth, proliferation, epithelial to mesenchymal transition, survival, invasion, migration, and apoptosis. It is often altered in BC caused by mutations or amplification of the genes encoding the PI3 K catalytic subunits p110α (PIK3CA). However, there is a relative paucity of data on the prevalence and hotspot profile of PIK3CA mutation in Indian breast cancer patients. Therefore, we investigated the distribution of somatic PIK3CA mutations in Indian BC patients and correlated their associations with clinical features and prognosis.

Material and methods: A total 40 patients with newly diagnosed treatment naïve primary breast cancer were recruited from breast clinics at AIIMS, New Delhi. After surgery, tumour and blood samples were obtained with informed consent, and genomic DNA was extracted. Followed by targeted sequencing of the entire exon of PIK3CA by using Illumina platform. Bioinformatics analysis was done by using in house developed script. Further DDPCR (Droplet Digital PCR) was used to validate the hotspot mutation. The QX200 droplet digital PCR system was used according to the manufacturer's instructions.

Results: By using automated sequencing technology, the PIK3CA genes are shown to be mutated in BC with a somatic mutation rate of 40%. Our studies have discovered mutation at 7 different positions in the catalytic subunit of PIK3CA. Out of these, 5 point mutations (E542 K, Q546 K, C901F, H1047R, and H1047L) were reported in the COSMIC database, while the other 2 (L387M & Q582 K) are novel mutations. The substitution of His with Arg at 1047 shows the highest frequency (20%). DDPCR results endorsed the presence of H1047R in tumor and matched blood samples. In tumor and blood samples, mutant fraction % varies from 0 to 33.36% and 0 to 2.7% respectively.

Conclusions: We demonstrated the first mutation profiling of PIK3CA in BC of the Indian population. We also found a novel nonsynonymous mutation with oncogenic potential along with the reported point mutation. Previous studies elucidate the mechanism of endocrine therapy resistance induced due to H1047R. A higher mutant fraction of H1047R is associated with less likely to achieve pathological complete response (pCR). A smaller fraction of H1047R in blood compared to a tumor indicates its low copy number in circulation. Thus H1047R mutation can be used as a predictive pCR and the development of a specific inhibitor against this mutation may be useful in the fight against this breast cancer subtype.

No conflict of interest.

105 (PB-105) Poster

Contrast enhanced mammography in further assessment of screen-detected breast cancer

C. Maccallum[1], G.B. Mann[2], A. Rose[3], C. Nickson[4], K. Ruecker[1]. *[1]Royal Melbourne Hospital, General Surgery, Melbourne, Australia; [2]Royal Melbourne Hospital, Breast Surgery, Melbourne, Australia; [3]Royal Melbourne Hospital, Radiology, Melbourne, Australia; [4]University of Melbourne, Epidemiology, Melbourne, Australia*

Background: Bilateral mammogram and ultrasound is the standard local assessment after diagnosis of early breast cancer. MRI is selectively used but remains controversial. Contrast enhanced mammography (CEM) is reported to have higher sensitivity than mammography, better specificity than ultrasound, and similar performance with better accessibility than MRI. We introduced CEM as near-routine for assessment of patients with screen-detected breast cancer, to identify mammographically occult disease. Here we report imaging/biopsy findings for occult disease and impact on surgical decisions.

Material and methods: Women with screen-detected breast cancer underwent CEM as supplementary imaging. CEM findings were documented and pathology of lesions identified by CEM was described. Additional findings were divided into true positives (TP) and false positives (FP). TPs included DCIS or invasive cancer on histopathology, and FPs included any other finding, based on histopathology or imaging.

Results: 208 screen-detected breast cancer patients underwent CEM. 66/208 (32%) had additional findings on CEM, consisting of enhancing mass (38/66), non-mass enhancement (25/66), or both (3/66). 31/66 (47%) were TPs, with 23 invasive cancers and 6 DCIS cases, while 33/66 (50%) were FPs and 2/65 (3%) had neoadjuvant CT and were unclassifiable. FPs consisted of normal breast tissue (16/33), non-proliferative lesions (4/33), proliferative lesions (6/33), atypical proliferative lesions (4/33), and other benign lesions (3/33). Overall, CEM identified 31/208 (15%) occult malignant lesions in screen-detected breast cancer. TPs were found with low/BIRADS A/B (15/31, 48%) and high/BIRADS C/D (16/31, 52%) mammographic densities (MD). 30% of patients with lower density breasts had additional abnormalities, compared with 38% patients with higher density breasts; this difference was not statistically significant ($p = 0.21$). Further, there was no statistically significant difference between the percentage of lower and higher MD patients with an occult malignancy identified on CEM (14% v 20%, $p = 0.25$). TPs were identified in younger and older patients (16/71 <60 years old, 15/137 ≥60 years old). CEM resulted in management change in 44/208 (67%) patients, including wider resection (20/208), conversion to mastectomy (10/208), contralateral breast surgery (6/208), additional ipsilateral excision (4/208), bracketing (2/208), and neoadjuvant therapy (2/208). 25/44 patients with management change were TP with occult malignancy, while 18/44 patients were FP.

Conclusions: CEM for further assessment in screen-detected breast cancers identified occult malignancy in 15% of patients, with even distribution of TPs over low and high MD and age. This indicates CEM may supplement standard imaging in screen-detected breast cancers. The impact on longer-term outcomes requires further investigation.

No conflict of interest.

106 (PB-106) Poster

Prediction of histological grade and molecular subtypes of invasive breast cancer using mammographic growth rate in screening

J. Peters[1], N. Moriakov[2], J. van Dijck[1], S. Elias[3], E. Lips[4], J. Wesseling[4], R. Mann[2], J. Teuwen[5], M. Caballo[2], M. Broeders[1], The IMAGINE Consortium. *[1]Radboud Institute for Health Sciences - Radboudumc, Department for Health Evidence, Nijmegen, Netherlands; [2]Radboud Institute for Health Sciences - Radboudumc, Department of Medical Imaging, Nijmegen, Netherlands; [3]Julius Center for Health Sciences and Primary Care - Utrecht University - Utrecht University Medical Center, Department of Epidemiology, Nijmegen, Netherlands; [4]Netherlands Cancer Institute NKI, Division of Molecular Pathology, Amsterdam, Netherlands; [5]Netherlands Cancer Institute NKI, Department of Radiation Oncology, Amsterdam, Netherlands*

Introduction: In breast cancer screening, recall decisions may be optimized if we could determine the aggressiveness of a suspicious lesion. Aggressive invasive breast cancer (IBC) should be detected timely, while overdiagnosis of indolent lesions could be reduced by delaying recall. Molecular subtypes and histological grade of IBC are widely used in prognostication. Growth rate (GR) may be a prognostic marker and can be measured on serial mammograms. We therefore evaluated the discriminative accuracy of mammographic GR to predict molecular subtypes and histological grade of IBC in screening.

Material and methods: In this consecutive cohort study, serial mammograms of 641 women with screen-detected IBC presenting as a unifocal mass were used. Two investigators manually segmented the masses in both mammographic views. A physics-based algorithm was developed to estimate tumour volume (mm^3), which was measured on the last, prior and penultimate screening mammogram, when available. GR was calculated based on a power law growth function. Information on estrogen receptor (ER), Her2 receptor and histological grade was obtained from pathology reports. Surrogate molecular subtypes were defined as “luminal-like” (ER +/Her2-), “Her2-enriched-like” (ER-/Her2+) or “basal-like” (ER-/Her2-). Tumour volume at last screening, GR or both were used in logistic regression models to predict whether a tumour was of high grade (III) or not (I or II), or whether a tumour was of a particular molecular subtype. For each model, an internally validated discriminative accuracy was calculated using the mean 10-fold cross-validated area under the curve (AUC), with standard deviations (SD) calculated over 100 repeats.

Results: Preliminary results are shown in Table 1. For each task, a higher predictive accuracy was achieved with GR compared to volume alone. Combining volume and GR did not further improve this performance. The best AUC (AUC 0.72 ± 0.004) was achieved using GR to predict whether a tumour was high grade or not.

Table 1: Mean validation AUCs for the predictive accuracy of volume, GR or both to discriminate between surrogate molecular subtypes or grade of IBC

		Grade III vs. I/II	Luminal vs. non-luminal	Her2-enriched vs. non-Her2-enriched	Basal-like vs. non-basal-like
Volume last screen	AUC (SD)	0.63 (0.006)	0.59 (0.005)	0.59 (0.010)	0.53 (0.040)
GR	AUC (SD)	0.72 (0.004)	0.65 (0.006)	0.64 (0.010)	0.63 (0.010)
Volume + GR	AUC (SD)	0.71 (0.002)	0.65 (0.004)	0.63 (0.006)	0.62 (0.050)

Conclusions: GR can predict molecular subtypes and histological grade of IBC, with moderate discriminative accuracy for prediction of high grade. Using GR improves predictive performance over using volume alone. Interval cancers have yet to be included. To determine the precise value of GR as a prognostic marker to optimize recall decisions, external validation and the study of survival endpoints are of interest.

No conflict of interest.

107 (PB-107) Poster

MaThAI: A MultiModal imaging combining Mammography and Thermalytix for better prioritization of mammography scans to detect early malignancies

S.T. Kakileti[1], G. Manjunath[1]. *[1]Niramai Health Analytix Pvt Ltd, Machine Learning Research, Bengaluru, India*

Background: Breast cancer screening helps in early intervention and treatment. Post COVID, there is a huge backlog of women who missed their regular screening resulting in increased workload for radiologists, delayed reporting and intervention for malignant women. Thermalytix is an AI-based tool over thermal images that generates a 5 point score called B-Score where 5 is highest suspected risk for breast cancer and 1 is the lowest risk. In this study, we propose and evaluate a multimodal imaging modality called MaThAI that combines mammography and Thermalytix for prioritization of Mammography scans using B-Score.

Materials and Methods: Data from two clinical studies were pooled together and a total of 583 women who took both mammography and thermal scans were included in the study. Among them, 72 women were diagnosed to be malignant using mammography, ultrasound, and/or biopsy. Sensitivity and specificity of (i) Mammography alone (as reported by experienced radiologists), (ii) Thermalytix alone (using B-Score $\geq$3 as positive) and (iii) MaThAI (considering a scan as positive if either Mammogram interpretation or Thermalytix interpretation or both were positive) were computed. As a second experiment, we assessed the benefit of MathAI prioritized mammography scans by estimating the reporting times for detecting 95% malignant patients.

Results: The sensitivity and specificity of mammography were 81.9% and 98.8%, respectively, assuming BIRAD 0 as negative. Assuming BIRAD 0 as positive the sensitivity and specificity were 90.3% and 86.9%, respectively. Six malignancies were found in the 67 women with inconclusive reports (BIRADS 0). When Thermalytix B-Score was considered, the sensitivity and specificity were 94.4% and 81.0%, respectively. MaThAI showed an overall sensitivity and specificity of 98.6% (CI: 95.9%–100%) and 80.6% (CI: 77.2%–84.1%), respectively. The combo modality increased sensitivity over mammography alone by 16.7%, and Thermalytix alone by 4.2%, while decreasing the specificity of mammography by 6.3%.

In the second experiment, we evaluated the benefit of MaThAI in prioritizing mammography scans using Thermalytix B-Score. Assuming mammography interpretation time is 20 minutes per exam and considering the order of the interpretation to be scan date + time, a single radiologist would have released the reports of 95% of the women with malignancy in 6720 minutes. Whereas using B-Score to reorder the scans for interpreting, the same radiologist would release the reports of 95% of the women with malignancy in 3080 minutes.

Conclusion: MaThAI is a promising multimodal tool for breast screening that enables effective and efficient adjunct usage of thermal image along with mammography. It was effective in increasing the sensitivity of mammography by 16.7% and is estimated to reduce the reporting time for malignant patients by 54%.

Conflict of interest:
Ownership: Yes
Board of Directors: Yes
Corporate-sponsored Research: Yes

POSTER SESSION **16 November 2022**

Supportive and Palliative Care Including End of Life Treatment

109 (PB-109) Poster

Evaluation and optimization of treatment for patients with metastatic breast cancer and receiving CDK4/6-inhibitors

F. Henze[1], A. Hester[1], A. Koenig[1], N. Harbeck[1], R. Wuerstlein[1]. *[1]Breast Center, Department of Gynecology and Obstetrics, CCC Munich und LMU University Hospital, Munich, Germany*

Background: Since the European approval of CDK4/6-i, treatment sequences and procedures for patients with HR+ metastatic breast cancer have changed substantially. Compared to intravenous or oral chemotherapy, endocrine-based therapy has different side effects and different diagnostic and therapeutic consequences. Therapy goals are optimal drug efficacy and treatment duration while maintaining maximum independence, adherence and quality of life for patients and conserving resources for medical staff.

Methods: Time and workload were measured in real time before start and during further course of therapy. Therapy preferences of medical staff (25 nurses and physicians) and patients (11 treated with endocrine monotherapy, 17 with CDK4/6-i and 14 with intravenous chemotherapy) were evaluated, using specified questionnaires.

Results: Most time and workload investments for practitioners occur before patients start with endocrine-based oral therapy; these remains substantial during the first three months of therapy because of managing side effects, dose interruptions, and dose modifications. After the first 3 months of therapy with CDK4/6-i, fewer side effects occur and contacts between doctors/nurses and patients can be reduced. Compared with intravenous chemotherapy the workload with oral tumor therapy is less after the first three months. All Patients (n = 42) clearly prefer oral therapy (100%) compared to other application forms like intravenous (47.6%), subcutaneous (35.7%) or intramuscular (16.7%) injections and visit intervals at the oncology department of 4 weeks (76.2%). Medical staff (25) also prefer oral therapy (100%), followed by subcutaneous (72.0%), intravenous (60%) and intramuscular (36.0%) injections; 96% of them also prefer patient visit intervals of 4 weeks. Regarding medication regimens, medical staff members prefer continuous (100%) compared to 21/7 regimens (40%) while patients do not show significant preferences for one of these two regimens. Patients are likely to accept side effects, e.g. neutropenia, diarrhea, and fatigue up to a severity of CTCAE grade I. Patients would accept an average of 3 [2–5] additional tablets to reduce side effects. From a severity of CTCAE grade II onwards, patients prefer the regimen in which the side effects occur less often.

Conclusion: Patients and practitioners prefer oral tumor therapy over other application forms. Time requirements and workload for the medical staff is highest before the start of endocrine-based therapy and continues in the first three months but substantially reduced over long time treatment. Visit intervals of 4 weeks and well-treated side effects during a long-lasting therapy with CDK4/6-i enable maintained quality of life and high adherence for metastatic breast cancer patients.

Conflict of interest:
Advisory Board: F. Henze: Pierre Fabre
Corporate-sponsored Research: A. Hester: Walter-Schulz-Stiftung
Other Substantive Relationships:
F. Henze: Lilly, WebMD
A. Hester: Pfizer, Roche
A. Koenig: none
R. Wuerstlein: Agendia, Amgen, Aristo, Astra Zeneca, Boeringer Ingelheim, Carl Zeiss, Celgene, Clinsol, Daiichi-Sankyo, Eisai, Exact Sciences, Genomic Health, Gilead, Glaxo Smith Kline, Hexal, Lilly, Medstrom Medical, MSD, Mundipharma, Mylan, Nanostring, Novartis, Odonate, Paxman, Palleos, Pfizer, Pierre Fabre, Pomme Med, PumaBiotechnolgogy, Riemser, Roche, Sandoz/Hexal, Sanofi Genzyme, Seattle Genetics /Seagen, Tesaro Bio, Teva, Veracyte, Viatris
N. Harbeck: Amgen, Astra Zeneca, Daiichi-Sankyo, Exact Sciences, Gilead, Lilly, MSD, Novartis, Pierre Fabre, Pfizer, Roche, Sandoz, Seagen

111 (PB-111) Poster

Use of immersive virtual reality for management of anxiety and depression among chemotherapy-naïve Filipino breast cancer outpatients in a national university hospital

M. Ando[1]. [1]*Perpetual Succour Hospital, Cebu Cancer Institute, Cebu, Philippines*

Background: Anxiety and depression have negatively influenced the quality of life among breast cancer patients, potentially interfered with their compliance to treatment, and eventually affected their overall survival. The use of antidepressants has been the standard therapy but may present with several side effects, e.g., drug-to-drug interactions, dependence, and tolerance. As a novel method to address these stressors, virtual reality (VR) utilizes non-invasive simulation digital technology that generates sensory experiences which allow the subjects to interact with the stimuli. This study aimed to determine the effectiveness of immersive VR as an adjunct in the management of treatment-related anxiety and depression among breast cancer outpatients undergoing chemotherapy.

Material and Methods: In this open-label phase II randomized control trial, participants were randomly assigned into two groups during their first cycle of chemotherapy – the intervention group who were subjected to immersive VR experience using VR Box 3D goggle sets plus standard-of-care and the control group who received standard-of-care only. Anxiety and depression scores of at-risk breast cancer patients were measured using the self-reported questionnaire Hospital Anxiety and Depression Scale – Pilipino (HADS-P) before and after chemotherapy. The influence of clinico-demographic factors on mean differences in HADS-P scores was explored. Pre- and post-chemotherapy blood pressures, heart rates, and respiratory rates were also determined.

Results: A total of 114 patients were screened and 65.8% (n = 75) of them had HADS-P scores of ≥11. Proportion of patients who were at-risk to develop treatment-related anxiety and depression was 73.5% (n = 50) and 22.1% (n = 15), respectively. 68 patients were subsequently randomized. Statistically, significant mean differences of |–2.71| and |–4.74| in pre-and post-chemotherapy HADS-P scores between the control group and intervention group were reported ($p < 0.05$). Changes in mean arterial pressures, heart rates, and respiratory rates pre-and post-chemotherapy were not statistically significant.

Conclusion: Immersive VR could potentially decrease the level of treatment-related anxiety and depression of breast cancer outpatients undergoing chemotherapy.

No conflict of interest.

112 (PB-112) Poster

Designing digital health tools for helping metastatic breast cancer patients manage symptoms at home and optimize quality of life: PRICE and MET-GUIDE

A. Kassianos[1,2], M. Matsangidou[3], S. Maria[1], P. Demetris[4], S. Theodoros[4], A. Maria[5], M. Karekla[1], P. Constantinos[4]. [1]*University of Cyprus, Department of Psychology, Nicosia, Cyprus;* [2]*Cyprus University of Technology, Department of Nursing, Limassol, Cyprus;* [3]*CYENS, HealthXR, Nicosia, Cyprus;* [4]*University of Cyprus, Department of Computer Science, Nicosia, Cyprus;* [5]*European University of Cyprus, Department of Psychology, Nicosia, Cyprus*

Background: Patient Reported Outcome Measures (PROMs) are patients' reports of their symptom experience, quality of life and functionality. These measures are used as an endpoint to clinical trials but rarely integrated into routine cancer care. Moreover, they are resource intensive and prone to retrospective biases. Women with Metastatic Breast Cancer (MBC) face different challenges compared to women with earlier stages of breast cancer and today many of their needs are unmet and not well understood. Therefore, collecting information from this population routinely can allow for ecologically momentary interventions using digital means.

Materials and Methods: We present two digital tools developed to collect PROMs from MBC patients using Ecological Momentary Assessment (EMA) of pain using a mobile application (PRICE) and a website where MBC patients have access to short interventions based on Acceptance and Commitment Therapy (ACT) providing short messages to patients reporting severe pain. Working closely with 51 cancer patients, medical and paramedical personnel, we co-designed an intelligent personalized mobile application to first collect Ecologically Momentary Assessment data on symptoms like pain and fatigue and Health-Related Quality of Life and subsequently enhance symptom management of cancer patients at home.

Results: We will outline the screening process and quantitative analysis we run to identify virtual environments patients would like to receive as a Virtual Reality intervention in the PRICE project and the evidence from focus groups indicating that both tools are acceptable and can support care of MBC patients.

Conclusions: Methods to collect data like EMA can overcome biases and barriers in PROM assessment whilst EMI can offer an easy and possibly cost-effective intervention until patients re-visit the clinic.

No conflict of interest.

113 (PB-113) Poster

Long-term yogic intervention improves the level of TNF-α, IFN-γ, MDA, and NO in breast cancer patients undergoing chemotherapy and/or radiotherapy: A randomized control study

M. Jain[1], A. Mishra[1], V. Yadav[2], H. Shyam[3], S. Kumar[4], P. Ramakant[5], S.K. Mishra[6]. [1]*King George's Medical University, Department of Thoracic Surgery, Lucknow, India;* [2]*University of Lucknow, Department of Physical Education, Lucknow, India;* [3]*King George's Medical University, Department of Center for Advance Research, Lucknow, India;* [4]*King George's Medical University, Department of Thoracic Surgery, Lucknow, India;* [5]*King George's Medical University, Department of Endocrine Surgery, Lucknow, India;* [6]*University of Lucknow, Department of Human Consciousness and Yogic Sciences, Lucknow, India*

Background: Breast cancer is the 1st most commonly diagnosed cancer in women and is one of the leading cancers in the world and expected 2.3 million new cases and 0.69 million new deaths in 2022. Inflammation is very well linked to tumor proliferation and metastasis in breast cancer. The yogic

intervention had a positive impact on the patient's quality of life and fatigue. But its association with pro-inflammatory cytokines along with oxidative stress markers in breast cancer has not yet been reported.

Material & methods: We randomized 96 stage II/III breast cancer patients receiving radiotherapy and/or chemotherapy with no other comorbidities. Forty-eight stage II/III breast cancer patients were divided into each group (yoga and control). The yoga group was performing yoga for 5days/week for 1-year and the control group was not performing the yoga. Serum levels of TNF-α, IFN-γ, GM-CSF, MDA, NO, SOD and catalase were measured in both the group at baseline, 4th months, 8th months, and 12th months.

Results: In both groups total of 70% of patients were infiltrating ductal carcinoma and the remaining 30% were others. The mean age in the control group was 47.67 ± 11.68 and in the yoga group 43.11 ± 9.388. A total of 42 patients in the yoga and 40 patients in the control group were analyzed for all 4-time points. In the control group, five patients died whereas three were lost in follow-up after 6 months. In the yoga group, two patients died and four were lost in follow-up at different time points. Both groups did not show any significant difference in the level of Hematocrit, TLC, platelets, and total serum bilirubin. Serum IFN-γ and MDA, levels decreased significantly in the yoga group vs the control group at the 8th ($p < 0.001$) and 12th ($p < 0.001$) months. Whereas reduction in the TNF-α was observed in both the groups but the difference in the control group was not significant. TNF-α decreases significantly in yoga group vs control at 8th ($p < 0.05$) and 12th ($p < 0.01$) months. However, the level of NO was upregulated in the control group but in the yoga group, no change was observed. A significant difference was obtained in the level of NO while comparing the yoga group with the control group at 8th ($p < 0.05$) and 12th ($p < 0.001$) months.

Conclusion: The data suggested that long-term yogic intervention is beneficial in reducing the level of TNF-α, IFN-γ, and MDA in the breast cancer patients going through treatment. Yoga also helps in maintaining the level of NO. Yoga can be a helpful additional therapy for reducing inflammation and oxidative stress in breast cancer patients undergoing cancer treatments.

No conflict of interest.

114 (PB-114) Poster

Exosomes from mistletoe treated tumor cells for the stimulation of immune cells

J. Sahay[1], S.E. Combs[1], D. Schilling[1], M. Gehrmann[1]. *[1]Klinikum rechts der Isar, Technische Universität München, Department of Radiation Oncology, München, Germany*

Background: Breast carcinoma is the most common and one of the most malignant tumors in women. Multimodal standard therapy currently increases the 5-year survival rate to over 80%. For some years now, complementary medicine has also been playing an increasingly role in the field of cancer therapy. In particular, mistletoe extract is used in breast cancer therapy to reduce the side effects of tumor therapy and to improve patients' quality of life. Different approaches exist to stimulate the immune system. In this in vitro study, the effects of exosomes from mistletoe extract treated tumor cells on the cytotoxic behavior of immune cells were investigated.

Material and Methods: Two human breast cancer cell lines MCF-7 and SK-BR3 were used. Mistletoe extract preparation Viscum album M at a concentration of 10 µg/ml was used to treat tumor cells. After 48 h incubation, exosomes were isolated from the cell culture supernatant of tumor cells. These were then used for stimulation of T cell line MOLT4 and NK cell line KHYG-1. Fluorescence-activated cell sorting (FACS) and a cytotoxicity assay (LDH assay) were used to examine the immune cells. The focus was laid on the analysis of surface markers and cytotoxicity of immune cells against tumor cells.

Results: The LDH assays showed significant differences with respect to the cytotoxicity of the immune cells. The NK cell line KHYG-1 showed a significant increase in cytotoxicity after incubation with the exosomes derived from mistletoe extract-treated tumor cells MCF7 compared to the NK cells that remained untreated (57,9% ± 22,6% vs. 86,8% ± 12,8%). FACS analysis shows significant differences in surface markers CD3 and CD45 on the T cell line after incubation with the exosomes isolated from the tumor cells treated with mistletoe extract.

Conclusion: Based on the results, we conclude that mistletoe extract has a positive effect on the cytotoxicity of immune cells. Thus, there is an assumption of a stimulation effect of the patient's immune system. It is already proved by clinical studies that mistletoe extract does not exert negative influence on standard therapy procedures nor does it lead to unexpected side effects. Therefore, the use of mistletoe extract could be an integral part of standard therapy in breast cancer patients in the future.

No conflict of interest.

115 (PB-115) Poster

Anxiety and depression screening during neoadjuvant chemotherapy treatment in early breast cancer patients: a multicenter longitudinal observational study

J. Rodrigues[1], A. Sá[2], R. Fontes[1], A. Barbosa[3], J. Barbosa-Martins[3], C. Oliveira[1], M. Peixoto[1], S. Santos[1], J. Rocha[1], M. Almeida[1], C. Carvalho[3], L. Queiroz[1], R. Fernandes[1], I. Faustino[3], C. Portela[1], C. Coutinho[3], R. Nabiço[1]. *[1]Hospital de Braga, Medical Oncology, Braga, Portugal; [2]University of Minho, School of Medicine, Braga, Portugal; [3]Hospital da Senhora da Oliveira – Guimarães, Medical Oncology, Guimarães, Portugal*

Background: Anxiety and depression are common psychiatric disorders in breast cancer patients with an impact on quality of life. While there are many studies addressing psychiatric disorders in metastatic breast cancer patients, few address this problem in early breast cancer treatment.

Methods: This was a multicenter longitudinal observational study that aimed to screen for anxiety and depression with Hospital Anxiety and Depression Scale (HADS) in early breast cancer patients, with no previous known psychiatric disorders, at different time points during neoadjuvant chemotherapy treatment.

Results: A total of 42 female patients with early breast cancer diagnosis were included, with a mean age of 50 years, 52.4% were premenopausal and 92.9% with an ECOG-PS 0. Invasive breast carcinoma of no special type was the most common diagnosis (92.9%). According to HADS score, at baseline screening before chemotherapy, 17 patients had anxiety (40.5%) and seven patients (16.7%) were borderline cases. A reduction in mean anxiety HADS scores was seen when comparing baseline screening (8.55, SD 4.41) to time point one (between cycle 2 and 3 of the first phase of neoadjuvant chemotherapy protocol) (6.81, SD 3.78) and time point two (between cycle 2 and 3 of the second phase of chemotherapy protocol) (7.10, SD 4.35) ($p = 0.026$, $p = 0.022$, respectively), reflecting a decline in the number of cases and borderline anxiety cases with time. As for depression, at baseline screening, one patient had a score reflecting depression, while eight patients presented as borderline cases. During chemotherapy, the number of depression cases and borderline cases increased from 26.2% at time point one to 33.3% at time point two. Throughout treatment, 28.6% patients started anxiolytic treatment, while 11.9% began antidepressants. Despite a high incidence of anxiety and depression in our study, only four women enrolled psychologist or psychiatrist *follow-up* during neoadjuvant chemotherapy treatment.

Conclusions: Anxiety is highly prevalent and potentially neglected at the time of breast cancer diagnosis. Depression, on the other hand, seems to be absent in the beginning, but the number of cases increases progressively during neoadjuvant treatment. As psychiatric disorders can impact quality of life, screening at diagnosis and during (neo)adjuvant chemotherapy treatment may allow an early psychologist or psychiatrist intervention.

No conflict of interest.

116 (PB-116) Poster

The psycho-emotional condition of the spouses of breast cancer patients

A. Georgiou[1], E. Epiphaniou[1], P. Liakou[2], G. Georgiou[3]. *[1]European University of Cyprus, Clinical Psychology, Nicosia, Cyprus; [2]Metropolitan General, Breast Unit, Athens, Greece; [3]Limassol General Hospital, Surgical Department, Limassol, Cyprus*

Background: There is substantial evidence that there is an alarming increase in the incidence of breast cancer and therefore, several studies have been undertaken. Many studies were conducted in relation with the psycho-emotional condition of the women with breast cancer. However, the current available and existing research in relation with the care givers of women with breast cancer (i.e., spouses, siblings, friends, dependents) is limited. The aim of the present study is to analyze and evaluate the levels of anxiety, stress, and depression of the spouses of women with breast cancer and the spouses of women without any health issues.

Material and Methods: The sample of the present study consists of 26 spouses of women with breast cancer and of 77 spouses of women without any health issues. We used a qualitative method with standardized questionnaires (DASS-21) for the evaluation of the levels of anxiety, stress, and depression.

Results: The results of our study shows that there is a significant difference in the levels of anxiety, stress and depression among the two groups. The spouses of women with breast cancer have higher levels of anxiety, stress and depression regarding the spouses of women without any health issues.

Conclusions: The outcome of the present research, encourages the further research on the psycho-emotional condition of the spouses of women with breast cancer. Hopefully new ways can be suggested to help them afford this new situation, be more effective and helpful for their siblings with breast cancer.

No conflict of interest.

POSTER SESSION **17 November 2022**

Genetics

117 (PB-030) Poster

Mutation detection rates associated with specific selection criteria for BRCA1/2 testing in 100 high risk families with breast cancer: A single center study

J.S. Lee[1], Korean Breast Cancer Foundation. [1]*Inje University Haeundae Paik Hospital, Surgery, Busan, South Korea*

Background: BRCA mutation screening for BrCa/OvCa families is frequently offered on the basis of the fulfillment of empirical selection criteria, thought to be indicative of a genetic predisposition to breast/ovarian cancer (BrCa/OvCa). This study aimed to evaluate, in a single center cohort of BrCa/OvCa families, the mutation detection rate associated with specific clinical features and the relative performance of the employed selection criteria.

Methods: This was a cross-sectional study in 100 healthy individuals with breast cancer family history, including 13 who were referred for BRCA1,2 carrier families (cohort1) and 87 whose family with breast cancer had not previously tested for BRCA1,2 mutations (cohort 2). Screening for mutation in BRCA 1 and BRCA2 was performed by Next generation sequencing. The Fisher exact test was used to compare the detection rates associated with different clinical features. In a subset of families fulfilling only mutually inclusive criteria, odd ratios and 95% confidence interval were estimated to test the relative effectiveness of each criterion.

Results: Among Cohort 1, the DRs was 53.8% (5 BRCA-1 mutation, 2 BRCA-2 mutation). Additionally, 2 VUS (15.3%) (BRCA-2; c.1909 + 12delT) and 4 negative BRCA mutation was found. Among Cohort 2, only two women (1.74%) was c.390C>A (p.Tyr130), c.5445G>A (p.Trp1815) at BRCA-1. 14 VUS (16.1%) (3 BRCA-1, 11 BRCA-2) and 71 negative BRCA-1,2 mutation were detected. The clinical feature was significantly different between family member of BRCA carriers and them of breast cancer with unknown BRCA ness (Table 1).

Table 1: Characteristics of families with breast cancer (n = 100)

Variables		Cohort 1 (n = 13)	Cohort 2 (n = 87)	*p*-value
Age(years old), mead ± SD		35.7 ± 5.6	34.8 ± 7.8	0.61
BRCA 1/2 Mutation	BRCA-1 Neg & BRCA-2 Pos	2(15.3%)	0(0%)	<0.001
	BRCA-1 Pos & BRCA-2 Neg	5(38.5%)	2(1.74%)	
	BRCA1- Neg & BRCA2-VUS	2(15.3%)	11(12.6%)	
	BRCA1-VUS & BRCA2-Neg	0	3(3.4%)	
	Both negative	4(30.7%)	71(81.6%)	
Age of breast cancer onset	≤40	7(36.8%)	16(13.9%)	0.02
	40–45	2(10.5%)	19(16.5%)	
	>45	10(52.6%)	68(59.1%)	
	unknown	0	12(10.4%)	
Family history of breast cancer in the first or second degree relatives	1	5(38.4%)	67(77.0%)	0.002
	2	6(46.1%)	13(14.9%)	
	3	2(15.4%)	7(8.0%)	
Family history of ovary cancer in the first or second degree relatives	No history	11(84.6%)	85(97.7%)	0.03
	1	2(15.4%)	2(2.3%)	
	2	0(0%)	0(0%)	
Disease history of cancers other than breast cancer		0	7(8%)	

Conclusions: Under the employed selection criteria, detection rate of mutation was low (1.74%). Most of family member of breast cancer with unknown BRCA ness was negative under criteria. If BRCA mutation screening for BrCa/OvCa families could be necessary, further larger scaled studies for useful criteria should be investigated.

No conflict of interest.

118 (PB-031) Poster

Information needs of individuals from BRCA-harboring families: A systematic review and content analysis

S.Y. Park[1], Y. Kim[2], S. Kim[3], M. Katapodi[4]. [1]*Yonsei University, College of Nursing, Seoul, South Korea;* [2]*Far East University, Department of Nursing, Eumseong-gun, South Korea;* [3]*Mo-Im Kim Nursing Research Institute-Yonsei University, College of Nursing, Seoul, South Korea;* [4]*University of Basel, Department of Clinical Research, Basel, Switzerland*

Background: Accurate and personalized information from reliable sources is paramount for participating in medical decision-making regarding cancer risk management. However, a comprehensive understanding of information needs of individuals from *BRCA*-harboring families is lacking. To identify information needs of individuals from *BRCA*-harboring families and compare findings based on demographic (women vs. men) and clinical characteristics (cancer survivors vs. previvors and *BRCA*-carriers vs. untested relatives).

Methods: This systematic review followed the appropriate PRISMA guidelines. We identified 6495 potentially eligible studies from Medline, Embase, Cochrane, PsycInfo, and CINAHL databases on 06 March 2022. Quality of selected studies was based on the Mixed Methods Appraisal Tool. Narrative synthesis was based on content analysis of primary studies.

Results: From 18 selected studies, including 1055 individuals, we identified 9 categories and 34 subcategories of information needs. Risk of bias in the selected studies was moderate. Fewer studies addressed the information needs of men and of untested relatives. Frequently reported information needs were risk-reducing strategies (n = 17) and related decision-making (n = 8); personalized cancer risk assessment (n = 12) including (cascade) genetic testing (n = 6); communication with family and relatives (n = 10); and emotional management and coping (n = 7). Fewer studies reported on information needs regarding the role of *BRCA* genes in hereditary cancer (n = 4); social issues related to genetic testing (n = 3); and cancer diagnosis and treatment (n = 2). Men were more concerned about cancer risk and communication with relatives rather than with decision-making or with emotional support and coping. Cancer survivors placed a greater emphasis on information regarding cancer treatment and chemoprevention, which was not observed in previvors. *BRCA* carriers reported information needs in all 9 identified categories, whereas untested relatives focused on risk-reducing strategies, communication with family, and emotional management and coping.

Conclusions: Members of *BRCA*-harboring families require personalized information according to their demographic and clinical characteristics. Information needs depend on sex and change according to health- and cascade testing status. Findings have implications for the development of tailored educational materials and personalized interventions.

Registration: PROSPERO database (CRD42021293285).

No conflict of interest.

119 (PB-032) Poster

Epigenetic silencing of P16INK4a hasten disease stage in Carcinoma of Breast: A hospital-based study of North India

S. Singh[1], M. Tewari[1], A. Singh[1]. [1]*Banaras Hindu University, Department of Surgical Oncology, Varanasi, India*

Background: Epigenetic alterations involved in the onset and progression of breast cancer may serve as biomarkers for early detection and prediction of disease prognosis. In the current study, it has been tried to determine the methylation status of tumor suppressor gene *P16*/INK4a in 50 breast cancer patients and their association with clinicopathological parameters.

Material and Methods: To investigate the methylation status of the *P16INK4A* gene in Iranian patients with breast carcinoma, promoter methylation was studied by methylation-specific PCR (MSP).

Results: The mean age of Breast cancer patients was 49.30 ± 9.75 years. Of the 50 breast cancer patients investigated, 21 (42%) breast cancer cases were found to be methylated for the *P16* gene. *P16* hypermethylation was found to be significantly associated with <50 years of age group, premenopausal status, and advanced disease stage. Multivariate analysis (Table 4) suggested a strong association between advanced disease stage (Stage III and Stage IV) presentation and *P16* hypermethylation (P = 0.008, RR = 5.996, 95%CI = 1.581–22.739). Association of TNBC (ER-/PR-/HER-2-) suggested that triple-negative is more prone to breast cancer due to hypermethylation (P = 0.045, OR = 4.181, 95%CI = 1.030–16.981).

Conclusion: These findings indicate that *P16INK4a* hypermethylation is a frequent event in primary breast cancer. Hypermethylation of this gene may influence the clinical disease course, distinguishing a particular group of TNBC patients with an even more aggressive phenotype.

No conflict of interest.

120 (PB-033) Poster

Pathogenic mutations in ethnic Lebanese Arab patients with high risk for hereditary breast cancer

H. Moukadem[1], N. Uhrhammer[2], Y. Bidet[3], N. Safi[1], M. Charafeddine[1], F. Kreidieh[1], N. Zgheib[1], N. El Saghir[1]. *[1]American University of Beirut Medical Center, Internal Medicine, Beirut, Lebanon; [2]Centre Jean Perrin, Oncogenetics, Clermont Ferrand, France; [3]Universite Clermont Auvergne, Imagerie Moléculaire et Strategies Theranostiques, Clermont Ferrand, France*

Background: Breast cancer accounts for 35–40% of cancer in women in Lebanese and Arab countries with 50% of patients (pts) diagnosed before age 50. Prevalence of pathogenic BRCA variants in high-risk pts is 5.6–20% (Abulkhair and El Saghir 2021). 7 BRCA1 and 7 BRCA2 pathogenic variants were found in 5.6% of 250 pts with high hereditary risk breast cancer using amplicon sequencing and MLPA (El Saghir 2015; Poulet 2016). We report results of Next Generation Sequencing (NGS) on selected cases based on Manchester Score. First report in ethnic Lebanese Arab pts.

Methods: Pts prospectively enrolled in 2009–2012. IRB approval secured. Pts signed informed consent. Data collected from medical records. Amplicon and MLPA was done on 250 patients. NGS was done on 100 cases with Manchester Score 14–56. DNAs of the 14 pts previously found to have a pathogenic variant (Manchester Score 10–59) were not re-sequenced. NGS on remaining 150 pts was not done due to Covid-19 pandemic and lack of additional funding.

Results: NGS showed 7 pathogenic variants, 4 in PALB2 and 3 in ATM. No new BRCA variants were found. Two BRCA2 mutations noted by Amplicon/MLPA reported as VUS in 2015 are reclassified as pathogenic. Total BRCA2 pathogenic variants becomes 9. Total pathogenic variants 23. Risk of having hereditary breast cancer in pts with MS 10–59 is 20% (23/114), and at least 9.2% in the entire cohort (23/250). Age ≤40 with family history (FH) carries 18.9% risk of harboring a pathogenic mutation while no FH, 1.4% (Table 1).

Table 1: Risk of carrying a pathogenic variant in 114 high risk pts grouped by age with/without positive FH

Age	FH	No. of pts	BRCA 1	BRCA 2	ATM	PALB2	Risk (%)	BRCA1/ 2 risk (%)
≤ 40	+	74	6	4	2	2	18.9	13.5
≤ 40	–	74		1			1.4	1.4
41–50	+	75	1	3		2	8	5.3
>50	+	27		1	1		7	3.7
All high-risk pts with Manchester Score 10–59		114	7	9	3	4	20	14.0

All BRCA1 pts had triple negative and 7/9 BRCA2 pts had hormone receptor positive breast cancer. 4 unrelated pts shared the same c.1056_1057delGA PALB2 pathogenic variant thus we suggest this is a founder mutation in Lebanese Ethnic Arab population.

Conclusions: Mutation rates in high hereditary risk pts with Manchester Score range 10–59 is 20%. Age ≤40 with positive FH can be used to select pts for testing when resources are limited. Our data suggests that c.1056_1057delGA is a PALB2 founder mutation.

No conflict of interest.

121 (PB-034) Poster

Genome wide association study of long-term patient-reported outcomes following radiotherapy for breast cancer – results from the REQUITE cohort study

H. Jandu[1], C.D. Veal[1], D. Azria[2], J. Chang-Claude[3], A.M. Dunning[4], D. de Ruysscher[5], L. Fachal[6], S. Gutiérrez-Enríquez[7], T. Rancati[8], B.S. Rosenstein[9], M.C. de Santis[10], P. Seibold[3], E. Sperk[11], R.P. Symonds[1], A. Vega[12], L. Veldeman[13], A. Webb[1], C. West[14], C.J. Talbot[1], T. Rattay[1]. *[1]University of Leicester, Department of Genetics and Genome Biology, Leicester, United Kingdom; [2]ICM Institut du Cancer Montpellier, Radiation Oncology Department, Montpellier, France; [3]German Cancer Research Center DKFZ, Division of Cancer Epidemiology, Heidelberg, Germany; [4]University of Cambridge, Centre for Cancer Genetic Epidemiology- Dept of Oncology, Cambridge, United Kingdom; [5]University Hospitals Leuven/KU Leuven, Department of Radiation Oncology, Leuven, Belgium; [6]University of Cambridge, Genomics of Inflammation and Immunity, Cambridge, United Kingdom; [7]Vall d'Hebron Institute of Oncology, Hereditary Cancer Genetics Group, Barcelona, Spain; [8]Fondazione IRCCS Istituto Nazionale dei Tumori, Istituto Tumori di Milano Prostate Cancer Program, Milan, Italy; [9]Mount Sinai School of Medicine, Department of Radiation Oncology, New York, USA; [10]Fondazione IRCCS Istituto Nazionale dei Tumori, Radiation Oncology, Milan, Italy; [11]Universitätsmedizin Mannheim- Heidelberg University, Medical Faculty Mannheim, Mannheim, Germany; [12]Fundacion Publica Galega Medicina Xenomica, Instituto de Investigación Sanitaria de Santiago de Compostela, Santiago de Compostela, Spain; [13]Universiteit Ghent, Dept. of Radiation Oncology, Ghent, Belgium; [14]University of Manchester, Division of Cancer Sciences, Manchester, United Kingdom*

Background: The 10-year survival rate for breast cancer is now approaching 80%. Research has shown that breast cancer survivors increasingly regard long-term quality of life (QoL) as an important treatment outcome. Prior studies suggest that QoL following cancer treatment is in part heritable. Therefore, a genome-wide association study (GWAS) was performed to elucidate common single nucleotide polymorphisms (SNPs) associated with QoL following radiotherapy for breast cancer.

Methods: Breast cancer patients (n = 2059) were recruited prospectively following breast-conserving surgery (with or without chemotherapy) and prior to radiotherapy across 27 centres in Europe and the US into the multicentre REQUITE cohort study (www.requite.eu) between 2014 and 2016. Longitudinal patient reported outcomes (PROs, EORTC-QLQ-C30 and –B23) were available for 1,919 patients at baseline, following radiotherapy as well as 1 and 2-year follow-up. Patient demographic and treatment predictors of health-related QoL overtime, across the six domains of Global Health Status, Fatigue, Pain, Body Image, Arm Symptoms and Breast Symptoms were identified using multivariable linear mixed effects models. All patients were genotyped using Illumina OncoArrays with ∼600 000 SNPs. Datasets were imputed according to OncoArray Network methods. A total of 7 097 340 SNPs with minor allele frequency >0.05 and imputation score >0.3 were tested for association with the model residuals for each QoL domain. A linear mixed model approach using the GMMAT software was used in R (R version 4.1.3). The top 15 principal components were used to correct for population stratification and European sub-populations.

Results: The rs62260112 SNP was statistically significant with respect to breast symptoms (beta = –5.59, $p = 1.41 \times 10^{-8}$). No other SNP reached the genome wide significant threshold (5×10^{-8}) for any QoL domain. Nevertheless, the top reported SNP on chromosome 22 was borderline significant with respect to Global Health Status (rs5754385 with beta = 5.74, $p = 5.14 \times 10^{-8}$). A SNP on chromosome 2 (rs145005002) almost reached significance (beta = –4.67, $p = 9.18 \times 10^{-8}$) with respect to body image. A cluster of SNPs on chromosome 22, particularly rs713705, appeared to be linked with arm symptoms (beta = –8.54 and $p = 1.18 \times 10^{-7}$). In addition, peaks of SNPs on chromosome 16 were observed for pain; the top SNP was rs11542180 with (beta = 7.13, $p = 1.26 \times 10^{-7}$).

Conclusion: This largest GWAS to date for patient-reported outcomes up to 2 years following breast radiotherapy provides evidence for genome-wide association of common SNPs with distinct QoL domains. These biologically plausible candidate SNPs can potentially be used to predict health-related QoL after breast cancer treatment.

No conflict of interest.

122 (PB-035) Poster

Detecting actionable PIK3CA mutations through next-generation sequencing (NGS) in hormone receptor positive (HR+)/HER2-negative advanced/metastatic breast cancer (MBC): a real-life experience

A. Caldart[1], E. Fiorio[1], S. Zanelli[1], P. Biondani[1], V. Parolin[1], F. Pellini[2], S. Montemezzi[3], A. Nottegar[4], A. Caliò[4], I. Zampiva[1], S. Merler[1], M. Mongillo[1], B. Avesani[1], G. Borghesani[1], E. Giontella[1], A. Scarpa[5], M. Milella[1], PRIN 2020 (grant number B39J21037270006). *[1]Section of Oncology, Department of Medicine, University of Verona, Azienda Ospedaliera Universitaria Integrata AOUI di Verona, Verona, Italy; [2]Unit of Breast Surgery, Ospedale Civile Maggiore, University Hospital of Verona, Verona, Italy; [3]Radiology Unit, Department of Pathology and Diagnostics- Azienda Ospedaliera Universitaria Integrata- P.le Stefani 1- 37126, Verona, Italy; [4]Section of Pathology, Department of Diagnostics and Public Health, University and Hospital Trust of Verona, 37134, Verona, Italy; [5]Section of Pathology, Department of Diagnostics and Public Health- University and Hospital Trust of Verona- 37134, Verona, Italy, ARC-Net Research Centre University and Hospital Trust of Verona, Verona, Italy*

Background: *PIK3CA* mutations occur in approximately 40% of patients (pts) affected by HR+/ HER2-negative MBC, and are associated with poor prognosis. The SOLAR-1 trial showed that pathogenic *PIK3CA* mutations are theoretically actionable (ESCAT Tier I) through the kinase inhibitor alpelisib. Nevertheless, in Europe and Italy the administration of alpelisib is allowed by regulatory restrictions only in association with fulvestrant, following progression after endocrine therapy (ET) alone.

Material and methods: From October 2021 to January 2022, somatic NGS analysis assessed on archival FFPE tissue specimens through the FoundationOne® CDx was offered to HR+/HER2-negative MBC pts, with an ECOG PS of 0–1, expected to progress within the following 6 months on ongoing treatments, regardless of histology, number of therapeutic lines undergone, and extension of disease.

Results: To date, fifty-one pts have been enrolled, reporting 7 screening failures due to inadequate histologic material. Pathogenic (class 4 and 5) *PIK3CA* mutations were detected in 24 pts (54.5%). E545 K and E542 K resulted the most frequent mutations. A concurrent CDH1 mutation was reported in 8 (33.3%) pts, while isolated CDH1 mutations were detected in 3 pts (all with lobular or mixed histology). Further potentially actionable alterations (ESCAT Tiers I-III) were documented in 10 pts (20%), including unrecognized HER-2 amplifications and exon-20 mutations, and pathogenic BRCA1/2 mutations. Notably, high TMB (19–43 mut/Mb) was detected in 3 pts, one of which showed MSI. As the majority of pts had undergone ET combined with CDK inhibitors, at the time of NGS profiling only 2 pts were eligible to receive alpelisib; an additional patient received alpelisib through an off-label prescription.

Conclusions: The prevalence of *PIK3CA*-mutated pts in our cohort was slightly higher than the one reported in the literature and concomitant CDH1 mutations resulted in 1/3 of cases. However, according to current permissions, only a negligible percentage of *PIK3CA*-mutated pts would be eligible for alpelisib administration. Therefore, we speculate that genomic profiling should be offered as early as possible to MBC pts, in order to improve therapeutic opportunities.

No conflict of interest.

123 (PB-036) Poster

Analysis of rare disruptive germline mutations in 2135 enriched BRCA-negative breast cancer cases excludes additional high-impact susceptibility genes

C. Loveday[1], A. Garrett[1], P. Law[1], S. Hanks[1], E. Poyastro-Pearson[1], D. Eccles[2], G. Evans[3], K. Snape[4], H. Hanson[4], R. Houlston[1], C. Turnbull[1], The Breast and Ovarian Cancer Susceptibility Collaboration. *[1]Institute of Cancer Research, Genetics and Epidemiology, Sutton, United Kingdom; [2]University of Southampton, Faculty of Medicine, Southampton, United Kingdom; [3]St. Mary's Hospital, 3. University Department of Medical Genetics, Manchester, United Kingdom; [4]St. George's Hospital, South West Thames Regional Genetics Service, London, United Kingdom*

Background: To better understand the unexplained ~60% of the genomic architecture of breast cancer susceptibility, we undertook germline whole exome sequencing (WES) of 2,135 *BRCA*-negative female breast cancer cases. Our series was highly enriched for early-onset, bilateral, family history of disease and concomitant ovarian cancer, substantially boosting power for discovery.

Materials and methods: We leveraged, for comparison, gnomAD WES data from 51 377 ethnicity-matched controls. Parallel variant annotation, quality control, per-site coverage normalisation and GATK QualByDepth calibration, were applied to reduce confounding effects from differences in sequencing and analytic pipelines. Burden testing was performed on damaging variants (protein truncating, damaging missense, and ClinVar pathogenic) at minor allele frequency ≤0.5% for targeted gene sets (known cancer susceptibility genes, DNA repair genes, oncogenes) and exome wide, using Fisher's exact test and Bonferroni-corrected significance thresholds.

Results: Excluding known breast cancer susceptibility genes, no gene demonstrated significant association with breast cancer in any analysis after correction for multiple testing.

Conclusions: Our study was very well powered to identify additional major high-penetrance breast cancer susceptibility genes. We had 90% power to detect a gene, should one have existed, of *PALB2*-like effect size (odds ratio = 5) down to a population mutational frequency of 1 in 1475 (less than half that of *PALB2*). Multiple breast cancer susceptibility genes of extremely low mutational frequency and/or very modest effect (odds ratio ≤2) are likely to exist, but studies much larger than ours are required to identify them. Our analyses exemplify the challenges of gene discovery for common complex diseases and contextualises the gains in power achieved through using genetically enriched case series and increased sample sizes. In concert with findings from genome-wide association studies, our data support the architecture of residual inherited susceptibility to breast cancer as being highly polygenic, with limited prospect regarding existence of additional genes relevant to clinical testing.

No conflict of interest.

124 (PB-037) Poster

Novel breast cancer predisposing candidate genes identified in Brazilian families with hereditary breast cancer

G. Bandeira[1], K. Rocha[1], M. Lazar[1], S. Ezquina[1], G. Yamamoto[1], T. Gollop[2], M. Zatz[1], M. Passos-Bueno[1], A. Krepischi[1], O. Keith Okamoto[1]. *[1]Institute of Biosciences, Department of Genetics and Evolutionary Biology, São Paulo, Brazil; [2]Faculty of Medicine of Jundiai, Department of Gynecology and Obstetrics, São Paulo, Brazil*

Background: It is estimated that 5 to 10% of breast cancer (BC) cases present strong hereditary components. Currently, patients with BC in hereditary breast cancer (HBC) syndrome families are frequently tested for germline mutations in the *BRCA1* and *BRCA2*. However, the pathogenic variants in these genes are identified in only 20% of all HBC cases, 8% of germline mutations are identified in a few other cancer predisposing genes, while most remain without a determined genetic etiology.

Given the significant proportion of HBC cases without a determined genetic etiology, as well as the scarcity of data regarding the genetic predisposition to BC in the Brazilian population, we aim to identify novel HBC predisposing genes candidates by performing whole exome sequencing (WES) of families with multiple affected.

Material and methods: As an inclusion criterion, families with at least 3 cases of BC were selected, in which the proband had previously been subjected to sequencing and found negative for pathogenic or likely pathogenic variants in the main predisposing genes associated with HBC. The study cohort is comprised of 30 patients with HBC from 8 families and 2 unaffected relatives from the familial branch without BC.

WES was performed with the genomic DNA extracted from the 32 samples of saliva or blood, using the IDT xGen Exome v2 library preparation kit, and the Illumina HiSeq or NovaSeq sequencing platforms. VarSeq software (Golden Helix®) was used to annotate variants and apply filters to the WES data.

Results: We identified 24 variants in 24 novel candidate genes that completely segregate with the BC in one of the 8 families studied. The number of potential candidates is consistent with genetic heterogeneity exhibited by HBC and the prevailing hypothesis that remaining BC cancer predisposing genes yet to be discovered will each likely account for a small proportion of HBC but collectively account for a significant proportion of cases.

Among these, 3 candidate variants identified in 3 different families are interesting, as they have high prediction scores for pathogenic potential, and have been reported in genes in signaling pathways and biological processes already associated with cancer predisposition.

The most promising candidate gene identified participates in the homologous recombination DNA repair pathway, a pathway containing numerous known BC predisposition genes, including the *BRCA1* and *BRCA2*. Two other promising candidate genes are known to participate in important canonical oncogenic pathways, such as the MYC and KRAS.

Conclusions: Our findings contribute to characterizing the genetic background of HBC by presenting novel candidate genes for BC predisposition. The results of this study have great potential for informed clinical management by including novel predisposing genes in genetic tests offered to patients and their families.

No conflict of interest.

POSTER SESSION **17 November 2022**

Lifestyle, Prevention including Secondary Prevention

126 (PB-039) Poster

A multimodal approach for the management of co-morbid cardiotoxicity in the elderly breast cancer patients

G. Karanasiou[1], G. Grigoriadis[1], A. Alexandraki[2], A. Antoniades[3], C. Brown[3], A. Bucur[4], C. Cipolla[5], P. Economopoulou[6], T. Foukakis[7], J. Goossens[4], K. Keramida[8], L. Lakkas[9], K. Marias[10], K. Naka[9], A. Papakonstantinou[7], G. Pravettoni[11], D. Ribnikar[12], B. Šeruga[12], M. Zacharia[2], M. Tsiknakis[13], D. I. Fotiadis[1]. *[1]University of Ioannina, Department of Material Science & Engineering, Ioannina, Greece; [2]Bank of Cyprus Oncology Centre, Bank of Cyprus Oncology Centre, Nicosia, Cyprus; [3]Stremble Ventures LTD, Stremble Ventures LTD, Limassol, Cyprus; [4]Philips Research, Philips Research, Eindhoven, Netherlands; [5]European Institute of Oncology, Cardiology Division, Milan, Italy; [6]National and Kapodistrian University of Athens- Attikon University Hospital, Department of Internal Medicine, Section of Medical Oncology, Athens, Greece; [7]Karolinska Institutet & Karolinska University Hospital, Department of Oncology-Pathology & Department of Breast Cancer- Endocrine Tumours and Sarcoma, Stockholm, Sweden; [8]National and Kapodistrian University of Athens-Attikon University Hospital, Department of Cardiology, Cardioncology Unit, Athens, Greece; [9]University of Ioannina, University Hospital of Ioannina, Department of Cardiology, Ioannina, Greece; [10]Foundation for Research and Technology- Institute of Computer Science, Computational BioMedicine Laboratory, Heraklion, Greece; [11]European Institute of Oncology, Applied Research Division for Cognitive and Psychological Science, Milan, Italy; [12]Institute of Oncology Ljubljana, Department of Medical Oncology, Ljubljana, Slovenia; [13]Hellenic Mediterranean University, Department of Electrical and Computer Engineering, Heraklion, Greece*

Background: Evidence-based best practices for risk stratification of elderly breast cancer patients are still lacking. Data for this patient population are scarce since elderly patients are underrepresented in clinical oncology trials. As a result, lower doses of chemotherapy are prescribed due to concerns for cardiotoxicity, frailty and high prevalence of multimorbidity [1]. This contributes to undertreatment and suboptimal outcomes with a negative impact on the patients' Quality of Life (QoL) [2]. CARDIOCARE project [3] develops a novel and cost-effective risk stratification and healthcare model providing evidence-based best practices and care pathways to improve the management of multimorbid breast cancer patients at risk for cardiac toxicity.

Material and methods: CARDIOCARE exploits existing retrospective real world data from 5 clinical partners (European Institute of Oncology, Bank of Cyprus Oncology Centre, Karolinska University Hospital, National and Kapodistrian University of Athens and University of Ioannina) of elderly breast cancer patients. In parallel, a multicenter clinical study will be performed collecting data (clinical, imaging, omics, biomarkers, psychomarkers, intrinsic capacity and QoL) though the CARDIOCARE mobile application and digital biomarkers from sensor devices (physical activity sensor, ECG sensor) to be explored by machine learning approaches.

Results: New validated sets of quality Key Performance Indicators (KPIs) will be defined for better managing the elderly multimorbid breast cancer patient and cardiotoxicity, including biomarker, intrinsic capacity, QoL, satisfaction and cost-effectiveness indicators. Novel integrated eHealth behavioral and psychological interventions will be established for improving the intrinsic capacity and QoL and counteract cardiotoxicity in elderly breast cancer patients and new validated risk stratification models will be developed, incorporating novel biomarkers, psychomarkers for optimal healthcare pathways identification.

Conclusions: CARDIOCARE approaches the challenge of the seamless integration and interoperability of a variety of software components. It creates a scalable big data management and analysis platform of multidimensional health data, sensor signals, and data from the mobile health application aiming to provide actionable insights and assist clinicians to identify best practices to improve QoL, identify patient care gaps, improve patient outreach by automatically tracking and managing a patient's progress, participation, compliance, preference and satisfaction and support patient-centred care.

No conflict of interest.

References

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127 (PB-040) Poster

The effect of prehabilitation in cancer patients: systematic review and meta-analysis

A. Lahousse[1,2], K. Mostaqim[1], E. Roose[1], J. Nijs[1,3], D. Beckwée[1,4], S. Demunter[1], H. Ghijselings[1], E. Rheel[1,5], L. Leysen[1]. *[1]Vrije Universiteit Brussel, Department of Physiotherapy- Human Physiology and Anatomy-Faculty of Physical Education and Physiotherapy, Brussels, Belgium; [2]Research Foundation, Flanders FWO, Brussels, Belgium; [3]University of Gothenburg, Institute of Neuroscience and Physiology, Gothenburg, Sweden; [4]University of Antwerp, Department of Rehabilitation Sciences and Physiotherapy- Faculty of Medicine and Health Sciences, Wilrijk, Belgium; [5]Ghent University, Department of Experimental Clinical and Health Psychology, Gent, Belgium*

Background: Recently, prehabilitation (i.e., "a process on the cancer continuum of care that occurs between the time of cancer diagnosis and the beginning of treatment") gained noteworthy acceptance in the field of oncology. Therefore, this systematic review with meta-analysis aimed to evaluate the effect of prehabilitation in patients with breast, colon, lung, and prostate cancer on biopsychosocial outcomes before and after cancer treatment.

Material and methods: PubMed, Web of Science, and Embase were screened for randomized control trials (RCTs) that studied prehabilitation programs consisting of exercise, nutritional or psychological interventions, or a combination, in cancer patients. Subgroup analyses based on intervention and cancer types were performed in case of heterogeneity (I^2 >50%).

Results: Forty-five RCTs (n = 3699) were included. Prehabilitation has a significant effect before the start of the cancer treatment, on maximal inspiratory pressure (SMD: −1.06 [−2.07; −0.06], I^2 = 92%), peak VO_2 (SMD: −1.01 [−1.70; −0.31], I^2 = 87%), watt max (SMD: −0.97 [−1.56; −0.38], I^2 = 81%), walking capacity (SMD: −0.87 [−1.68; −0.05], I^2 = 64%), peak expiratory flow (SMD: −0.75 [−1.13; −0.36], I^2 = 27%), walking distance (WD) (SMD: −0.63 [−0.74; −0.51], I^2 = 65%), VO_2 at anaerobic threshold (SMD: −0.63 [−1.03; −0.24], I^2 = 65%), lower body strength (BS) (SMD: −0.62 [−0.85; −0.39], I^2 = 0%) and physical functioning (PF) (SMD: −0.20 [−0.40; −0.00], I^2 = 0%).

Also, immediately after cancer treatment significant effects in favor of prehabilitation were found for days with chest tubes (SMD: −1.02 [−1.45; −0.59], I^2 = 0%), depression (SMD: −0.95 [−1.38; −0.51], I^2 = 33%), mental health (SMD: −0.58 [−0.98; −0.19], I^2 = 0%), insulin (SMD: −0.52 [−0.85; −0.19], I^2 = 18%), WD (SMD: −0.44 [−0.70; −0.19], I^2 = 58%), forced vital capacity (SMD: −0.43 [−0.84; −0.02], I^2 = 0%), fat-free mass (SMD: −0.35 [−0.65; −0.05], I^2 = 0%), length of stay (SMD: −0.35 [−0.58; −0.12], I^2 = 83%), PF (SMD: −0.32 [−0.63; −0.02], I^2 = 37%) and upper BS (SMD: −0.28 [−0.51; −0.04], I^2 = 0%). Additionally, prehabilitation reduced post-cancer treatment complications (RR: 0.75 [0.60; 0.95], I^2 = 24%), infections (RR: 0.66 [0.49; 0.87], I^2 = 4%), pneumonia (RR: 0.56 [0.37; 0.85], I^2 = 0%), atelectasis (RR: 0.48 [0.29; 0.81], I^2 = 0%) and pulmonary complications (RR: 0.42 [0.29; 0.59], I^2 = 0%).

Even after a longer period of time (±1 month) significant results were found for interferon-γ (SMD: −0.93 [−1.31; −0.56], I^2 = 0%), tumor necrosis factor-α (SMD: −0.90 [−1.38; −0.42], I^2 = 29%), physical activity (SMD: −0.67 [−1.28; −0.05], I^2 = 68%), PF (SMD: −0.34 [−0.55; −0.12], I^2 = 0%), WD (SMD: −0.24 [−0.43; −0.05], I^2 = 26%) and quality of life (SMD: −0.22 [−0.43; −0.01], I^2 = 0%).

Conclusions: Prehabilitation before and after cancer treatment has a positive effect on biopsychosocial outcomes in cancer patients. However, more research is needed to determine the optimal content of prehabilitation for each cancer type and explore strategies to improve compliance.

No conflict of interest.

128 (PB-041) Poster

Does fertility preservation affect the onset of the oncological treatment and the response to neoadjuvant chemotherapy in breast cancer?

S. Baulies[1], M. Devesa[2], F. Tresserra[3], M. Izquierdo[4], I. Rodríguez[5], C. Ara[4], R. Fàbregas[4]. *[1]Hospital Universitari Quirón-Dexeus, Gynecologic Oncology and Breast Pathology Section. Department of Obstetrics- Gynecology and*

Reproduction, Barcelona, Spain; [2]Hospital Universitari Quirón-Dexeus, Service of Reproductive Medicine. Department of Obstetrics- Gynecology and Reproduction, Barcelona, Spain; [3]Hospital Universitari Quirón-Dexeus, Department of Pathology, Barcelona, Spain; [4]Hospital Universitari Quirón-Dexeus, Gynecologic Oncology and Breast Pathology Section, Department of Obstetrics- Gynecology and Reproduction, Barcelona, Spain; [5]Hospital Universitari Quirón-Dexeus, Statistics and Epidemiology Unit. Department of Obstetrics- Gynecology and Human Reproduction, Barcelona, Spain

Aims: Study in breast cancer patients to assess whether fertility preservation (FP) can affect the onset of the oncological treatment and the pathological response in those patients who underwent neoadjuvant chemotherapy (NAC).

Methods:

- Patients with breast cancer who underwent fertility preservation and NAC are matched 1:2.45 to non-FP controls by age and date al diagnosis and are studied:
- Timing between the diagnosis of breast cancer and the onset of oncological treatment was performed. The following variables were chosen: 1.- Confirmation (pathologic result), 2.- FP visit, 3.- Onset FP, 4.- Final FP, 5. – Onset oncological treatment. The periods analyzed (median in days) were: 1.- Period of FP visit (AP result-FP visit), 2.- Period of FP (FP beginning –FP ending), 3.- Period of onset of oncological treatment (FP ending-onset of oncological treatment), 4.- Overall period (AP result-onset of oncological treatment).
- Studying the pathological complete response (Miller Payne scale) among patients with FP compare to non-FP control group was also performed.

Results: 20 patients with FP and NAC are studied between 2010 and 2019 and were compared to 49 non-FP patients. The median age at diagnosis was 36 years (28–39). The oncological characteristics of the patients are shown in Table 1.

The time analysis in FP group was: 1.- Period of FP visit was 4 days (1–26), 2.- the period of FP (start of the stimulation treatment until the recovery of the oocytes) 12 days (7–20), 3.- the Period of onset of oncological treatment 7 days (1–27).

The overall period took 26 days (18–51) compared to 17.5 days (1–60) in non-FP group (NS).

Pathological complete response (Miller Payne 5): The pathological complete response was80% (16/20) in FP group versus 40.8% (20/49) in non-FP group.

Analyzed by tumor subtype in FP group, a MP5 was achieved in 72.7% luminal tumor (8/11), 75% positive-HER2 (3/4), 100% triple negative (5/5) versus 19% luminal tumor (4/21), 41.6% (5/12) positive-HER2 and 68.7% triple negative (11/16) in non-FP group.

Conclusion: FP does not delay the onset of oncological treatment and our data do not suggest an adverse impact of FP on pathological complete response to NAC.

No conflict of interest.

129 (PB-042) Poster

Association between physical activity and subsequent cardiovascular disease among 5-year breast cancer survivors

K.H. Kim[1], S. Choi[2], K. Kim[3], J. Chang[3], S.M. Kim[3], S.R. Kim[4], Y. Cho[5], Y.H. Oh[6], G. Lee[7], J.S. Son[7], S.M. Park[7]. *[1]Seoul National University Hospital, Comprehensive Care Clinic, Seoul, South Korea; [2]Seoul National University Hospital, Internal Medicine, Seoul, South Korea; [3]Seoul National University Graduate School, Department of Biomedical Sciences, Seoul, South Korea; [4]College of Medicine, Seoul National University, Undergraduate Student, Seoul, South Korea; [5]Samsung Medical Center, Family Medicine, Seoul, South Korea; [6]Jeju National University School of Medicine, Family Medicine, Jeju, South Korea; [7]Seoul National University Hospital, Family Medicine, Seoul, South Korea*

Purpose: To examine the association of physical activity among long-term breast cancer survivors on the occurrence of subsequent cardiovascular disease (CVD).

Methods: We investigated the risk of CVD among 39,775 breast cancer patients who were newly diagnosed in 2006 and survived until 2011 within the Korean National Health Insurance Service database. Patients were followed up from 5 years after breast cancer diagnosis to the date of CVD event, death, or December 31, 2018, whichever came earliest. Every 500 MET-mins/week correspond to 152, 125, and 62.5 minutes per week of light-moderate- and vigorous-intensity physical activity, respectively. Adjusted hazard ratios (aHRs) and 95% confidence intervals (CIs) for CVD were calculated using Cox proportional hazards regression by physical activity levels.

Results: Compared with those with physical activity of 0 MET-min/week, those with 1–499 (aHR 0.82, 95% CI 0.69–0.98), 500–999 (aHR 0.75, 95% CI 0.63–0.90), and ≥1000 (aHR 0.76, 95% CI 0.63–0.93) MET-min/week of PA had lower risk of CVD. Higher levels of PA were associated with lower risk of stroke (p for trend = 0.016). The benefits of PA on obese and overweight breast cancer survivors were smaller than those in normal weight survivors. The frequency of moderate-to-vigorous physical activity (MVPA) showed a reverse J-curve association with CVD, and the best benefit occurred in the 3–4 times MVPA per week group (aHR 0.59, 95% CI 0.46–0.74).

Conclusions: The study showed that even small amounts of PA may be beneficial in potentially decreasing the risk of CVD, CHD, and stroke in breast cancer survivors. Our result will be useful to prescribe and delivery exercise among long-term breast cancer survivors.

No conflict of interest.

130 (PB-043) Poster

Early integrated rehabilitation helps maintain good cognitive function in breast cancer patients – a comparison of self-reported cognitive function between the intervention group and control group in a prospective study in 511 patients

Z. Mavric[1], T. Zagar[2], V. Homar[3], N. Kopcavar Gucek[4], A.C. Skufca Smrdel[5], J. Knific[5], S. Borstnar[6], R. Cencelj-Arnez[7], L. Zadravec Zaletel[8], N. Kos[9], B. Strazisar[10], T. Slapar[11], D. Mastnak Mlakar[11], N. Kovacevic[12], V. Hadzic[13], B. Pelhan[14], M. Sremec[14], A. Mozetic[1], T. Rozman[14], N. Besic[7]. *[1]Institute of Oncology, Nursing, Ljubljana, Slovenia; [2]Institute of Oncology, Cancer Registry, Ljubljana, Slovenia; [3]Community Health Centre Vrhnika, Adult Healthcare Services, Vrhnika, Slovenia; [4]Community Health Centre Ljubljana, Adult Healthcare Services, Ljubljana, Slovenia; [5]Institute of Oncology, Psycho-Oncology, Ljubljana, Slovenia; [6]Institute of Oncology, Medical Oncology, Ljubljana, Slovenia; [7]Institute of Oncology, Surgical Oncology, Ljubljana, Slovenia; [8]Institute of Oncology, Radiotherapy, Ljubljana, Slovenia; [9]University Medical Centre Ljubljana, Medical Rehabilitation, Ljubljana, Slovenia; [10]Institute of Oncology, Anesthesiology, Ljubljana, Slovenia; [11]Institute of Oncology, Clinical Nutrition, Ljubljana, Slovenia; [12]Institute of Oncology, Gynecology, Ljubljana, Slovenia; [13]Faculty of Sport Ljubljana, Medical Sciences in Sport, Ljubljana, Slovenia; [14]University Rehabilitation Institute Soca, Centre for Vocational Rehabilitation, Ljubljana, Slovenia*

Background: Impaired cognitive function after breast cancer treatment is a health problem that is very difficult to treat. Our aim was to determine whether the early introduction of integrated rehabilitation from the start of the cancer treatment is associated with the prevalence of self-reported cognitive function decline in breast cancer patients.

Material and methods: The subjects of our prospective study were 511 female breast cancer patients (29–65 (mean 52) years of age), who participated in the pilot study on the individualized integrated rehabilitation of breast cancer patients in 2019–2022 and were followed for at least six months. The control group included 297 patients and the intervention group 214 patients. The patients completed three questionnaires (EORTC QLQ - C30, B23 and NCCN) before and six months after the beginning of cancer treatment. The control group obtained the same rehabilitation as was offered to all breast cancer patients in our hospital before the start of our prospective study. The multidisciplinary rehabilitation team reviewed the documentation of all the patients from the intervention group before and six months after the beginning of cancer treatment and recommended appropriate interventions according to the patient's needs. The integrated rehabilitation coordinator referred patients for additional interventions in compliance with the institute's clinical pathway (psychologist, general practitioner, nutritional treatment, physical rehabilitation, kinesiologist-guided online exercises, gynecologist, analgesia, vocational rehabilitation). Data on the patients' demographics, disease extent, cancer treatment and self-reported cognitive function reported in questionnaires before and six months after starting cancer treatment were collected and analysed using the chi-square, ANOVA and a paired t-test.

Results: There were no differences between the control and the intervention group of patients in terms of age, education, disease extent, surgical procedures, systemic cancer treatment, or radiotherapy. There were no differences between the groups in the prevalence of self-reported cognitive function decline before starting cancer treatment (p = 0.15). Before the cancer treatment, moderate or severe self-reported cognitive function decline were reported in the intervention and control groups in 4% and 6.6%, respectively. However, six months after the beginning of cancer treatment, moderate or severe self-reported cognitive function decline were less common in the intervention group in comparison to the control group (p < 0.001). Moderate or

severe cognitive self-reported function decline were reported in the intervention and control groups in 3.7% and 12.8%, respectively.

Conclusions: Early integrated rehabilitation helps maintain good cognitive function in breast cancer patients six months after starting cancer treatment.

No conflict of interest.

131 (PB-044) Poster

Effect of Covid-19 pandemic on breast cancer disease progression

A. Butt[1], A. Hill[1]. [1]*Beaumont Hospital, Breast Surgery, Dublin, Ireland*

Introduction: On 11th March 2020 WHO officially declared Covid-19-infection pandemic. The pandemic challenged the National Health systems worldwide. Most Hospitals were reconfigured, and elective surgeries rescheduled. Breast Cancer management was no different, with the pandemic affecting the screening, presentation, diagnosis and treatment of Breast Cancer. People who have been diagnosed with breast cancer and people who are at high risk for breast cancer found themselves in a uniquely difficult and frightening position since the crisis began.

Different hospitals and trusts adapted different guidelines of managing patient. As much as Beaumont hospital was affected with the crisis the breast department tried its best to continue looking after patients with breast cancer. Clinic numbers were sustained with reduced staff however efforts were put in to assess and manage urgently triaged patients.

In this paper we aim to conduct a retrospective analysis of locally advanced Breast cancers that presented during pre Covid compared to the pandemic era. The Hypothesis is that during the crisis the number of fungating breast cancer patients presenting to the breast clinic increased.

Methods: This is a retrospective study, which involves TNM Staging of all breast cancers that were presented to the Beaumont Hospital between January 2017 and December 2021. . Data was reviewed and clinical staging assigned. Final analysis was performed for each year for following variables.

- Total number of patients seen
- Absolute number of Breast cancers Treated
- Absolute Number of TNM stage
- Number of fungating Breast Cancers

Results: Of all the new patients presenting to the breast clinic during the five years a total of 1952 breast cancers were diagnosed. Of all the new breast cancer diagnosis the percentage of patients diagnosed in every stage did not show a huge difference. On average 36.8% patients were diagnosed per year in stage I between 2017–2019 compared to 40.5% during the pandemic. For stage II the numbers were 32.6% versus 34.5% which also showed a slight increase during the last 2 years. Interestingly stage 3 and stage 4 numbers were slightly high during pre-covid era. On an average 1.4% patients presented as fungating breast wound during the pre-pandemic era versus 3.4% presenting during the Covid 19. On applying two sample Z test of proportion p value (<0.00001) is significant.

Conclusion: The different presentation of breast cancer at various stages remained the same during the pre covid and during the pandemic however the number of locally advanced breast cancers presenting to Beaumont Hospital increased during the pandemic era. Possible explanation could be patients presenting late trying to avoid hospitals. Further research into the various causes will be helpful.

No conflict of interest.

132 (PB-045) Poster

Black seed oil supplement had positive effects on blood concentration and mRNA expression levels of estrogen and SHBG in premenopausal women with overweight and obesity: a crossover, double blind, placebo controlled randomized clinical trial

E. Razmpoosh[1], P. Mirmiran[2], S. Safi[3], A. Nadjarzadeh[3], M. Nazari[4], D. Meyre[5]. [1]*Shahid Beheshti University of Medical Science, Nutrition and Endocrine Research Center, Tehran, Afghanistan;* [2]*Shahid Beheshti University of Medical Sciences, Nutrition and Endocrine Research Center, Tehran, Afghanistan;* [3]*Shahid Sadoughi University of Medical Sciences, Department of Nutrition, Yazd, Afghanistan;* [4]*Shahid Sadoughi University of Medical Sciences, Department of Medical Genetics, Yazd, Afghanistan;* [5]*McMaster University, Department of Health Research Methods- Evidence and Impact, Hamilton, Canada*

Background: Medicinal herbs have been widely used for their anti-obesity effects among women with overweight and obesity. However, evidence showed that using these herbs with various types of phytoestrogens, fatty acids and active components may affect sex hormones and gene expression of parameters related to the prognosis of hormone-related cancers such as BC, especially among obese populations and premenopausal women. One of these medicinal herbs is black seed (BS) which is a major source of kaempferol (a flavonoid phytoestrogen) and fatty acids. This is the first study aimed to assess the effect of BS oil supplements on mRNA expression of *ERβ* and *SHBG* in PBMCs and serum peptide concentrations of free estradiol (E2) and SHBG in premenopausal healthy women with overweight and obesity.

Material and Methods: Participants were randomized to receive either BS supplements (2000 mg/day) (n = 23) or placebo (n = 24). This study had two treatment periods of 8 weeks each, separated by a 4-week washout period. Outcomes were measured four times during the study. A repeated-measure ANOVA model was used considering the effect of treatment, time, and interaction between them, called as the carryover effect. If the carryover effect was found to be significant (residual $p < 0.05$), the results of the first intervention period were analyzed using analysis of covariance (ANCOVA). The magnitude of the effects was measured estimating *Cohen's d*(d).

Results: Forty-seven participants were recruited for the study. BS supplementation significantly increased transcription levels of both *ERβ*($p = 0.039$), and *SHBG*($p = 0.02$), though with medium effect sizes ($d = -0.32$, $d = -0.47$, respectively). Although a significant decrease with a medium-high effect size was observed in serum E2($p < 0.001$, $d = 0.57$), the carryover effect was found to be significant($p < 0.05$). However, the results remained unchanged after the analysis based on the first intervention period. An insignificant increase with a medium effect size was observed in serum levels of SHBG($p = 0.052$, $d = -0.34$); it is possible that the duration of the intervention was not long enough to observe the effects.

Conclusions: Overall, despite a significant increase in the expressions of *ERβ*, *SHBG*, and serum SHBG, as well as a significant decrease in serum E2, the effect sizes were found to be medium, which partially supports the hypothesis that daily supplementation with 2000mg/day of BS oil (as a source of phytoestrogens) may lower the risk of BC in premenopausal healthy overweight and obese women. As the role of herbal medicine in BC prognosis is still of major concern, more RCTs with different designs and populations (specifically with various menopausal status and BC history) are necessary to clarify the exact BC preventive efficacy of BS and its actions beyond the estrogen receptors and other potential parameters during long-term exposure.

No conflict of interest.

133 (PB-046) Poster

Breast cancer nutritional risk factors: insights from the Tesco 1.0 dataset

D. Yilmaz[1], D. Pimenta[2], M.Z. Ullah[3], J. Taubel[4]. [1]*St.Bartholomew's Hospital- London, Breast Surgery, London, United Kingdom;* [2]*Richmond Research Institute, Research Dept, London, United Kingdom;* [3]*St. Bartholomew's Hospital- London, Surgery, London, United Kingdom;* [4]*St George's University- London, University of London, London, United Kingdom*

Background: Dietary influences on breast cancer outcomes have previously been hard to quantify, and traditional longitudinal approach to breast cancer studies are prone to bias, expensive, and fail to quantify changes in habits over time and with co-habitation. The Tesco 1.0 dataset is open-source data from Tesco's club card loyalty scheme, covering 420 m transactions amongst 16 m club card users resident in one of the 33 boroughs of Greater London. The data is presented as an average 'item' purchased in each borough, with 202 individual nutritional components data presented. Our associated group has previously validated this dataset with known cardiovascular risk factors and outcomes (EAPC 2022).

Method: We hypothesised that this dataset might give us meaningful insight into the correlation between population-level food purchasing behaviour and breast cancer outcomes. We performed a univariable Spearman's Rho on each dietary correlation with ASMR per 100,000 breast cancer mortality (ONS) per London borough. We used a 2-tailed P-value with a high significance level of <0.01. We also explored predicted confounders of borough deprivation, population % ethnicity, and hourly wage.

Results: We found that breast cancer outcomes were highly correlated with dietary purchasing habits, in biologically plausible relationships. Protective factors were consumption of dairy (R–0.5, P = 0.004) eggs (R –0.58, P = 0), fish (R–0.52, P = 0.002) and fruit and vegetable intake (R = –0.462). Risk factors were total consumption of sugar (R = 0.542, P 0.001), carbohydrate (R = 0.551, P = 0.001), ready-made meals (R = 0.599, P = 0), and sweets (R = 0.562, P = 0.001). Prevalence of diabetes (R = 0.516, P = 0.003) and obesity (R = 0.558, P = 0.001) were significant confounders. Interestingly breast cancer outcomes were significantly inversely correlated with population density (–0.6 P = 0) the higher the density, the lower the

breast cancer mortality, suggesting breast cancer is associated with affluence and smaller households.

Conclusions: In this exploratory analysis, we have demonstrated biologically plausible relationships, and compared to other cancers, breast cancer is a disease highly related to fat/inflammation/diet axis. Further work to explore the multi-variable relationships and at an individual level is required. This potentially could be ultimately be useful to better advise individuals on risk prevention and improve screening of at-risk populations.

No conflict of interest.

135 (PB-048) Poster

Finding patient-reported deterrents to adjunct Breast Cancer screening among patients with dense breast tissues. A cross sectional study in Pakistan

A. Fatima[1]. [1]*Shaukat Khanum Cancer Hospital, Surgical Oncology, Lahore, Pakistan*

Background: Women with dense breast tissues are at a greater risk of developing cancer because of reduced sensitivity of mammography. In order to address this issue, there's need to incorporate adjunct screening modalities for this particular population. We aim to identify patient's characteristics such as age, socioeconomic status, personal risk of breast cancer etc associated with patient cited concerns about adjunct breast screening modalities.

Methods: A cross sectional study was conducted from June 2019 to August 2020. The preferences and attitudes of women with dense breasts toward adjunct breast cancer screening were evaluated. Patient survey responses regarding whether various factors would deter patients from adjunct breast cancer screening and regarding which of three hypothetical breast screening examinations they would prefer were extracted from the survey data. Patient demographic and clinical data were obtained by re- view of patient medical records.

Results: Surveys were completed by 700 women (median age, 53.0 years) with dense breasts. Lower con dence in the sensitivity of mammography of dense breasts was independently associated with lesser concern about adjunct screening examination time (1 divided by adjusted odds ratio [1/AOR], 0.55 [95% CI, 0.34–0.89]), additional imaging that could result (1/AOR, 0.51 [95% CI, 0.31–0.85]), and greater preference for a more sensitive hypothetical screening examination (1/AOR, 1.85 [95% CI, 1.20–2.86]). Concern about examination cost, the most commonly cited deterrent to adjunct screening (66.9%), was independently associated with younger age (1/AOR, 1.45 [95% CI, 1.01– 2.08]) but not with imputed socioeconomic variables or other tested variables. Younger age was also associated with lesser concern about pain (1/AOR, 0.69 [95% CI, 0.48–0.99]), additional imaging that could result (1/AOR, 0.48 [95% CI, 0.31–0.76]), and IV contrast administration (1/AOR, 0.56 [95% CI, 0.37–0.83]).

Conclusion: Our study exhibits that patient concerns about adjunct breast cancer screening may be mitigated by educating patients about the limitations of the sensitivity of mammography of dense breasts and by exploring age-specific ways to address the financial impact of adjunct screening.

No conflict of interest.

136 (PB-049) Poster

Risk factors of complications after nipple-sparing mastectomies in women with breast cancer risk gene mutations (BRCA1,BRCA2, PALB2)

J. De La Torre-Fernandez De Vega[1], E. Valles[2], L. Barberan[2], M. Pancorbo[2], M.D.M. Comas[3], A. Garrido[4], I. Hernan[4], I. Vives[2], J. Rivero[2], C. Morales[2], C. Siso[2], M. Cruella[5], J. Balmaña[5], A. Gil-Moreno[2], M. Espinosa Bravo[2]. [1]*Vall d`Hebron, Gynaecology, Barcelona, Spain;* [2]*Vall d`Hebron Hospital, Gynaecology, Barcelona, Spain;* [3]*University Autonomous of Barcelona, Gynaecology, Barcelona, Spain;* [4]*Vall d`Hebron Hospital, Plastic Surgery, Barcelona, Spain;* [5]*Vall d`Hebron Hospital, Oncology, Barcelona, Spain*

Background: Nipple-sparing mastectomies (NSM) or skin-sparing mastectomies (SSM) and immediate breast reconstruction are performed as a therapeutic, as well as, prophylactic procedures in women with breast cancer risk gene mutations (BRCA1, BRCA2, PALB2). This study aimed to investigate the complications and risk factors associated with the surgical techniques used for breast reconstruction.

Material and methods: We study 116 carriers of BRCA1, BRCA2 of PALB2 mutations from at Vall d´Hebron University Hospital (Barcelona) from 2018 to 2021. Patient demographics ,clinical data, surgical techniques and postoperative complications were collected. A severe complication was defined as one that required resurgery.

Results: The median age at breast reconstruction was 41 years. Bilateral mastectomy were performed in 97 cases (83,62%) and 19 patients (16,38%) underwent a unilateral risk recuding mastectomy secondary to cancer in the contralateral breast. A total of 105 (90,52%) patients underwent reconstruction with breast implants. Autologous tissue Breast reconstruction using a DIEP flap from the abdomen was performed in 11 (9,48%) patients. No recurrence either new cancer did not develop in any patients. Overall, 36,21% of the women (42 patients) had complications within 30 days. None of the patients died within 30 days after surgery. The most frequent complication was skin necrosis in 11 patients (6,85%), hematoma in 5 patients (6,85%) and seroma in 4 patients (5,48%) followed by infection in 2 patients. Seven patients required a change of implant and 4 patients required drainage.

Conclusions: In the present study, no risk factors (radiation, smoking, age older than 55 years, breast volume greater than 800 mL obesity, comorbilities and a periareolar incision) was significantly associated with resurgery because of complications within 30 days. However, in our study the patients with breast cancer has greater risk of complications (OR 4,86; p 0,027).

No conflict of interest.

137 (PB-050) Poster

Effect of a 24 week home-based walking program on the incidence of aromatase inhibitor induced musculoskeletal pain: The WISE prospective, randomized, multicenter trial [SAKK 95/17]

F. Honecker[1], A. Müller[2], S. Schär[3], L. Rosset[4], M.N. Corke[5], M. Schwitter[6], U. Güth[7], A. Jakob[8], C. Balmelli-Cattelan[9], C. Leo[10], M. Fehr[11], D.R. Thorn[12], S. Riniker[13], A. Chouiter-Djebaili[14], J. Musilova[15], K. Ribi[15], N. Hoefnagels[16], PG Breast Cancer SAKK. [1]*Tumor and Breast Center East Switzerland, Oncology, St. Gallen, Switzerland;* [2]*Kantonsspital Winterthur, Oncology, Winterthur, Switzerland;* [3]*Competence Center of Swiss Group for Clinical Cancer Research SAKK, Statistics, Bern, Switzerland;* [4]*Centre du sein Fribourg/Brustzentrum Freiburg, Oncology, Fribourg, Switzerland;* [5]*Clinique des Grangettes, Oncology, Geneva, Switzerland;* [6]*Kantonsspital Graubünden, Oncology, Chur, Switzerland;* [7]*Brustzentrum Seefeld- Zürich, Gynecology, Zurich, Switzerland;* [8]*Tumorzentrum Aarau - Hirslanden MC-Aarau, Oncology, Aarau, Switzerland;* [9]*Caba Zentrum für Onkologie-Psychologie und Bewegung- Basel, Oncology, Basel, Switzerland;* [10]*Kantonsspital Baden, Gynecology, Baden, Switzerland;* [11]*Spital Thurgau - Kantonsspital Frauenfeld, Gynecology, Frauenfeld, Switzerland;* [12]*Brustzentrum Basel - Praxis Thorn, Oncology, Basel, Switzerland;* [13]*Brustzentrum Kantonsspital St. Gallen- St. Gallen, Oncology, St Gallen, Switzerland;* [14]*Network - Hospital Neuchâtelois- Neuchatel, Oncology, Neuchatel, Switzerland;* [15]*Competence Center of Swiss Group for Clinical Cancer Research SAKK, Competence Center of Swiss Group for Clinical Cancer Research SAKK, Bern, Switzerland;* [16]*Tumor and Breast Center East Switzerland, Oncology, St Gallen, Switzerland*

Background: Aromatase inhibitor (AI) induced arthralgia/myalgia (AIA) is a frequent side-effect of AI-therapy. We investigated the effect of a simple, home-based walking program outdoors, beginning at the start of AI-therapy, on the incidence of AIA, as well as symptom burden and quality of life (QoL) during 24 weeks.

Material and methods: 375 patients (pts) with early breast cancer were included. Pts were randomly allocated to intervention (arm A) or control arm (arm B). The statistical considerations were: H0 incidence of "pain" 50%; H1 35%; alpha 0.05 (1-sided); power 80%. Stratification accounted for level of physical activity (PA) before inclusion, menopausal status, taxane pre-treatment and Her-2 targeting therapy. The intervention in arm A aimed at briskly walking outdoors for 30 min continuously with 100 steps/minute on 5 days a week, versus an unspecified recommendation of 150 minutes PA according to WHO standard in arm B. Pts wore an activity tracker with a customized display (arm A: display of performed activity; arm B: performed activity not visible). Primary endpoint was the incidence of AIA, measured by the BPI-SF single-item "worst pain" score (scale 0–10). It was reached if pain was either ≥3 at 3 time points, or at ≥2 consecutive time points, or if AI therapy was permanently discontinued. Secondary endpoints included fatigue, hot flashes, QoL, intensity of AIA, PA in general, weight, AI treatment adherence/discontinuation, falls, disease status, and overall survival.

Results: 158 pts in arm A and 162 in arm B were eligible for analysis. Median daily number of steps was moderately, yet statistically significantly higher in arm A (A: 8542; B: 7742; p = 0.015). 68% of pts self-reported to have achieved the set activity goal in arm A. Mean "worst pain" remained continuously between 2 and 3 in both arms during all time points measured. The incidence of AIA during 24 weeks was high, but was not different between the two arms (A: 58.2%, and B: 56.2%, p = 0.6). No significant association between AIA and PA, independent of the allocation to the trial

arms, was found (p = 0.3). None of the secondary endpoints was significantly different between the trial arms. Adherence to AI over 24 weeks was high, and only 5% of pts discontinued AI treatment.

Conclusions: Median number of daily steps in arm A was higher than in arm B, whereas the number of daily minutes spent doing activity was not. In general, mean AIA was low. Incidence of AIA did not differ between trial arms. Within the whole trial population, no association between the number of daily minutes spent doing activity and AIA was found. Furthermore, none of the secondary endpoints showed any significant differences. In summary, our simple walking program allowed two thirds of pts in arm A to achieve the defined goal of PA, but failed to reduce the symptom burden as compared to arm B.

No conflict of interest.

138 (PB-051) Poster

Cumulative risks of false positive recall and screen detected breast cancer after multiple rounds of screening

L. Kregting[1], N.T. van Ravesteyn[1], S. Chootipongchaivat[1], E.A.M. Heijnsdijk[1], J.D.M. Otten[2], M.J.M. Broeders[2,3], H.J. de Koning[1]. *[1]Erasmus MC, Public Health, Rotterdam, Netherlands; [2]Radboudumc, Health Evidence, Nijmegen, Netherlands; [3]Dutch Expert Centre for Screening, Scientific Department, Nijmegen, Netherlands*

Background: Breast cancer screening has been shown to reduce breast-cancer mortality, but is also associated with harms. It is, therefore, important to provide balanced, high-quality information to enable women to make an informed decision about participating. Since most women make a decision about participation and adhere to this decision for future invitations, presenting risks from multiple screening rounds is crucial.

Materials and methods: This study included 114 931 women who were invited for their first screening round in 2005. Individual screening data from 2005 to 2018 were gathered via the Netherlands Comprehensive Cancer Organisation on subsequent screening rounds. Survival analyses were used to calculate cumulative risks for a false-positive (FP) and a true positive (TP) result. Also, participation and detection rate were calculated for women with a history of FP results in comparison to women with true negative (TN) results.

Results: In total, 92 902 women participated in the first screening round (80.8%). Of the women invited seven times, 63.3% participated in all rounds. Over seven rounds of participation, the cumulative risk of a TP result was 3.7% and the cumulative risk of a FP result was 9.1% (Table 1). In the screening round after a FP result, participation was lower (72–81%) compared to a round following a TN result (91–93%). This difference was more pronounced if the FP result was received in the first screening round. Furthermore, in women who had a FP result, the detection rate at subsequent rounds was 59% higher and 66% more interval cancers were found than after a TN screening outcome. Also, women with a history of a FP result had nearly twice as many FP results in later rounds.

Table 1: Cumulative risks of receiving a FP or TP screening outcome after 1–7 screening rounds

Cumulative risk	FP	TP
After round 1	2.5%	0.7%
After round 2	3.9%	1.1%
After round 3	5.0%	1.5%
After round 4	6.1%	2.0%
After round 5	7.3%	2.6%
After round 6	8.2%	3.2%
After round 7	9.1%	3.7%

Conclusions: Over the course of seven screening rounds in the Dutch breast cancer screening program, women had a 3.7% chance of a screen-detected breast cancer and a 9.1% chance of at least one FP result. The detection rate and the number of new FP results among women with a previous FP was higher than in women with previous TN results, while the participation rate was lower. Information provided to women invited for screening should include cumulative risks and the higher detection in women with a history of FP results.

No conflict of interest.

139 (PB-052) Poster

How 'breast aware' are the Indian women? A study among the women visiting a tertiary-care, referral and teaching hospital

M.V. Newton[1], V.V. Palanivelrajan[1]. *[1]St. John's Medical College, General Surgery, Bengaluru, India*

Introduction: "Who will educate us" lamented a School Principal after she took part in our study & education session. There's palpable low Breast Cancer (BC) literacy with rising incidence and disproportionate mortality rates.

Methodology: Breast-Cancer Awareness Measure (B-CAM) developed by Cancer Research UK was administered to 944 women. B-CAM measures Knowledge, age related risk & reported frequency of breast checking & other components. A woman is BC aware if she identified 5 or more non-lump symptoms, age related risk and reported breast checking once a week/ month. At the end, each participant was given 'Be Breast Aware' education; what/how to look for demonstrated on a model.

Results: 2.8% Health Professionals. 3.1% BC survivors. 78.8% had lump & 55.3% had Non-Lump knowledge of BC, 10% had age related risk knowledge. 24.3% check breasts once a week/month. 41.9% aware BC is common after 50 years. 14/944 (1.5%) had BC awareness. 59.9% had breast symptoms but never consulted a doctor, 31.1% embarrassed, 29.5% scared to consult. 43% heard of Breast screening, 34% Mammography, 31.4% Ultrasound, 18.9% both. 44.06% knew family history risk. Those practicing breast checking looked for size change (24.5%), Nipple position (17.4%), discharge (22.2%), pain (32.6%), & lump (24.7%) in standing (17.8%) supine (8.5%) using finger pads (15.8%) finger tips (21.6%), using circular movements (16.4%) & pinching breast tissue (19.6%)

Conclusion: Healthcare workers & Breast Cancer survivors lack breast awareness which is alarming, indicates the need for BC awareness and post BC treatment follow-up care education in these two groups and general population. Some practice wrong method (E.g. pinching tissue) of breast checking which may lead to anxiety, unnecessary investigative costs. 'Be Breast Aware' education based on NHS 5-point plan given to 944 participants.

N = 944	Health Care N (%) = 26 (2.8)	Non Health care N (%) = 918 (97.2)	P	Breast Cancer Survivors N (%) = 29 (3.1)	Non Breast Cancer N (%) = 915 (96.9)	P
Non-lump Knowledge (a)	17 (65.4)	505 (55)	0.32	15 (51.7)	507 (55.4)	0.70
Age-related risk (b)	3 (11.5)	91 (9.9)	0.74	4 (13.8)	90 (9.8)	0.52
Breast checking (c)	9 (34.6)	220 (24)	0.25	7 (24.1)	222 (24.3)	1.00
BC Awareness (abc)	1 (3.8)	13 (1.4)	0.33	0 (0)	14 (1.5)	1.00
Knowledge Median Score (out of 9)	6	5	0.12	5	5	0.73

Inter-professional Comparison

Profession, N 944	Knowledge		Age Related Risk N (%)	Breast Checking N (%)
N (%)	Score			
Healthcare, 26	17 (65.4)	6	3 (11.5)	9 (34.6)
Software, 34	27 (79.4)	5.5	0 (0)	8 (23.5)
Teacher, 76	52 (68.4)	5.5	9 (11.8)	18 (23.7)
Home Maker, 364	201 (55.2)	5	31 (8.5)	68 (18.7)
Farmer, 22	9 (40.9)	4	1 (4.5)	2 (9.1)
Students, 204	106 (52)	5	22 (10.8)	62 (30.4)
Others, 218	110 (50.5)	5	28 (12.8)	62 (28.4)
P	0.001	0.003	0.195	0.051

No conflict of interest.

140 (PB-053) Poster

Contribution and performance of subsidized mammography and breast cancer detection rate in underserved populations of rural and urban areas of Sindh, Pakistan

U. Shamsi[1], S. Zeeshan[2], S. Afzal[3], G. Shafqat[3], K. Kerlikowske[4]. *[1]Aga Khan University Karachi Pakistan, Community Health Sciences, Karachi, Pakistan; [2]Aga Khan University, Surgery, Karachi, Pakistan; [3]Aga Khan University, Radiology, Karachi, Pakistan; [4]UC San Fransisco, Medicine & Epidemiology, San Fransisco, USA*

Background: In Pakistan, breast cancer is an enormous public health concern as its mortality is the highest in any Asian population. It can be effectively detected in its early stage with screening mammography, offered

to all eligible asymptomatic women. However, in Pakistan, there is no organized screening mammography program at the national level & screening practices are very low. That is why advanced-stage presentation is common in our population. It is important to assess the utility of subsidized screening mammography services in the early detection of breast cancer and reduction of mortality rates in Pakistan. The main objective of the study was to assess performance and patient outcomes in the audit of screening mammography from Jan 2019–March 2021.

Materials and Methods: The study setting was the mobile mammography unit in Aga Khan Maternal and Child Care Centre, Hyderabad. A cross-sectional study was conducted to audit the results of mammography of 1102 women who underwent mammography. All Computed Radiology (CR) screening mammograms performed among all asymptomatic women of 40 years–75 years of age & with no personal history of breast cancer were analyzed. It also included women of women less than 40 years of age if of high-risk profile or advised screening by surgeon/ health care provider. The patients were followed-up until December 2021.

Results: The breast cancer detection rate was 11 cases per 1,000 mammograms which is much higher than that reported by the NMD National Mammography Database (CDR of 3.43 per 1000) for women. The median age of cancer diagnosis was 55 years (range 29–63 yrs). Ductal carcinoma in situ was found in 3 (25%) and invasive breast cancer in 9 (75%) of cases. 3 (37.5%) had stage 0 and 5 (62.5%) had stages 1 & 2. Minimal cancer (<10 mm) was reported in 5 (41.6%) cases. Positive predictive values PPV1 for abnormal interpretations was 1.6%, PPV2 for biopsy conducted was 40% and PPV3 for biopsy performed was 75%. 14 (46.7%) women who were recommended a biopsy, were lost to follow-up. The distribution of BIRADS of 1102 screening mammograms, according to BI-RADS was the following: category 0 (65.5%), 1 (12.5%), 2 (21%), 3 (0%), 4 (12%). The recall rate was very high (72%).

Conclusion: The high cancer detection rate and high recall rate in the study are important findings to draft MMU screening mammography guidelines for Pakistani women. Considering the high CDR, it is important to plan for implementing an organized population-based screening program that can address the issues of cost, remoteness, and dearth of mammogram machines. There is a need for establishing similar MMUs suitable for our women belonging to all socioeconomic statuses. Multicenter research with a larger sample size is needed to confirm the effectiveness and analyze the cost-effectiveness of using an MMU for implementing it in other areas.

No conflict of interest.

141 (PB-054) Poster

Patterns and predictors of cancer-related fatigue domains after breast cancer: the influence of lifestyle

A. Witteveen[1], L. Beenhakker[1], K.A.E. Wijlens[1], E. Kampman[2], R.M. Winkels[2]. *[1]University of Twente, TechMed Centre- Biomedical Signals and Systems, Enschede, Netherlands; [2]Wageningen University, Division of Human Nutrition and Health, Wageningen, Netherlands*

Background: One of the most reported late effects after breast cancer is Cancer-Related Fatigue (CRF). CRF is multidimensional and can be physical, emotional and/or cognitive, which makes CRF hard to predict. Identification of lifestyle predictors and subsequently patients at high risk of CRF can enable early treatment and prevent the fatigue from becoming chronic.

Materials and Methods: We used data of an observational study (COBRA) among 200 breast cancer patients who received chemotherapy, and a comparison group of women without breast cancer. CRF was assessed using the Multi-fatigue Inventory (MFI); possible predictors included general, psychosocial, lifestyle and physiological factors and use of anti-emetics. Data were assessed at three time points (T1: baseline [chemotherapy start], T2: after 6 months, T3: after 12 months). We created a Random Forest model to predict CRF and evaluated using the Mean Square Error (MSE). Additionally, a Random Forest Classifier was built to assess the pattern in the CRF dimensions mental (MF), general (GF), reduced activity (RA), reduced motivation (RM) and physical fatigue (PF) over time. To evaluate the classifier, 5-fold cross-validation was used. A K-nearest neighbour clustering algorithm was used with the identified features to differentiate between high and low risk patients.

Results: Correlations between the dimensions ranged from 0.62 (RM-RA) to 0.86 (GF-PF). MF was the hardest to predict (MSE 4.4%), followed by GF (MSE 4.0%). Weight, BMI or waist size were predictors for all five types of fatigue, as well as fatigue at a previous time point and whether someone has used birth control pills. For fatigue at T3, age and alcohol use were also important predictors. The clustering algorithm could determine separate profiles for high and low risk patients. All fatigue dimensions in the patient group followed a similar profile and were highest at T2. Healthy controls showed the same level of fatigue across all dimensions and at all time points.

Conclusions: In this study, lifestyle factors predicted the risk of CRF in breast cancer patients who received chemotherapy. Therefore, lifestyle should be included in prediction models to target patients at high risk of CRF. As lifestyle factors are modifiable, more research should be performed towards interventions to target these and the effect on CRF.

No conflict of interest.

143 (PB-056) Poster

Coverage and Socio-economic inequalities in breast cancer screening in Low- and Middle-Income Countries: Analysis of Demographic and Health Surveys between 2010 and 2019

D.B. Abila[1], G. Kangoma[2], R.K. Kisuza[3], B.S. Wasukira[4], W. Henry[1]. *[1]Makerere University, School of Medicine, Kampala, Ouganda; [2]Makerere University, School of Public Health, Kampala, Ouganda; [3]Makerere University, School of Biomedical Sciences, Kampala, Ouganda; [4]Infectious Disease Institute, Research Department, Kampala, Ouganda*

Background: Breast cancer is the most diagnosed cancer among women living in low- and middle-income (LMICs). The majority of the women are diagnosed with advanced-stage disease. The World Health Organisation (WHO) launched the Global Breast Cancer Initiative (GBCI) in 2020 intending to reduce global breast cancer mortality by 2.5% per year until 2040, thereby averting an estimated 2.5 million deaths. Pillar 1 of the initiative aims to achieve a diagnosis of at least 60% of invasive breast cancers at stage I or II which can be attained by robust screening. In this study, we aimed to determine the coverage and socio-economic inequalities in the screening for breast cancer over one decade before the establishment of the GBCI.

Material and methods: For each country, using STATA 16 software and sampling weights, we analyzed the datasets of Demographic and Health Surveys (DHS) that included questions on breast cancer screening and were conducted between 2010 and 2019 in low- and middle-income countries. We included women aged 15 to 49 years and considered screening using breast self-examination (BSE), clinical breast examination (CBE), and mammography. Absolute and relative inequalities were determined using the Slope Index of Inequality (SII) and Concentration Index (CIX) respectively.

Results: A total of 18 surveys from 13 countries were included in this study. BSE was the most used screening method with a proportion screened ranging from 3.5% to 53.24%. Only 6 surveys from 5 countries measured the rates of screening by mammography which ranged from 5.58% to 12.96%. Considering screening using any method, the proportion that had ever screened for breast cancer ranged from 2.53% to 60.21%. Higher rates of screening were seen in upper-middle-income countries compared to low-income countries.

For the CIX for screening using any method, the inequalities were pro-rich in all the countries except the Philippines where it was pro-poor with a CIX of –2.84 [p-value 0.015]. For the SII for screening using any method, the inequalities were also pro-rich in all the countries except the Philippines where it was pro-poor with SII of –1.01 [P value <0.001]. For the CIX and SII for screening using mammography, the inequalities were pro-rich in all the countries. For the CIX and SII for screening using CBE, the inequalities were pro-rich in all the countries. For the CIX and SII for screening using BSE, the inequalities were pro-rich in all the countries.

Conclusions: Access to mammography is generally low in low- and middle-income countries (LMICs). There exist socio-economic disparities in the coverage of breast cancer using mammography, clinical breast examination, and breast self-exam with pro-rich and pro-ubarn inequalities. There is a need to address these disparities to achieve the targets of breast cancer control by the GBCI.

No conflict of interest.

POSTER SESSION **17 November 2022**

Local Regional Treatment – Radiotherapy

144 (PB-057) Poster

Ultrahypofractionated radiation therapy for breast cancer: two-year normal tissue effects

R. Oulkadi[1], S. Amrouch[2], A. Dabach[1], K. Schaerlaeken[1], R. Weytjens[1], C. Billiet[1], P. Poortmans[1], M. Machiels[1]. [1]*Iridium Network, Radiation Oncology, Wilrijk, Belgium;* [2]*University of Antwerp, Radiation Oncology, Antwerp, Belgium*

Introduction: Parallel with the emerging results of the FAST-Forward (FF) trial, we implemented ultrahypofractionated radiation therapy (RT) for early-stage breast cancer in our clinic at the beginning of the COVID-19 pandemic [Brunt 2020]. This scheme of 26 Gy in 5 consecutive fractions, was given to all breast cancer patients referred for postoperative RT of the breast only. Uniquely, in view of the pandemic, we also gave a single ultrahypofractionated sequential tumourbed boost of 6 Gy, if indicated according to our local protocol. The aim of this prospective study was to assess 2-year late normal tissue effects in this cohort of breast cancer patients.

Methods: Data was recorded in a prospective database. Early results were published before [Machiels 2020]. A sequential boost of 6 Gy in 1 fraction was delivered to all patients <70 y. Late normal tissue effects were patient-assessed using EORTC QLQ-BR23 breast cancer module, body image scale questionnaire and the FF protocol-specific questions relating to changes to the affected breast (breast appearance, size, induration, and skin appearance) 24 months after treatment. Patient assessments used a four-point scale (i.e., not at all, a little, quite a bit, very much). We performed this 24-month assessment using tele-medicine follow-up as we did during the pandemic. Descriptive statistical analysis of late normal tissue effects was performed; differences were assessed using Pearson chi-square test and *p*-values <0.05 were considered significant.

Results: All 68 patients from our earlier cohort were contacted 2 years after completion of RT, of which all but two were available. Forty-two patients received a boost and 24 did not. Median follow-up was 24 months (range; 22–27). Prevalence of the most-reported mild late normal tissue effects was 53% for mild increase in induration, 50% for mild appearance changes and 48% for mild sensitivity (Table 1). Most-reported moderate normal tissue effects was 13% for sensitivity. The only reported marked effects was 3% change in breast appearance. No significant differences between patients receiving a boost and no boost were seen.

Table 1:

	None [n (%)]	Mild [n (%)]	Moderate [n (%)]	Marked [n (%)]
Pain	51 (77)	9 (14)	6 (9)	0 (0)
Sensitivity	25(38)	32 (48)	9 (14)	0 (0)
Skin changes	51 (77)	9 (14)	6 (9)	0 (0)
Shrinkage	46 (69)	17 (26)	3 (5)	0 (0)
Oedema	44 (67)	20 (30)	2 (3)	0 (0)
Induration	25 (38)	35 (53)	6 (9)	0 (0)
Appearance	26 (39)	33 (50)	5 (8)	2 (3)

Conclusions: Our findings are similar to the late normal tissue effects reported in the FF trial and endorse the use of ultrahypofractionated RT for early-stage breast cancer. An ultrahypofractionated tumourbed boost did not result in increased late normal tissue effects, which is being further investigated in a randomised trial.

No conflict of interest.

145 (PB-058) Poster

Preoperative partial breast irradiation in low-risk breast cancer patients: a systematic review of literature

Y. Civil[1], L. Jonker[1], M. Groot Koerkamp[2], R. de Vries[3], A. Oei[2], K. Duvivier[4], B. Slotman[1], S. van der Velde[5], D. van den Bongard[1]. [1]*Amsterdam UMC-location VUmc, Radiation Oncology, Amsterdam, Netherlands;* [2]*Amsterdam UMC- location AMC, Radiation Oncology, Amsterdam, Netherlands;* [3]*Vrije Universiteit, Medical Library, Amsterdam, Netherlands;* [4]*Amsterdam UMC-location VUmc, Radiology, Amsterdam, Netherlands;* [5]*Amsterdam UMC-location VUmc, Surgery, Amsterdam, Netherlands*

Background: Since 2017, partial breast irradiation (PBI) is considered standard treatment after breast conserving surgery (BCS) in breast cancer patients with a low risk on recurrence. In order to reduce the irradiated breast tissue volume, toxicity, and the number of radiotherapy sessions, PBI can be performed preoperatively. In this study, we assessed the clinical and oncological outcomes of preoperative PBI.

Materials and methods: We conducted a systematic review of studies on preoperative PBI followed by BCS in low risk breast cancer patients using the databases Ovid Medline, Embase.com, Web of Science (Core Collection) and Scopus. References of eligible manuscripts were checked for other relevant articles. The primary endpoint was pathologic complete response (pCR) according to EUSOMA criteria.

Results: A total of 7 prospective and 1 retrospective cohort studies were identified (Table 1). In up to 42% of the patients pCR was found, and the rate was higher after a longer interval between radiotherapy and BCS (range 0.8–8 months). After a maximum median follow-up of 5.8 years, studies on external beam radiotherapy reported low local recurrence rates (0–3%) and overall survival of 97–100%. Acute toxicity consisted mainly of grade 1 skin toxicity (19–34%) and seroma (31%). Late toxicity was predominantly fibrosis grade 1 (46–100%) and grade 2 (10–11%). Cosmetic outcome was rated good to excellent by 78–100% of the patients.

Conclusion: Existing literature on preoperative PBI showed a higher pCR rate after a longer interval between PBI and BCS. Acceptable toxicity, good oncological and cosmetic outcomes were reported. In the ongoing ABLATIVE-2 trial (NCT05350722), pCR will be evaluated 12 months after single-dose preoperative PBI aiming to omit surgery in future low-risk patients with a predicted pCR.

Table 1: Characteristics of the included cohort studies on preoperative partial breast irradiation followed by breast conserving surgery

Author, year of publication	Technique	Number of patients	Dose/ fractionation (% patients)	Adjuvant systemic therapy (% patients)		Follow-up (years)	Time interval to surgery (weeks) (% patients)
Weinfurtner *et al.* 2022	EBRT	19	28.5 Gy/3	-		-	6–8
Bosma *et al.* 2019 *PAPBI trial*	EBRT	133	40 Gy/10 in 2 weeks (59)	-		5.9	6
			30 Gy/5 in 1 week (41)			3.6	
Nichols *et al.* 2016	EBRT	27	38.5 Gy/10 bid	CT	22	3.6	3
Tiberi *et al.* 2020	EBRT	10	20 Gy/1	-		-	11–13
Vasmel *et al.* 2019 *ABLATIVE trial*	EBRT	36	20 Gy/1	HT	19*	1.8	24 (41) 32 (89)
Guidolin *et al.* 2019 *SIGNAL trial*	EBRT	27	21 Gy/1	-		1.0	1
Horton *et al.* 2015	EBRT	32	15 Gy/1 (25) 18 Gy/1 (25) 21 Gy/1 (50)	HT HT+CT	72 6	1.9	1.4
VanderWalde *et al.* 2013 *LCCC 0218 trial*	IORT	53	15 Gy/1	CT HT HT+CT	8 45 8	5.8	0

EBRT external beam radiotherapy, IORT intraoperative radiotherapy, bid twice a day, CT chemotherapy, HT hormonal therapy. *this study also included patients treated with neoadjuvant hormonal therapy (17%).

No conflict of interest.

146 (PB-059) Poster

Proton beam therapy for early breast cancer: a systematic review and quantitative synthesis of adverse clinical outcomes

F. Holt[1], J. Probert[1], Z. Liu[1], F. Duane[2], G. Ntentas[1], S. Darby[1], D. Dodwell[1], C. Coles[3], J. Haviland[4], A. Kirby[5], C. Taylor[1]. [1]*Nuffield Department of Population Health, University of Oxford, Oxford, United Kingdom;* [2]*Trinity College Dublin, St Luke's Radiation Oncology Network, Dublin, Ireland;* [3]*Department of Oncology, University of Cambridge, Cambridge, United Kingdom;* [4]*Pragmatic Clinical Trials Unit, Queen Mary University of London, London, United Kingdom;* [5]*Breast Cancer Radiotherapy, The Royal Marsden and The Institute of Cancer Research, London, United Kingdom*

Background: Proton beam therapy (PBT) is increasingly available to some patients with early breast cancer because it achieves better planned dose distributions than standard photon radiotherapy. But there are uncertainties around how planned PBT dose distributions relate to clinical outcomes. This study quantitatively summarises the adverse clinical outcomes of delivered PBT for early breast cancer.

Methods: A systematic review and quantitative synthesis of clinical outcomes from published studies of adjuvant PBT for early breast cancer 2000–2021 was undertaken. Eligible studies were identified by searching Ovid MEDLINE® and EMBASE.

Results: Thirty studies (1408 patients) published between 2000 and 2021 reported clinical outcomes after PBT for early breast cancer. 26/30 studies (1315 patients) were conducted in the USA. There were no randomised trials. Median follow up ranged from 2–59 months. There were 18 studies (918 patients) of PBT to the whole breast/chest wall ± regional lymph nodes and eight studies (358 patients) of PBT to the partial breast. Reconstruction outcomes after PBT to the reconstructed breast ± regional lymph nodes were reported in nine studies (332 patients). PBT delivery type varied over time. Scattering PBT was delivered in six studies (230 patients) starting between 2003 and 2012. Uniform or pencil beam scanning PBT was used in 20 studies (1004 patients) starting between 2013 and 2019. Two studies (123 patients) beginning 2011 used both PBT types. For two studies (51 patients) PBT type was unspecified.

In the short term reported adverse outcomes varied by clinical target and PBT type. Severe adverse outcomes after scanning PBT to the whole breast or chest wall ± regional lymph nodes were dermatitis (42/715, 6%), infection (1/126, <1%), pain (1/235, <1%), and pneumonitis (1/246, <1%). Severe adverse outcomes after scattering PBT to these targets were dermatitis (11/41, 27%) and infection (3/18, 17%). There were no severe adverse outcomes reported after scanning PBT to the partial breast. After scattering PBT to the partial breast severe dermatitis (7/169, 4 %) was reported. Adverse breast reconstruction outcomes after scanning PBT were removal of prosthetic implant (32/152, 21%), capsular contraction (21/153, 14%), infection (19/142, 13%), and revision of prosthetic (2/25, 8%) or autologous (0/3, 0%) reconstruction. One of the four (25%) patients assessed for adverse breast reconstruction outcomes after scattering PBT developed an infection.

Conclusions: In the short-term there were few severe adverse effects from scanning PBT delivered to the whole breast or chest wall ± regional lymph nodes or the partial breast. Longer follow up of patients treated with PBT and randomised trials are needed to gain a fuller understanding of the benefits and late adverse effects of PBT.

No conflict of interest.

147 (PB-060) Poster

Oesophagus exposure in hypofractionated breast cancer radiotherapy: an organ at risk commonly overlooked?

Z. Naimi[1], M. El Bessi[1], M. Bohli[1], R. Ben Amor[1], A. Hamdoun[1], L. Kochbati[1]. *[1]Abderrahmen Mami Hospital, Radiation Oncology Department, Ariana, Tunisia*

Background: Recent evidence related breast cancer radiotherapy to higher risk of subsequent oesophageal cancer in long-term survivors. The aim of this study was to assess radiation dose distribution to oesophagus in modern hypofractionated 3D conformal breast cancer radiotherapy.

Material and methods: Data of 436 women planned for adjuvant hypofractionated 3D conformal radiotherapy were evaluated. Patients were treated in the years 2019–2020. The prescription dose was 40 Gy delivered in 15 daily fractions of 2.67 Gy ± an additional boost of 13.35 Gy to the tumor bed. Patients were treated with tangential fields ± supraclavicular field. Oesophagus was contoured according to the RTOG guidelines. Dose volumes histograms were generated for all delineated structures. Mean and maximum doses, V5 Gy, V10 Gy and V20 Gy to oesophagus were assessed and analysed with regards to irradiated target volumes.

Results: The mean Dmean /Dmax to oesophagus was 2.6 Gy/20.57 Gy. The average V5 Gy, V10 Gy and V20 Gy were respectively 9.8%, 3.93%, 0.31%. Oesophagus exposure was strongly correlated to nodal radiotherapy with Pearson coefficient of 0.78 ($p < 0.01$). For breast or chest wall radiotherapy, the mean Dmean/Dmax was 0.37 Gy/0.53 Gy, versus 9.3 Gy/26.7 Gy for radiotherapy including sub clavicular nodes. The V10 Gy to oesophagus was >35% for 67% of patients receiving sub-clavicular nodal irradiation. For radiotherapy including axillary lymph nodes, doses to oesophagus were substantially higher with average Dmean/Dmax of 10.2 Gy/29.4 Gy.

Conclusions: This study showed higher oesophagus exposure in radiotherapy including sub-clavicular nodes when compared to breast/chest wall radiotherapy alone. The mean Dmean oesophagus was 9.3 Gy in sub-clavicular nodal radiotherapy, which may increase threefold the risk of oesophageal cancer according to recent evidence. Therefore, oesophagus contouring and sparing should be routinely considered in nodal radiotherapy planning as it may substantially reduce the risk of radiation induced oesophageal cancer.

No conflict of interest.

149 (PB-062) Poster

Primary results of ANZ 1002 : Post-operative Radiotherapy Omission in Selected Patients with Early breast Cancer Trial (PROSPECT) following pre-operative breast MRI

B. Mann[1], A. Rose[2], J. Hughes[3], A. Skandarajah[3], A. Murugasu[4], A. Spillane[5], B. Chua[6], N. Zdenkowski[7], H. Badger[7], H. Braggett[7], V. Gebski[8], R. Eggins[8], A. Park[3], J. Collins[3], Breast Cancer Trials. *[1]The Royal Melbourne Hospital, Breast Service, Melbourne, Australia; [2]The Royal Melbourne Hospital, Radiology, Parkville, Australia; [3]The Royal Melbourne Hospital, Breast Service, Parkville, Australia; [4]The Royal Melbourne Hospital, Pathology, Parkville, Australia; [5]Mater Hospital, Breast Service, Sydney, Australia; [6]Prince of Wales Hospital, Radiation Oncology, Randwick, Australia; [7]Breast Cancer Trials, Trials, Newcastle, Australia; [8]University of Sydney, Clinical Trials Centre, Sydney, Australia*

Background: We aimed to determine if preoperative MRI could identify patients in whom the ipsilateral invasive recurrence (IIR) rate was sufficiently low without RT, such that RT might be safely omitted. Here we report primary analysis, and imaging/biopsy findings for occult lesions.

Methods: PROSPECT is a prospective single-arm study. Criteria for omission of RT included age ≥50, nil/minimal or mild Background Parenchymal Enhancement (BPE) on MRI, unifocal pT1N0 cancer, not Triple Negative, no LVI. Imaging findings on MMG, US and MRI were documented and all biopsies were recorded. Pathology of occult lesions (OLs) identified by MRI was described. The primary outcome was the IIR at 5 years of those treated without RT. An IIR rate of 5% or less was considered acceptable. Primary analysis occurred after the 100th patient reached 5 years. Results were compared to those of LUMINA which used the Luminal A phenotype to select similar patients for RT omission.

Results: Between 9/2011 and 5/2019, 443 patients had MRI. BPE was nil/minimal or mild in 344. MRI detected 194 OLs in 144 (33%) patients. 61 MMG/US malignant OLs - 36 invasive and 25 DCIS - were identified in 48 patients (11% of total cohort). Of 38 ipsilateral malignant OLs in 32 patients (7% of total cohort), 23 were DCIS, 4 were T1a, 7 T1b and 4 T1c. 201 patients were treated on trial without RT. The mean age was 63 years (range: 50 to 84), median tumour size 11 mm, grade 1 (104), grade 2 (86) or grade 3 (11). The rate of IIR at 5 years was 1% (1/101). There were 2 IIRs at 4.6 and 7.7 years follow up, 1 regional recurrence, and 1 patient with both a regional and distant recurrence with 1 breast cancer death. There was 1 contralateral (CL) breast cancer, 1 CL DCIS, 2 other cancer diagnoses and 1 death from other causes. Of 242 patients undergoing MRI but not in the main study, median age was 63, median tumour size, 13 mm. 9 underwent mastectomy (2% of total cohort). Followup is complete for 228. There were 3 IIR, 1 ipsilateral regional recurrence and 3 CL primary with no distant metastases or breast cancer deaths. At least 93/201 (46%) would have been ineligible for LUMINA, and 14/199 (7%) apparently eligible for LUMINA had biopsy proven ipsilateral malignant OLs.

Conclusion: Breast MRI in selected, low risk patients identified occult malignancy in 11% of patients. At a median of 5 years follow up the IIR and other breast cancer events was very low. This suggests that local recurrences may be due to occult breast cancers, and MRI may allow the identification of truly localised cancers for which radiation may be safely omitted. The event rate for the entire cohort was very low, suggesting that identification of occult malignancy in apparently unifocal EBC is beneficial. Confirmatory trials are needed.

No conflict of interest.

150 (PB-063) Poster

Accelerated Partial Breast Irradiation With Multicatheter Brachytherapy after second conservative-surgery

I. Martinez Montesinos[1], I. Visus Fdez de Manzanos[2], A. Sola Galarza[3], P. Armendáriz Rubio[4], N. Moras Pérez[5], A. Manterola Burgaleta[6], K. Zavala Aguilar[6], E. Villafranca Iturre[7]. *[1]Hospital Universitario de Navarra, Radiation Oncology in Breast Cancer and Brachytherapy, Pamplona, Spain; [2]Hospital Universitario de Navarra, Brachytherapy and Prostate Cancer, Pamplona, Spain; [3]Hospital Universitario de Navarra, Brachytherapy, Pamplona, Spain; [4]Hospital Universitario de Navarra, Breast Surgery, Pamplona, Spain; [5]Hospital Universitario de Navarra, Breast Surgery, Pamplona, Spain; [6]Hospital Universitario de Navarra, Radiation Oncology in Breast Cancer, Pamplona, Spain; [7]Hospital Universitario de Navarra, Brachytherapy Department, Pamplona, Spain*

Background: To examine 5 and 10-year rates of local control (LC) and overall survival (OS) for breast cancer patients with local relapses after

second conservative surgery and accelerated partial breast irradiation (APBI).

Material and methods: For the analysis we included local relapses of breast tumours <3 cm after a secondary conservative surgery with negative surgical margins. Two APBI-HDR schemes were used: 32 or 34 or Gy in 8–10 twice-daily fractions over 4–5 days. For statistical analysis, we focused on ipsilateral breast recurrence (IBR), regional recurrence (RR), and distant metastases (DM), progression-free (PFS) and overall survival.

Results: The median follow-up was 50 months (1–154 months). 111 patients (p) were accrued from September 2008 to December 2021. Histology: intraductal 29p (26.1%), CDI 63p (56.8%), CLI: 9p (8.11%); Papilar: 5 (4.5%), others 4.5%; 74p had T1 tumours and 4p T2. 82% were oestrogen and/or progesterone receptor positive.

Events: 11 IBR, 4 regional recurrence (RR), and 4 distant metastases (DM). 5 and 10-year IBRFS was 90.8 and 80.1%, respectively. 5 and 10-year PFS and OS were 87.6 and 71.2%, and 94.1 and 84.3%, respectively. G3 fibrosis was 8%p. Two cases of late mastitis were noticed. For statistical analysis, Kaplan-Meier and Log-rank were used. Main dosimetric results: median of needles used: 10 (4–18), with a median of planes 2 (1–4), median PTV volume (cc): 44.29, median D90 PTV (Gy): 3.70, median V100 PTV (%): 94.42, median CI and HI, 1.64 and 0.30, respectively.

Data table. Dosimetric results:

	MEDIAN	MINIMUM	MAXIMUM
Needles	10	4	18
Planes	2	1	4
PTV volume (cc)	44.29	4.6	158
D90 PTV (Gy)	3.70	1.8	4.70
V100 PTV (%)	94.42	65.7	99.68
V100 implant (cc)	72.72	7.2	225.25
V150 implant (cc)	20.25	3.3	72

Conclusion: APBI in local relapses of breast cancer show a high local control with acceptable toxicity.

No conflict of interest.

151 (PB-064) Poster

First results on acute skin toxicity in model-based selected breast cancer patients treated with adjuvant intensity modulated proton therapy

M.G.A. Sattler[1,2], J. Somer[1,2], J. Jacobs[2], R. Louwe[2]. *[1]Erasmus MC, Radiotherapy, Rotterdam, Netherlands; [2]Holland PTC, Radiotherapy, Delft, Netherlands*

Background: Several studies have reported on acute skin toxicity outcomes in breast cancer (BC) patients treated with proton therapy (PT). However, limited data is available on (1) acute skin toxicity outcomes of mildly hypo-fractionated intensity modulated PT, and (2) on PT outcomes of model-based selected BC patients. Therefore, the primary objective of this study was to assess the incidence and severity of acute skin toxicity in these BC patients, and the secondary objectives were to assess predictive factors and dose-effect relationships. This study is part of an ongoing national multicenter study initiative in collaboration with 2 other Dutch Proton Therapy Centers (PTCs) (UMC Groningen PTC and Maastro PT).

Material and methods: A consecutive cohort of 155 model-based selected BC patients were treated between May 2019 and September 2021 at the Holland PTC in The Netherlands. Baseline and BC treatment characteristics, PT characteristics, and Doctor Reported Outcome Measures were assessed. Acute skin toxicity in the form of Radiation Dermatitis (RD) was graded according to the Common Terminology Criteria for Adverse Events (CTCAE). RD was prospectively registered at baseline, in the last week of PT, at 2 and 12 weeks after PT. Several clinical and dose-volume histogram (DVH) PT parameters were analyzed as potential predictive factors.

Results: In this study, RD grade 0, 1, 2 or 3 was observed in 1 (0.6%), 52 (33.6%), 85 (54.8%), and 17 (11%) of BC patients. There were no grade 4 or grade 5 toxicities. The total administered radiation dose (grade 2; $p = 0.027$ and grade 3; $p = 0.006$), the elective radiation dose (grade 3; $p = 0.001$), a boost irradiation (grade 2; $p = 0.015$ and grade 3; $p = 0.039$) and bilateral irradiation (grade 3; $p = 0.005$) were predictive of moderate-to-severe (grade 2 - grade 3) acute skin toxicity (univariate multinominal logistic regression analyses with RD grade $\leq$1 as reference group). No significant clinical predictive factors were found. There was no dose-effect relationship between the radiation dose that was received by the skin and the maximum scored RD grade.

Conclusions: The majority of model-based selected BC patients treated with mildly hypo-fractionated PT developed a mild-to-moderate (grade 1 - grade 2) acute skin toxicity. An ongoing national multicenter study will further assess predictive factors and dose-effect relationships for the most severe grade 3 acute skin toxicity outcomes by combining the BC patient cohorts from the 3 Dutch PTCs and this may provide further insight into the identification of high risk patients.

No conflict of interest.

152 (PB-065) Poster

Late cardiac effects in patients with left breast cancer treated with hypofractionated radiotherapy

B. Yadav[1], A. Sood[2], D. Dahiya[3]. *[1]Postgraduate Institute of Medical Education & Research, Radiation Oncology, Chandigarh, India; [2]Post Graduate Institute of Medical Education & Research, Nuclear Medicine, Chandigarh, India; [3]Post Graduate Institute of Medical Education & Research, General Surgery, Chandigarh, India*

Background: Patients treated with breast cancer may develop late effects because of treatment. In this study we analysed late cardiac effects in patients with left sided breast cancer treated with hypofractionated radiotherapy.

Materials and methods: In this retrospective study from January 1986 to December 2005 patients treated with left breast cancer were analysed for late cardiac effects. Patients' information was gathered from the files. Patients who had received hypofractionated radiotherapy for left breast cancer at least 10 years ago were included in this study. Radiotherapy dose was 35–40 Gy/15–16#/3 weeks. These patients underwent echocardiography, stress myocardial perfusion scintigraphy (MPS) to look for any (reversible or irreversible) perfusion defect (PD) in the myocardium. PD was classified on the basis of extent and intensity. The extent was defined as not significant, mild, moderate and large if it was <5%, 5–10%, >10–20% and >20%, whereas severity was defined as mild moderate and severe.

Results: A total 87 patients underwent stress MPS. Mean age at the time of diagnosis was 42 years (range 28–65). Median follow up was 20 years (range 10–36). PD was observed in 28(33%) patients. PD was not significant, mild and moderate in 5(6%), 25(29%) and 1(1%) patient, respectively. Large PD was not reported in any of the patients. In majority 30(97%) of patients PD was observed in apex and apical anterior left ventricle myocardium. Basal and inferior myocardium was affected in 1(3%) patient only. PD intensity was mild, mild to moderate and moderate in 23(68%), 4(13%) and 4(13%) patients, respectively. PD was reversible, partially reversible, minimal reversible and fixed in 24(29%), 3(10%) 1(3%) and 3(6%) patients, respectively. Left ventricular ejection fraction deterioration was observed in 1(1.1%) patient only. Coronary event occurred in 1(1%) patient.

Conclusion: Left side breast patients treated with radiotherapy; myocardial PD was observed in 1/3rd patients in the area exposed to radiation. Left ventricular functional deterioration was observed in one patient only.

No conflict of interest.

153 (PB-066) Poster

Radiotherapy in patients receiving anthracyclines: phase 3 SAFE trial (NCT2236806) interim analysis

L. Visani[1], I. Meattini[2], C. Becherini[1], L. Marrazzo[3], V. Salvestrini[1], E. Scoccimarro[1], I. Desideri[2], G. Francolini[1], C. Bellini[1], M. Valzano[1], G. Simontacchi[1], V. Scotti[1], C. Arilli[3], M. Casati[3], J. Nori[4], M. Bernini[5], L. Orzalesi[5], S. Pallotta[3], G. Barletta[6], L. Livi[2]. *[1]Azienda Ospedaliero-Universitaria Careggi, Radiation Oncology Unit, Florence, Italy; [2]University of Florence, Department of Experimental and Clinical Biomedical Sciences "M. Serio," Florence, Italy; [3]Azienda Ospedaliero-Universitaria Careggi, Department of Medical Physics, Florence, Italy; [4]Azienda Ospedaliero-Universitaria Careggi, Diagnostic Senology Unit, Florence, Italy; [5]Azienda Ospedaliero-Universitaria Careggi, Breast Surgery Unit, Florence, Italy; [6]Azienda Ospedaliero-Universitaria Careggi, Cardiothoracic and Vascular Department, Florence, Italy*

Background: Several studies have evaluated cardioprotective strategies to prevent myocardial dysfunction in patients receiving cardiotoxic therapies. The SAFE trial (ClinicaTrials.gov identifier: NCT2236806) is a four-arm, randomized, phase 3, double-blind, placebo-controlled study. This is a subgroup analysis focused on the impact of postoperative breast radiation therapy (RT) of the pre-specified interim analysis on the first 174 patients who had completed cardiac assessment at 12-month.

Material and methods: Patients were eligible for trial inclusion if they had indication to primary or postoperative systemic therapy using an anthracycline-based regimen. Cardioprotective therapy (bisoprolol, ramipril, or both

drugs, as compared to placebo) was administered for 1 year from the initiation of chemotherapy or until the end of trastuzumab therapy. The primary endpoint was defined as detection of any subclinical impairment (worsening ≥10%) in myocardial function and deformation measured with standard and 3-dimensional (3D) echocardiography, left ventricular ejection fraction (LVEF) and global longitudinal strain (GLS).

Results: At 12-month, 3D-LVEF worsened by 4.4% in placebo arm and 3.0%, 1.9%, 1.3% in ramipril, bisoprolol, ramipril plus bisoprolol arms, respectively (P = 0.005). GLS worsened by 6.0% in placebo arm and 1.5%, 0.6% in ramipril, and bisoprolol arms, respectively; whereas it was unchanged (0.1% improvement) in ramipril plus bisoprolol arm (P < 0.001). Concerning differences in 3D-LVEF changes from baseline to end of treatment, bisoprolol-containing arms showed significant benefit in patients not receiving RT (P = 0.09), in patients receiving right-sided breast RT (P = 0.0001), and with lesser extent, in patients receiving left-sided RT (P = .041). No significant benefit was shown in ramipril-containing arms. Concerning differences in GLS changes from baseline to end of treatment, bisoprolol-containing arms showed significant benefit in patients not receiving RT (P = 0.0001) and in patients receiving right-sided breast RT (P = 0.0001), while no benefit was shown in patients receiving left-sided breast RT (P = 0.270). Ramipril-containing arms showed significant benefit in patients not receiving RT (P = 0.035) and in patients receiving left-sided breast RT (P = 0.14), while no benefit was shown in right-sided breast RT (P = 0.260).

Conclusions: At the interim analysis, cardioprotective pharmacological strategies in patients affected by breast cancer receiving an anthracycline-based chemotherapy are well tolerated and seem to protect against cancer therapy-related LVEF decline and heart remodeling. This favorable effect seems to be reduced in patients receiving postoperative left-sided breast RT, thus calling for further investigations on potentially radiation-related early subclinical heart damage.

No conflict of interest.

154 (PB-067) Poster

Results from a large single institute experience of targeted intraoperative radiotherapy (TARGIT-IORT) as partial breast irradiation modality

L. Vinante[1], J. Vaidya[2], C. Angela[1], M. Mileto[3], E. Piccoli[3], M. Avanzo[4], L. Barresi[4], G. Pirrone[4], F. Bertini[1], M. Marson[1], M. Montico[5], L. Baboci[6], T. Perin[7], M. Urbani[8], F. Puglisi[9], S. Massarut[3]. *[1]Centro di Riferimento Oncologico di Aviano CRO IRCCS, Radiation Oncology, Aviano, Italy; [2]University College London, Division of Surgery and Interventional Science, London, United Kingdom; [3]Centro di Riferimento Oncologico di Aviano CRO IRCCS, Breast Surgery Unit, Aviano, Italy; [4]Centro di Riferimento Oncologico di Aviano CRO IRCCS, Medical Physics Unit, Aviano, Italy; [5]Centro di Riferimento Oncologico di Aviano CRO IRCCS, Clinical Trial Office, Aviano, Italy; [6]Centro di Riferimento Oncologico di Aviano CRO IRCCS, Immunopathology and Oncologic Biomarkers Unit, Aviano, Italy; [7]Centro di Riferimento Oncologico di Aviano CRO IRCCS, Pathology Unit, Aviano, Italy; [8]Centro di Riferimento Oncologico di Aviano CRO IRCCS, Radiology Unit, Aviano, Italy; [9]Centro di Riferimento Oncologico di Aviano CRO IRCCS, Medical Oncology, Aviano, Italy*

Background: Partial breast irradiation (PBI) with targeted intraoperative radiotherapy (TARGIT-IORT) for early stage breast cancer was investigated in TARGIT A trial. However the majority of national guidelines do not consider TARGIT-IORT as a standard PBI modality and additional clinical evidence is necessary. In this study we present "real world" outcome measures of TARGIT-IORT as PBI modality.

Materials and Methods: Patients were treated with TARGIT-IORT as PBI modality between 2004 and 2021 in a single institute. Inclusion criteria were consistent with TARGIT-A protocol. Primary outcome was 5-years in breast tumour recurrence (IBTR), secondary analyses were regional and distant recurrence risks, disease-free survival, overall survival and tumour-related survival. Primary and secondary outcomes were estimated with Kaplan-Meier method and the analysis was conducted in all study population and in a subgroup of patients that received exclusive TARGIT-IORT (without the addition of whole breast EBRT). High grade toxicity events were described and scored according to Common Terminology Criteria of Adverse Events scale 4.0.

Results: The study included 828 patients, with a median follow up of 64 months (range:3–203). The majority of patients (59.8%) received only TARGIT-IORT ("exclusive IORT" group), while 40.2% of patients were considered unsuitable for PBI after definitive histopathological report and received additional whole breast radiation therapy. 5 years IBTR was 2.4% (95%CI = 1.4%–3.9%) and 3% (95%CI = 2.5%–5.6%) in all study population and in "exclusive IORT" cohort respectively. Survival analysis results were reported in Table 1. High grade toxicity (CTCAE Grade 3–4) events were rare (incidence = 0.6%) and consisted in 1 case of skin necrosis, 3 cases of severe fibrosis and 1 radiation induced angiosarcoma.

Table 1: five-years Kaplan-Meier estimates of outcomes measures for all population and for exclusive IORT cohort

Outcomes	All study population Kaplan-Meier estimates (95%CI)	Exclusive IORT cohort Kaplan-Meier estimates (95%CI)
5 years local recurrence-free survival	97.6 (96.1–98.6)	97 (94.6–98.3)
5 years regional recurrence-free survival	98.9 (97.6–99.5)	98.6 (96.6–99.4)
5 years distant recurrence-free survival	98.1 (96.6–98.9)	98 (95.9–99.1)
5 years recurrence-free survival	95.6 (93.7–97)	95.1 (92.3–96.9)
5 years overall survival	96.2 (94.4–97.5)	95.8 (93.1–97.4)
5 years tumour related overall survival	98.5 (97.0–99.2)	98.5 (96.4–99.4)

Conclusion: 5 years local recurrence rate and survival outcomes were consistent with TARGIT A trial results. This "real world" single institute experience confirmed the safety and efficacy of TARGIT-IORT as PBI modality.

No conflict of interest.

155 (PB-068) Poster

Postoperative breast radiotherapy using deformable image registration of initial PET-CT before NAC

K. Shiraishi[1]. *[1]Teikyo University, Department of Radiology, Tokyo, Japan*

Background: Radiation treatment planning (RTP) is based on the clinical stage at diagnosis and the pathological stage after surgery in postoperative radiotherapy for patients with breast cancer who undergo neoadjuvant chemotherapy (NAC). However, adopting initial PET-CT images for RTP is challenging because of image registration inconsistency due to different acquisition conditions. We compared relevant clinical parameters in between patients who underwent PET-CT under the same conditions as those at the RTP (group A) and those who did not (group B).

Materials and Methods: Dose-volume histogram parameters of targets and organs at risk were evaluated for thirty-five consecutive cases from July 2019 to April 2021, in which PET-CT imaging was performed under the same postural conditions as for radiotherapy (flat panel on the back and both upper arms raised, group A), and thirty-five consecutive cases before then (group B). Regions of interests were generally set according to the RTOG contouring guideline, with appropriate individual modifications. All primary tumours and lymph node metastases considered to be positive at initial PET-CT before NAC were included in the target with ANACONDA deformable image registration technique. All prescribed doses were 50 Gy in 25 fractions.

Results: Both groups were well-balanced in age, BMI, laterality, clinical/pathological T stages, and pathological N stage without significant difference in clinical N stage. Among the targets, favorable coverages in CTVs and PTVs were observed in the group A, and statistically significant improvement was seen especially in axillary lymph nodes. Such advantage was not observed for supraclavicular nodes or internal mammary nodes. We did not find any meaningful difference in sparing the risk organs such as lung, heart, or contralateral breast within two groups.

Conclusions: RTP by using PET-CT under the same conditions as treatment planning CT can improve the coverage of targets and in particular, affected axillary lymph nodes at diagnosis, which may lead to survival benefit. Proposed approach is in line with the era of surgical de-escalation.

No conflict of interest.

156 (PB-069) Poster

Accelerated partial breast irradiation (APBI) in a single 18 Gy fraction with high-dose-rate brachytherapy (HDR)

J. Anchuelo[1,2], A. Rivero[1], P. Galdós[1], L. Alonso[3], R. Astudillo[1], P. Navarrete[1], E. Arrojo[1], J. Jimeno[4], J. Albendea[1], F. Pinto[1], R. Fabregat[1], A. De Juan[3], C. Hinojo[3], F. Hernanz[4], P. Merino[5], M. Díaz de Tuesta[6],

F. Borniquel[7], J. Mazaira[8], P. Muñoz[9], P. Prada[1]. [1]*Hospital Universitario Marqués de Valdecilla, Radiation Oncology, Santander, Spain;* [2]*IDIVAL, Research Department, Santander, Spain;* [3]*Hospital Universitario Marqués de Valdecilla, Medical Oncology, Santander, Spain;* [4]*Hospital Universitario Marqués de Valdecilla, Breast Unit, Santander, Spain;* [5]*Hospital Universitario Marqués de Valdecilla, Radiology, Santander, Spain;* [6]*Hospital Sierrallana, Radiology, Torrelavega, Spain;* [7]*Hospital Universitario Clínico Lozano Blesa, Nursing, Zaragoza, Spain;* [8]*Hospital Sierrallana, Gynaecology, Torrelavega, Spain;* [9]*Servicio Cántabro de Salud, Gerencia de Atención Primaria, Santander, Spain*

Backround: APBI has positioned itself as the standard treatment for patients over 50 years, with low risk of relapse criteria. The technique with the most evidence to date is HDR brachytherapy. With the intention of carrying out increasingly shorter treatments, the idea of very accelerated partial breast irradiation (VAPBI), arose. At present, there is very little evidence with sufficient follow-up of its results, both in terms of survival and safety.

Material and methods: To analyze the results of patients treated with VAPBI in a tertiary hospital with a median follow-up of 51 months, both in oncological results and in terms of toxicity. Patients who received this treatment underwent breast-conserving surgery ± SLNB, following the recommendations established by the European Society for Radiotherapy and Oncology, after knowing the definitive anatomic pathology report.

Treatment was in all cases outpatient. All patients received loco-regional anesthesia. The implant was placed guided by ultrasound and fluoroscopy, under optimal conditions of asepsis and antisepsis. Planning was performed with CT, with Oncentra®Brachy and a dose of 18 Gy was administered with an iridium 192 source.

Results: Between September 2014 and March 2021, a total of 97 patients with localized breast cancer were treated. The mean and median age was 62 years (49–81). 24 patients had intraductal carcinoma (DCIS) and the rest were infiltrating (73). Infiltrating duct carcinoma was the most frequent histology (56%), followed by infiltrating lobular carcinoma (4%). 48% were Luminal A, 15.46% Luminal B and 1% Her2- positive Luminal B, the rest were DCIS (20.8% g1, 25% g2 and 46% g3). One patient presented lymphovascular invasion. Regarding the infiltrating tumors, 51% were G1, 32% G2, and 3% G3. All patients with infiltrating carcinoma had T1 tumors, except one. The mean number of lymph nodes removed was 2 (0–14). Two patients received adjuvant chemotherapy, 5 tamoxifen, and 73 aromatase inhibitors. The median volume that received 18 Gy was 33cc (10.78–0.83), the median DHI was 0.71 (0.32–0.83).

Regarding acute toxicity, we found no g ≥3 toxicity. Three patients presented g2 pain, and one g2 epidermitis.

With a median follow-up of 51 months, none of the patients had g ≥3 toxicity. Four patients presented g2 pain, one patient was diagnosed of g2 fat necrosis and another patient of g2 fibrosis.

Regarding the cosmetic result, 86.59% presented good/very good, and 9% fair-bad.

Two patients relapsed locally (with DCIS, G3). With our data, local control is 97.4%, regional control 100% and distant control 98.9%, with an overall survival of 96%.

Conclusions: VAPBI at a fraction of 18 Gy is an effective and safe treatment in the short and long term.

No conflict of interest.

POSTER SESSION **17 November 2022**

Rehabilitation/Survivorship

157 (PB-070) Poster

The mediating effect of perceived injustice and pain catastrophizing in the relationship of pain on fatigue and sleep in breast cancer survivors: a cross-sectional study

A. Lahousse[1,2], S. Ivakhnov[1], J. Nijs[1,3], D. Beckwée[1,4], W. Cools[5], C. Fernandez-de-las-Penas[6], E. Roose[1], L. Leysen[1]. [1]*Vrije Universiteit Brussel, Department of Physiotherapy, Human Physiology and Anatomy, Faculty of Physical Education and Physiotherapy, Brussels, Belgium;* [2]*Research Foundation, Flanders FWO, Brussels, Belgium;* [3]*University of Gothenburg, Institute of Neuroscience and Physiology, Gothenburg, Sweden;* [4]*University of Antwerp, Department of Rehabilitation Sciences and Physiotherapy, Wilrijk, Belgium;* [5]*Vrije Universiteit Brussel, Interfaculty Center Data Processing and Statistics, Brussels Health Campus, Brussels, Belgium;* [6]*Universidad Rey Juan Carlos, Department of Physical Therapy Occupational Therapy- Physical Medicine and Rehabilitation, Madrid, Spain*

Background: Persistent pain is one of the most common sequelae among breast cancer survivors (BCS), seen in about one out of three. Recent insights and multidimensional aspects of pain have raised awareness about cognitive appraisals, such as perceived injustice (PI) and pain catastrophizing (PC). PI is defined as the tendency to blame others for one's suffering, interpret one's losses as severe and irreparable, and experience a sense of unfairness. PC is defined as the tendency to magnify or exaggerate the mental set during actual or anticipated painful experiences. It has been demonstrated that both maladaptive cognitions play an important role in patients' pain development, maintenance, and experience. However, the mediating effect of these appraisals has not been investigated in BCS yet, nor have they been related to fatigue and sleep.

Material and Methods: Cross-sectional data from 128 BCS were analyzed by structural path analysis with the aim to examine the mediating effect of PI and PC in the relationship of pain on fatigue and sleep. The pain was assessed with both the Visual Analogue Scale (VAS) and the Central Sensitization Inventory (CSI).

Results: The indirect mediating effects of PI on fatigue (CSI*PI = 0.21; $p < 0.01$ and VAS*PI = 1.19; $p < 0.01$) and sleep (CSI*PI = 0.31; $p < 0.01$ and VAS*PI = 1.74; $p < 0.01$) were found significant for both pain outcomes, CSI and VAS. On the other hand, PC only mediated the relationship between pain measured by VAS and fatigue (VAS*PC = 0.80; $p = 0.03$). Positive associations were found, indicating that higher pain levels are positively correlated with PI and PC, which go with higher levels of fatigue and sleep problems.

Conclusions: PI is an important mediator in the relationship of pain on fatigue and sleep, and PC as a mediator on fatigue after cancer treatment. These findings highlight the fact that both appraisals are understudied but also open new perspectives regarding treatment strategies in BCS. The results of our study warrant replication across longitudinal studies to clarify the dissimilarities with other study findings and continue to expand upon the evidence of the multifactorial nature of pain coping.

No conflict of interest.

158 (PB-071) Poster

Home-monitoring of cancer-related fatigue in breast cancer patients

K.A.E. Wijlens[1], L. Beenhakker[1], A. Witteveen[1], S. Siesling[2,3], M.M.R. Vollenbroek-Hutten[1,4], C. Bode[5]. [1]*University of Twente, Biomedical Signals and Systems, Enschede, Netherlands;* [2]*University of Twente, Health Technology and Services Research, Enschede, Netherlands;* [3]*Netherlands Comprehensive Cancer Organisation IKNL, Research and Development, Utrecht, Netherlands;* [4]*Medisch Spectrum Twente, Board of Directors, Enschede, Netherlands;* [5]*University of Twente, Psychology, Health and Technology, Enschede, Netherlands*

Background: There is a growing group of women who experience long-term effects of cancer and its treatment. Cancer-related fatigue (CRF) is the most reported health problem, which can lead to a significant decrease in quality of life. On average, CRF treatments are effective, but not for all patients. Holistic monitoring of fatigue severity and impact of fatigue on quality of life and social participation of the individual patient is needed to find the most beneficial personalized treatment. Therefore, the aims are 1) to determine relevant domains of the holistic patient profile and 2) to develop a holistic home-monitoring toolkit that allows personal treatment advice for CRF.

Materials and methods: Semi-structured online interviews with fourteen healthcare professionals from different disciplines working with cancer patients and four group interviews with breast cancer patients from four clinical institutions were held. The (group)interviews were coded using a thematic analysis approach (TAA). Next, a funnel approach was used to develop the toolkit, see Table 1.

1. Relevant domains based on TAA
2. Literature; methods to assess the content of the relevant domains
3. Assessment of methods using expert judgment
4. Consultation of patient advocates

Methods: Considered for each of the domains and onboarding were wearables, apps and experiences sampling methods, if validated in Dutch and with breast cancer patients. Where applicable, questions using Likert scales were selected using the highest discrimination parameter value in order to use questions with typically the highest information function. Usability was assessed with a thinking-aloud method with ten breast cancer patients.

Results: Following the (group)interviews and TAA, the relevant identified domains were CRF dimensions (physical, cognitive, and emotional), limitation in functioning (social, relational, and work), day pattern (including activity and sleep), and coping style. The toolkit consists of a selection of questions and wearables to assess the health status of the patients, split over onboarding questions which subsequently link to relevant deepening

domains. Over time, the onboarding will be repeated to take possible changes into account. The toolkit was easy to use by 90% of the patients.

Conclusion: A first holistic home-monitoring toolkit for CRF was developed consisting of an onboarding questionnaire which indicate which of the four domains will provide the best information for a personal CRF treatment advice and monitor the health status of patients over time. In the future we aim to integrate the toolkit in a personal health environment to ensure easy access and to enable sharing collected home-monitoring data and treatment advice with relevant healthcare professionals.

No conflict of interest.

159 (PB-072) Poster

Impact of lymphedema on health-related quality of life in early-stage breast cancer patients treated breast conserving therapy with or without sentinel lymph node biopsy: 2-year results from the randomized controlled trial BOOG2013–08

V. Wintraecken[1,2], E. Colier[1,2], L.M. van Roozendaal[3], V.C.G. Tjan-Heijnen[2,4], J.M. Simons[5], L.J.A. Strobbe[6], M.C. van Maaren[7,8], L.J. Boersma[2,9], M.B.I. Lobbes[10], T. van Dalen[11], S.C. Linn[12,13,14], P.M.P. Poortmans[15], J. de Vries[16], S.M.J. van Kuijk[17], J. de Wilt[18], M.L. Smidt[1,2]. *[1]Maastricht University Medical Centre+, Department of Surgery, Maastricht, Netherlands; [2]Maastricht University, GROW - School for Oncology and Developmental Biology, Maastricht, Netherlands; [3]Maastricht University Medical Centre+- Department of Surgery, Maastricht, Netherlands; [4]Maastricht University Medical Centre+- Department of Medical Oncology, Maastricht, Netherlands; [5]Erasmus Medical Centre, Department of Radiotherapy, Rotterdam, Netherlands; [6]Canisius-Wilhelmina Hospital, Department of Surgical Oncology, Nijmegen, Netherlands; [7]Netherlands Comprehensive Cancer Organisation IKNL, Department of Research and Development, Utrecht, Netherlands; [8]University of Twente, Department of Health Technology and Services Research- Technical Medical Center, Enschede, Netherlands; [9]Maastricht University Medical Centre+, Department of Radiation Oncology MAASTRO Clinic, Maastricht, Netherlands; [10]Zuyderland Medical Center, Department of Radiology, Sittard-Geleen, Netherlands; [11]Diakonessenhuis Utrecht, Department of Surgery, Utrecht, Netherlands; [12]Netherlands Cancer Institute, Department of Molecular Pathology, Amsterdam, Netherlands; [13]Netherlands Cancer Institute, Department of Medical Oncology, Amsterdam, Netherlands; [14]Universitair Medisch Centrum Utrecht, Department of Medical Oncology, Utrecht, Netherlands; [15]Radboud University Medical Centre, Department of Radiation Oncology, Nijmegen, Netherlands; [16]Tilburg University, Department of Medical and Clinical Psychology, Tilburg, Netherlands; [17]Maastricht University Medical Centre+, Department of Clinical Epidemiology and Medical Technology Assessment, Maastricht, Netherlands; [18]Radboud University Medical Centre, Department of Surgery, Nijmegen, Netherlands*

Background: The BOOG 2013-08 study examined non-inferiority of omission of the sentinel lymph node biopsy (SLNB) in clinically node negative cT1-2 breast cancer patients treated with breast conserving therapy (NCT02271828).[1] This study explores whether omission of the SLNB results in a significant decrease in axillary morbidity rate and improved health-related QoL (HRQoL) at 6- 12- and 24 months post-surgery.

Material and methods: The BOOG 2013-08 study enrolled 1736 patients between 2015 and 2022 who were randomized to SLNB or follow-up. A subgroup of 1055 participants were used for analysis.

Results: There were no statistical significant differences in patient characteristics or clinical relevant difference in lymphedema- or HRQoL scores at baseline between the groups. Table 1 displays lymphedema- and HRQoL scores. Both treatment groups experienced comparable axillary morbidity scores over time with no significant difference between the groups, with the exception of the domains 'total-', and 'physical function' at 6- and 12 months, and at the domain 'mobility' at 12 months, in favour of the group treated without SLNB.

Conclusion: The impact of omission of the SLNB on axillary morbidity, and consequently on HRQoL, is less than expected, and does not translate in a statistical or clinical relevant difference. A potential explanation for the similar scores could be found in radiotherapy. Additional radiotherapy data are currently being reviewed to explore this possibility.

No conflict of interest.

160 (PB-073) Poster

Perceived injustice in cancer survivors: an exploration and a population-specific cut-off score

E. Roose[1], E. Huysmans[1], A. Lahousse[1], J. Nijs[1], P. van Wilgen[1], D. Beckwée[1], A. Timmermans[2], M. De Couck[1], R. Bults[1], M. Vissers[3], L. van Gerven[3], L. Leysen[1]. *[1]Vrije Universiteit Brussel VUB, Department of Physiotherapy, Jette, Belgium; [2]Universiteit Hasselt UH, Department of Physiotherapy, Diepenbeek, Belgium; [3]Berekuyl Academy, Department of Oncology, Hierden, Netherlands*

Background: In the survival stage after cancer, fatigue and pain are the most occurring side effects. Both impact cancer survivors' daily life and quality of life. New insights recently showed that perceived injustice might play a

Table (abstract: 159 (PB-072)): Lymphedema- and HRQoL scores

	Baseline		6 months			12 months			24 months		
	BCT + SLNB N = 526	BCT *without* SLNB N = 529	BCT + SLNB N = 526	BCT *without* SLNB N = 529	*P value*	BCT + SLNB N = 526	BCT *without* SLNB N = 529	*P value*	BCT + SLNB N = 526	BCT *without* SLNB N = 529	*P value*
Lymph- ICF											
*Domain scores**											
Total	6%	6%	14%	12%	***.015***	14%	11%	***.007***	14%	13%	*.234*
Physical function	3%	4%	11%	8%	***<0.001***	13%	9%	***<0.001***	12%	10%	*.112*
Mental function	7%	7%	11%	8%	*.102*	13%	10%	*.051*	13%	12%	*.484*
Mobility domain	8%	8%	18%	16%	*.255*	17%	14%	***.026***	17%	15%	*.452*
EORTC QLQ C30											
Global Health**	79.9	79.5	74.0	74.0	*1.000?*	76.1	77.9	*.275*	77.1	76.9	*.875*
*Functioning scales***											
Physical	91.9	91.1	86.1	86.4	*.778*	84.9	86.7	*.161*	85.4	86.1	*.477*
Emotional	77.3	77.4	79.7	80.4	*.620*	79.1	80.5	*.387*	78.5	79.0	*.787*
Cognitive	88.7	89.1	80.5	81.9	*.411*	79.8	81.8	*.258*	80.8	81.3	*.788*
EORTC BR23											
*Symptom scales/ items****											
Breast symptoms	8.0	8.1	23.6	21.3	*.083*	21.6	18.5	***.028***	17.5	16.1	*.321*
Arm symptoms	5.1	4.9	13.3	11.0	*.060*	13.1	9.3	***.001***	12.1	11.44	*.669*

*Higher score indicates more impairments in function, activity limitations and participation restrictions due to arm lymphedema.
**Higher score indicates better functioning.
***Higher score indicates more symptoms.

substantial role in these side effects. Up to now, less is known about perceived injustice in cancer survivors. Furthermore, no cancer survivors' specific cut-off is available, making further research difficult.

Material and methods: This cross-sectional study assessed the Injustice Experience Questionnaire (IEQ), Numeric Pain Rating Scale (NPRS), Patient-Specific Complaints (PSC), Multidimensional Fatigue Index (MFI), and European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-C30 (EORTC-QLQ-C30) in cancer survivors from the Netherlands. A clinically relevant cut-off score for cancer survivors was identified based on the 75th percentile of the distribution of the total IEQ scores. Univariate and multivariate regression analyses were performed to explore the relationship between personal characteristics (gender, age, type of cancer, treatment type) and cancer-related rehabilitation factors (pain intensity, daily activity, fatigue, health-related quality of life) with perceived injustice in cancer survivors.

Results: One hundred twenty-one cancer survivors were included from private physiotherapy practices across the Netherlands. A cut-off of ≥20 on the IEQ was identified for cancer survivors. In the univariate analyses, chemotherapy (B = 3.321 [0.346 to 6.295], $p = 0.029$) and all rehabilitation factors (i.e., NPRS (B = 0.863 [0.161 to 1.566], $p = 0.016$), PSC (B = 0.067 [0.008 to 0.127], $p = 0.027$), MFI (B = 0.204 [0.124 to 0.284], $p < 0.001$), and EORTC-QLQ-C30 (–0.167 [–0.252 to –0.083], $p < 0.001$)) were significantly associated with the total IEQ scores. However, no significant indirect associations were found for gender (B = 1.520 [–1.779 to 4.820], $p = 0.363$), age (B = –0.094 [–0.208 to 0.019], $p = 0.103$), or type of cancer (B = 3.982 [–1.226 to 9.190], $p = 0.133$) with total IEQ scores. The multivariate model included MFI, EORTC-QLQ-C30, NPRS, PSC, type of treatment, age, and cancer type ($p < 0.20$). Only MFI and age maintained a statistically significant direct association with PI, which were respectively B = 0.205 [0.125 to 0.018], $p < 0.001$ and B = –0.086 [–0.191 to 0.285], $p < 0.001$.

Conclusion: Perceived injustice might be a new cornerstone for cancer survivors. However, its knowledge is scarce and its association with personal characteristics and rehabilitation factors should further be examined through longitudinal studies in a larger population to explore causal relationships.

No conflict of interest.

161 (PB-074) Poster

Overview of patient preference sensitive attributes in eHealth interventions for breast cancer-related fatigue

L. Beenhakker[1], A. Witteveen[1], K.A.E. Wijlens[1], E. Siemerink[2], M.L. van der Lee[3,4], C. Bode[5], S. Siesling[6,7], M.M.R. Vollenbroek-Hutten[1,8]. *[1]University of Twente, Biomedical Signals and Systems, Enschede, Netherlands; [2]ZiekenhuisGroepTwente, Internal Medicine, Hengelo, Netherlands; [3]Helen Dowling Institute, Scientific Research Department, Bilthoven, Netherlands; [4]Tilburg University, Medical and Clinical Psychology- Center of Research on Psychology in Somatic Diseases, Tilburg, Netherlands; [5]University of Twente, Psychology- Health and Technology, Enschede, Netherlands; [6]University of Twente, Health Technology and Services Research, Enschede, Netherlands; [7]Netherlands Comprehensive Cancer Organisation IKNL, Research and Development, Utrecht, Netherlands; [8]Medisch Spectrum Twente, Board of Directors, Enschede, Netherlands*

Background: One of the most disabling long-term effects after breast cancer is cancer-related fatigue (CRF). To prevent CRF from becoming chronic, it is important to start treatment against CRF timely. Fortunately, there are many evidence-based eHealth interventions. However, the effectiveness of these interventions varies per person, depending on patients' personality and preferences. The goal of this research is to create an overview of eHealth interventions for breast cancer patients with CRF and their attributes, with a focus on preference sensitive attributes. This overview can help in providing a more personalized treatment advice, thereby increasing the effectiveness on CRF.

Methods: With a scoping review, we searched systematically through Pubmed, Scopus and Web of Science for eHealth interventions. These eHealth interventions had to 1) be tested in a patient group including breast cancer patients and 2) measure the effect on CRF. Information was extracted on patient preference attributes like duration, intensity, contact with healthcare professionals, peer support, costs, content delivery and study results. Results were synthesized based on different categories of non-pharmacological interventions.

Results: We found 43 articles describing 35 interventions. Interventions were divided into five categories: physical activity, mind-body and psychological interventions, a combination of the previous or "other." Table 1 shows the variation in the attributes duration, intensity, contact with professionals and study results per category. Peer support was included in only seven interventions and in six interventions, information was given on potential costs. Content was delivered in various ways: information was presented on websites and apps as video, audio and text and also as vignettes, quizzes and graphics.

Conclusion: We created an overview of eHealth interventions for breast cancer patients with CRF and their (preference sensitive) attributes. There was variation between (categories of) interventions, showing possibilities to personalize an intervention advice. The overview hopefully supports professionals in guiding patients to an intervention that fits their preferences, leading to an improved intervention outcome on CRF and improving the quality of life of patients.

Table 1: Overview of interventions and attributes related to patient preferences

Category	Duration	Intensity	Professional involvement	Studies with significant improvement
Physical activity (n = 5)	6 weeks–6 months	Tailored by user - 3 hours/week - 3 sessions/ week	4/5	2/5
Mind-body (n = 7)	4–12 weeks, outlier of 20 weeks	Daily practice of exercises	2/7	4/7
Psychological (n = 13)	6 weeks–6 months	Weekly usage/at own pace, two exceptions: 4x/week and daily use	6/13	9/13
Other (n = 2)	6 months	Own pace - daily usage	2/2	1/2
Combination (n = 8)	8 weeks–6 months	Usage at own pace - once/ twice per week - daily use	5/8	8/8

No conflict of interest.

162 (PB-075) Poster

Who is at risk of developing breast cancer-related fatigue – a prediction study

L. Beenhakker[1], K.A.E. Wijlens[1], A. Witteveen[1], M. Heins[2], C. Bode[3], S. Siesling[4,5], M.M.R. Vollenbroek-Hutten[1,6]. *[1]University of Twente, Biomedical Signals and Systems, Enschede, Netherlands; [2]Netherlands Institute for Health Services Research NIVEL, Primary Care, Utrecht, Netherlands; [3]University of Twente, Psychology- Health and Technology, Enschede, Netherlands; [4]University of Twente, Health Technology and Services Research, Enschede, Netherlands; [5]Netherlands Comprehensive Cancer Organisation IKNL, Research and Development, Utrecht, Netherlands; [6]Medisch Spectrum Twente, Board of Directors, Enschede, Netherlands*

Background: Cancer-related fatigue (CRF) is still experienced by 20% of the breast cancer patients ten years after diagnosis. Although there are interventions against CRF, they should be started on time to prevent CRF from becoming chronic. Therefore, it is important to identify patients at risk of developing CRF to subsequently monitor them actively. The goal of this study is to explore the possibility to determine the risk breast cancer patients have for developing CRF.

Methods: To assess the risk for CRF, the Dutch Primary Secondary Cancer Care Registry (PSCCR) was used. This registry consists of a part with patient reported outcomes (PSCCR-PROFIEL) and a link between data of General Practitioners (GPs) and the Netherlands Cancer Registry (PSCCR). Both have information on breast cancer patient, tumor and treatment characteristics and late effects. In PSCCR-PROFIEL, 23 input variables for 390 patients were available and the patient reported outcomes included the late effect fatigue (yes/no, n = 254). In PSCCR, 12,813 patients were included and GP visits for fatigue were extracted (n = 2224). Fifty-three input variables were used, including information on complaints before diagnosis. Missing data was imputed using Multiple Imputation by Chained Equations. Risk was predicted using machine learning comparing several models: Random Forest Classifier, Logistic Regression, Gaussian Naïve

Bayes, K-Nearest Neighbors and Multi-Layer Perceptron. For extra comparison, a statistical logistic regression model was developed. A nested 5-fold cross validation was used to optimize hyperparameters. The area under the receiver operator characteristic curve (AUC) was calculated to compare model performances.

Results: For PSCCR-PROFIEL, the Logistic Regression machine learning model performed best with an AUC of 0.669 ± 0.040. The statistical logistic regression model did not do better, with an AUC of 0.629 ± 0.040. For PSCCR, the best AUC found was 0.561 ± 0.006, also for the Logistic Regression model and the statistical Logistic Regression did about the same with 0.551 ± 0.008 as AUC. The predicted probabilities were plotted and visually compared with the true value. This showed no difference between the fatigued and non-fatigued patients.

Conclusion: When calculating the risk patients have for CRF, we found relatively low AUCs, meaning that the models have low discriminative abilities. It could be that the variables present in the datasets are not predictive of fatigue and more information is needed (e.g. lifestyle factors). Another reason could be that the binary way fatigue is reported in both datasets is not detailed enough to predict CRF, because CRF is a multidimensional and complex long-term effect. In future studies, lifestyle factors should be included and CRF has to be measured multidimensionally to hopefully better predict the risk an individual has for developing CRF.

No conflict of interest.

163 (PB-076) Poster

Depression, loneliness and apathy in older breast cancer survivors: five-year follow-up from the Climb Every Mountain study

A. Lemij[1], N.A. De Glas[2], T. van Dalen[3], O.R. Guicherit[4], T.E. Lans[5], E.M.H. Linthorst-Niers[6], J.W.S. Merkus[7], C.C. van der Pol[8], A.J.E. Vulink[9], L. van Gerven[10], G.J. Liefers[11], J.E.A. Portielje[2]. *[1]Leiden University Medical Centre, Medical Oncology and Surgery, Leiden, Netherlands; [2]Leiden University Medical Centre, Medical Oncology, Leiden, Netherlands; [3]Diakonessenhuis, Surgery, Utrecht, Netherlands; [4]HMC Westeinde, Surgery, The Hague, Netherlands; [5]Admiraal de Ruyter Hospital, Surgery, Goes, Netherlands; [6]Groene Hart Hospital, Surgery, Gouda, Netherlands; [7]Haga Hospital, Surgery, The Hague, Netherlands; [8]Alrijne Hospital, Surgery, Leiden and Leiderdorp, Netherlands; [9]Reinier de Graaf Gasthuis, Medical Oncology, Delft, Netherlands; [10]Langeland Hospital, Internal Medicine, Zoetermeer, Netherlands; [11]Leiden University Medical Centre, Surgery, Leiden, Netherlands*

Background: Previous studies have shown a relatively high prevalence of psychological disorders in breast cancer survivors. However, there is a lack of information for the increasing older population. Besides, most studies focus on a period shortly after the diagnosis and treatment. However, for the majority of patients the processing and acceptance of their diagnosis and disease begins when the treatment of their cancer is finished and the follow-up begins. Therefore, the aim of the current study was to assess depressive symptoms, loneliness and apathy in older patients with breast cancer within the first five years after diagnosis.

Material and methods: Women aged 70 years and older who had been diagnosed with early-stage breast cancer were included from the prospective, multicentre Climb Every Mountain cohort study. Linear mixed models were used to assess longitudinal changes of depression (according to the 15-item Geriatric Depression Scale), loneliness (according to the De Jong Gierveld Loneliness Scale) and apathy (using the Starkstein Apathy Scale) over time at 3, 9, 15, 27 and 60 months follow-up.

Results: In total, 299 patients were included. At 3 months follow-up, shortly after the acute treatment, 12% of patients had significant depressive symptoms, while apathy was present in 23% and almost a third of all patients experienced loneliness at that point. Depression, apathy and loneliness scores showed no clinically significant change over time. However, patients who were classified as frail at baseline developed more depressive symptoms than patients who were not frail within the first five years after diagnosis.

Conclusions: Depressive symptoms, apathy and loneliness are relatively rare among older breast cancer survivals. However, patients who are frail at baseline are more prone to developing depressive symptoms within the first 5 years after diagnosis, leading to a reduced quality of life.

No conflict of interest.

164 (PB-077) Poster

Exploring timely perspectives of embodiment in women diagnosed with breast cancer undergoing oncoplastic breast surgery: A qualitative study from a plastic- and breast surgical outpatient clinic

S.Thestrup Hansen[1], L. Willemoes Ramussen[2]. *[1]Zealand University Hospital/University of Southern Denmark, Department of Plastic and Breast Surgery, Roskilde, Denmark; [2]Zealand University Hospital, Department of Plastic and Breast Surgery, Roskilde, Denmark*

Background: Women diagnosed with breast cancer in Western countries are increasingly offered oncoplastic breast surgery as part of breast cancer treatment. As the number of breast cancer survivors grows due to development in surgical and medical treatment, long-term outcomes and the experiences of individuals with breast cancer, such as quality of life related to satisfaction and body image, have become increasingly important components of breast cancer treatment and rehabilitation. Previous research indicates that women who undergo breast reconstruction after breast cancer treatment report the highest long-term satisfaction with their breasts. This could indicate that reconstruction should be recommended for all women diagnosed with breast cancer. However, the standardizing tendencies of evidence-based practice can overrule individual deviations, cultural wishes, preferences and rights. Therefore, women's' bodily experiences might be a more multifaceted and individual phenomenon than modest satisfaction outcomes. This study aimed to investigate women's experiences of oncoplastic breast surgery and how cancer treatment affect their body image over time.

Material and Methods: The study was guided by a qualitative descriptive approach and thematic analysis inspired by Braun and Clarke. Fourteen in-depth interviews with seven women diagnosed with breast cancer were conducted from August 2018 to March 2019. In this qualitative study, data analysis was inductively performed parallel with data construction as a process aimed at making sense of data. We framed the discussion of the findings within a theory of embodiment inspired by Merleau-Ponty coherent with the construct of exploring human experiences to generate meaningful knowledge for applied practice.

Results: The analysis resulted in two overall themes: "Treatment is required for life-threatening cancer," and "Striving for a new normal body." Common to the themes were patients feelings of being on a pendulum reflecting on who they were in the past, their current rationale and transitioning their life ahead from their breast cancer with a changed body.

Conclusions: The participants in the study expressed broad levels of satisfaction with the results of the oncoplastic breast surgery. Participants particular valued that the constructed breast had weight and volume even if it was no longer a natural breast.

An implication for future practice is that nurses and physicians caring for women with breast cancer who are candidates for oncoplastic breast surgery need to provide person-centered care and information. That being throughout the breast cancer treatment process, from diagnosis to surgery, to medical treatment and into recovery, to engage with women's lived experiences of embodiment and body image and to recognize the importance of these experiences in women's transitions.

No conflict of interest.

165 (PB-078) Poster

Evaluation of fertility preservation in young breast cancer patients

L. Beketic Oreskovic[1], P. Vukovic[2], F. Cmrecak[3]. *[1]School of Medicine, Univ. of Zagreb, Division of Clinical Oncology, Zagreb, Croatia; [2]Univ. Hospital for Tumors, Clinical Hospital Center Sestre Milosrdnice, Div. of Medical Oncology, Zagreb, Croatia; [3]Univ. Hospital for Tumors, Clinical Hospital Center Sestre Milosrdnice, Div. of Oncology and Radiotherapy, Zagreb, Croatia*

Background: Cancer treatment can be gonadotoxic and reduce significantly reproductive potential of young women. Oncofertility has emerged as a very important field in oncology which allows cancer survivors to have biological children and maintain their quality of life.

The aim of this study was to evaluate fertility issues and attitude towards fertility preservation in young breast cancer patients.

Material and methods: A survey regarding fertility issues and concerns was conducted from 1st of January to 10th of May 2019. Among breast cancer survivors aged 40 years or younger treated at University Hospital for Tumors in Zagreb, Croatia.

Results: Our research included 52 patients with a mean age of 36 years. At the time of diagnosis 85% of patients were informed about cancer treatment impact on fertility and potential premature ovarian insufficiency, 75% were informed about available fertility preservation options, 55%

already had children, 85% had a partner and 62.5% expressed maternal desire. A total of 42.5% of patients were interested in fertility preservation. GnRH analogues prior to chemotherapy were given in 52% of patients, 35% of patients underwent reproductive specialist consultation, 22.5% had their embryo/oocyte cryopreserved. The main reason to undergo cryopreservation procedure was a desire for future children before breast cancer diagnosis. Among those who did not consult reproductive specialist main reasons were lack of desire to have children in future (48%), unawareness of fertility preservation options (20%), fear of treatment delay (20%) and fear that pregnancy would cause disease reoccurrence (16%). Majority of patients (73%) reported satisfaction with their decision regarding fertility preservation, 27.5% expressed actually planning future pregnancy, while 25% were uncertain regarding future pregnancy. Half of the patients were not informed about potential timing of future pregnancy.

Conclusions: According to our results, more efforts should be put in providing adequate information on all aspects of fertility-related issues and multidisciplinary management of young breast cancer patients.

No conflict of interest.

166 (PB-079) Poster

Impact of breast cancer treatment on women's body image and self esteem

R. Bannour[1], B. Bannour[2], I. Bannour[1]. *[1]Faculty of Medicine of Sousse, Department of Obstetrics and Gynecology University Hospital Farhat Hached Tunisia, Sousse, Tunisia; [2]Faculty of medicine Ibn El Jazzar Sousse, Department of Obstetrics and Gynecology University Hospital Farhat Hached Tunisia, Sousse, Tunisia*

Introduction: Diagnosis and treatment of breast cancer affects women mentally and physically. Breast cancer has significant physical changes due to both the cancer itself as well as the corresponding treatment such as surgical intervention, radiotherapy, chemotherapy. These changes influence negatively the body image and self esteem among patients, adding a supplemental burden to psychological distress.

The aim of this study was to assess the body image and self esteem among breast cancer treated patients.

Methods: A cross-sectional survey was conducted during the year 2021 among women treated for breast cancer in the maternity ward of Sousse during the period from January 1, 2013 to December 31, 2017. In order to avoid the acute phase of the disease, patients were surveyed at a time distance of between 24 and 60 months from their cancer diagnosis.

Data was collected using the QLQ-BR23 validated questionnaire.

Results: Overall, 100 patients were included in the study with a mean age of 52 ± 8 year [23–73]. All patients had surgical treatment, 80% of which was radical (Patey) and 20% conservative treatment. Overall, 98% of patients had Chemotherapy, 99% radiotherapy and 70% hormonal therapy. Among the women who had a radical treatment, 2 were left by their partners after the treatment.

Body image and self esteem issues were experienced by a substantial proportion of women in the early months of treatment. Body image was altered among 81% of patients associated with mastectomy, hair loss from chemotherapy, concern with weight gain or loss, poorer mental health and sexual difficulties. The mean body image score was 63 ± 23.9 with a minimum of 0 and a maximum of 91.7. More than half of the patients had a score below 25. The increase in body image score was significantly associated with age ($p = 0.00$), type of treatment ($p = 0.00$), marital status ($p = 0\ 0.01$) and the feeling of support ($p = 0.01$). The elevation of the score was not significantly correlated with the feeling of discrimination ($p = 0.6$)

Conclusion: Difficulties related to body image and self esteem were common among breast cancer treated patients. Addressing these problems is essential to improve the quality of life of these women.

No conflict of interest.

167 (PB-080) Poster

Impact of breast cancer diagnosis on women's sexuality

R. Bannour[1], B. Bannour[1], I. Bannour[1]. *[1]Faculty of medicine of Sousse, Department of Obstetrics and Gynecology University Hospital Farhat Hached Tunisia, Sousse, Tunisia*

Introduction: Breast cancer remains the most frequently diagnosed cancer among in Tunisia representing 20–25% of malignant tumors in women with an incidence in 2017 estimated at 50.17/100 000 cases. Early diagnosis and treatment improves vital prognosis and survival rates on the depend of aesthetic prognosis. The impact of breast cancer on body image should not be underestimated. Physical changes due to oncological therapy are an important issue in long-term breast cancer survivors with a high incidence of sexual dysfunction.

The aim of this study was to evaluate the impact of breast cancer treatment on self esteem and sexual functioning among Tunisian women.

Methods: A cross-sectional survey was conducted during the year 2021 among women treated for breast cancer in the maternity ward of Sousse during the period from January 1, 2013 to December 31, 2017. In order to avoid the acute phase of the disease, patients were surveyed at a time distance of between 24 and 60 months from their cancer diagnosis.

Data was collected using the QLQ-BR23 validated questionnaire.

Results: Overall, 100 patients were included in the study with a mean age of 52 ± 8 year [23–73]. All patients had surgical treatment, 80% of which was radical (Patey) and 20% conservative treatment. Overall, 98% of patients had Chemotherapy, 99% radiotherapy and 70% hormonal therapy. Among the women who had a radical treatment, 2 were left by their partners after the treatment.

Sexual activity dropped from 71.9% before treatment to a minimum of 16% at the end of treatment. A similar effect was seen for pleasure and discomfort. Two years after treatment, a higher percentage was sexually active again, reaching almost the value of 65%.

The mean sexual activity score was 87.3 ± 22.6 with a minimum of 23 and a maximum of 100. A score $\geq$75 was noted in 75% of patients

The average sexual pleasure score was 88.33 ± 21.9 with a minimum of 23 and a maximum of 100. This score was greater than 75 in 75% of cases.

Conclusion: Breast cancer patients experience various sexual problems following breast cancer treatment. Targeted support interventions are needed. Sexuality-related education should be provided to all patients and their partners.

No conflict of interest.

168 (PB-081) Poster

The mediating effect of pain catastrophizing and perceived injustice in the relationship of pain on health-related quality of life in breast cancer survivors

E. Roose[1], L. Leysen[1], J. Nijs[1], N. Adrieanssens[1], R. Pas[1], P. van Wilgen[1], R. Bults[1], A. Lahousse[1], D. Beckwée[1]. *[1]Vrije Universiteit Brussel VUB, Department of Physiotherapy, Jette, Belgium*

Background: The importance of cognitive appraisals in the effectiveness of pain coping is well established. Two key variables in these appraisal processes are pain catastrophizing (PC) and perceived injustice (PI), which are known to increase the risk of long-term disability and to aggravate pain-related distress through maladaptive behavioral responses. However, to date, the mediating effect of these appraisals has not been examined concurrently in the breast cancer survivor (BCS) population, nor have they been related to health-related quality of life (HRQoL).

Material and methods: One hundred ten BCS were recruited by convenience sampling in the Oncology Center of the University Hospital of Brussels for this cross-sectional study. Measurements included the European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire, Pain Catastrophizing Scale, and the Injustice Experienced Questionnaire. Additionally, the Visual Analogue Scale, Douleur Neuropathique 4 Questionnaire, and Central Sensitization Inventory were used as pain outcome measures. The path analysis focused on evaluating the mediating effects of PC and PI in the relationship of pain on the HRQoL in breast cancer survivors.

Results: Results demonstrated a significant direct effect of pain and PI on HRQoL combined with a significant indirect effect through PI, but not through PC. An increase in pain is suggested to result in a decrease in quality of life. On the other hand, an increase in pain also is suggested to increase the PI. A similar relation with PC was not retained as significant.

Conclusion: The relative salience of PI as a mediator of HRQoL underscores the fact that PI is not only understudied but also under-appreciated and undertreated in the BCS population. The results of our study warrant replication across longitudinal studies but continue to expand upon the evidence of the multifactorial nature of pain coping in BCS.

No conflict of interest.

169 (PB-082) Poster

Post-treatment quality of life among Sri Lankan women with breast cancer

S. Seneviratne[1], H. Wijayalathge[1], K. Peiris[1], S. Gunasekara[2], T. Wijeratne[3]. *[1]National Hospital of Sri Lanka, Department of Surgery, Colombo, Sri Lanka; [2]National Cancer Institute, National Cancer Institute, Maharagama, Sri Lanka; [3]Queens University, Division of General Internal Medicine, Ontario, Canada*

Introduction: Quality of life (QOL) of women with breast cancer is known to be affected by the disease itself and treatment. This study was conducted to assess post-treatment QOL in women with breast cancer in Sri Lanka.

Methods: QOL was assessed among a randomly selected sample of 221 women with breast cancer undergoing follow-up at Apeksha Hospital, Maharagama, Sri Lanka. QOL was assessed using validated European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 and QLQ-BR23 questionnaires.

Results: The mean age of the sample was 57.6 years (SD = 11.5) with a mean follow-up duration of 31.5 months (SD = 18.6).

Mean global health score was 62.6 (SD = 23.4). Mean scores (greater scores indicating better functioning) of physical functions, role function, emotional function, cognitive function, and social function were 70.7, 76.1, 79.8, 82.3 and 88.0, respectively. Mean scores for body image, sexual functioning, sexual enjoyment, and future perspective assessed in QLQ-BR-23 were 82.2, 14.8, 19.3 and 75.5 respectively.

Mean symptom scores (greater scores for being more symptomatic) for fatigue, nausea and vomiting, pain, dyspnoea, insomnia, appetite loss, constipation, diarrhoea, and financial difficulties were 32.9, 10.1, 33.9, 13.4, 27.9, 22.6, 16.9, 5.6 and 33.0, respectively. Side effects, breast symptoms, arm symptoms and upset by hair loss assessed in QLQ-BR-23 were 22.3, 16.7, 27.3 and 24.4, respectively.

No significant association was noted between functional or symptom scores with the type of surgery (i.e., mastectomy vs. breast conservation) in QLQ-C30 or QLQ-BR23 ($p > 0.05$) when Chi-square test was applied.

Conclusions: Global health status and functional scores of many domains seemed satisfactory showing good general QOL. Substantially poor QOL was observed in areas of sexual functioning and sexual enjoyment.

Symptom scales showed moderate to low scores. Fatigue, pain, insomnia and arm symptoms were among the most disturbing symptoms. Financial difficulties were a major contribution to the poor QOL. Supportive therapy is indicated to improve specific symptoms of concern and QOL related to sexual domains.

No conflict of interest.

170 (PB-083) Poster

Depression, anxiety and stress among women with breast cancer in Sri Lanka

S. Seneviratne[1], H. Wijayalathge[1], K. Peiris[1], S. Gunasekara[2], T. Wijeratne[3]. *[1]National Hospital of Sri Lanka, Department of Surgery, Colombo, Sri Lanka; [2]National Cancer Institute, National Cancer Institute, Maharagama, Sri Lanka; [3]Queens University, Division of General Internal Medicine, Kingston, Canada*

Background: This study was conducted to understand the prevalence of clinically significant psychological symptoms (depression, anxiety, and stress) among Sri Lankan women with Breast cancer (BRC) for the first time in Sri Lanka.

Material and method: A random sample of 200 BRC patients diagnosed between 2016 January to 2022 April and were currently being followed up at Apeksha cancer hospital Maharagama was selected. BRC patients between the age of 18 to 75 without a history of clinically diagnosed depression, anxiety, and stress were included.

Validated self-administered DASS-21 (depression, anxiety, stress scale-21) and BDI (Beck depression inventory) questionaries were used to measure depression, anxiety, and stress levels.

Results: The mean age was 55.4 years (SD = 10.8) and the mean follow-up duration was 24.4 months (SD = 21.4).

The mean BDI score was 12.78 (SD = 9.3). Mild to moderate mood disturbances were observed in 24.7% and moderate to severe depression in 18.6% according to BDI scores.

Mean scores of depression, anxiety, and stress according to DASS-21 were 7.8 (SD = 8.7), 7.4 (SD = 7.4), and 9.6 (SD = 8.9) respectively. Mild to moderate depression, anxiety and stress were seen in 22.4%,26.7%, and 30.3% respectively according to DASS-21. Severe depression was seen in 10.6%.

Table 1: level of depression, anxiety, and stress according to DASS-21

DASS-21 SCORING	DEPRESSION	ANXIETY	STRESS
NORMAL	67%	58.3%	64.9%
MILD	11.2%	9.6%	20.7%
MODERATE	11.2%	17.1%	9.6%
SEVERE	7.4%	7.0%	3.7%
EXTREMELY SEVERE	3.2%	8.0%	1.1%

Conclusion: Stress levels are comparatively higher than depression and anxiety among the selected population. The results show the importance of understanding the psycho-oncological well-being of these patients. By understanding their mental well-being and risk factors, we can provide the necessary support to improve their mental health and quality of life.

No conflict of interest.

171 (PB-084) Poster

Clinical and sociodemographic determinants of disease-specific health-related quality of life in long-term breast cancer survivors

D. Doege[1], M.S.Y. Thong[1], L. Koch-Gallenkamp[2], H. Betrram[3], A. Eberle[4], B. Holleczek[5], A. Nennecke[6], R. Pritzkuleit[7], A. Waldmann[8], S.R. Zeissig[9,10], H. Brenner[2,11,12], V. Arndt[1]. *[1]German Cancer Research Center DKFZ, Unit of Cancer Survivorship- Division of Clinical Epidemiology and Aging Research, Heidelberg, Germany; [2]German Cancer Research Center DKFZ, Division of Clinical Epidemiology and Aging Research, Heidelberg, Germany; [3]Cancer Registry of North Rhine-Westphalia, Cancer Registry of North Rhine-Westphalia, Bochum, Germany; [4]Leibniz Institute for Prevention Research and Epidemiology - BIPS, Bremen Cancer Registry, Bremen, Germany; [5]Saarland Cancer Registry, Saarland Cancer Registry, Saarbrücken, Germany; [6]Hamburg Cancer Registry, Hamburg Cancer Registry, Hamburg, Germany; [7]Cancer Registry of Schleswig-Holstein, Cancer Registry of Schleswig-Holstein, Lübeck, Germany; [8]University of Lübeck, Institute of Social Medicine and Epidemiology, Lübeck, Germany; [9]Cancer Registry of Rhineland-Palatinate, Cancer Registry of Rhineland-Palatinate, Mainz, Germany; [10]Julius Maximilian University of Würzburg, Institute of Clinical Epidemiology and Biometry ICE-B, Würzburg, Germany; [11]German Cancer Research Center DKFZ, German Cancer Consortium DKTK, Heidelberg, Germany; [12]German Cancer Research Center DKFZ, Division of Preventive Oncology, Heidelberg, Germany*

Background: It is important to monitor disease-specific health-related quality of life (HRQoL) in breast cancer (BC) survivors to identify potential unmet supportive care needs. However, previous studies were characterized by small samples of mostly short-term survivors and were limited to certain age ranges, stages and/or treatments.

Material and methods: We used data from 3045 long-term BC survivors (5–15 years post-diagnosis) recruited in a German multi-regional population-based study. We assessed disease-specific HRQoL with the EORTC QLQ-BR23, scoring from 0 to 100. Differences in functioning and symptoms according to age at survey, self-reported treatments, stage, and disease status (disease-free vs. active disease) were assessed with multiple regression. Active disease was defined as any self-report of recurrence, metastasis or second primary cancer after the index cancer.

Results: Older BC survivors reported a higher body image and a better future perspective, but lower sexual functioning. Survivors aged 30–49 years who had breast-conserving therapy or mastectomy with breast reconstruction reported a better body image compared to those who had mastectomy only. We also found differences in symptoms according to treatments in some age groups. Stage at diagnosis was not associated with HRQoL overall and in most age subgroups. Disease-free BC survivors aged 30–79 years reported a better future perspective and less systemic therapy side effects than those with active disease.

Conclusions: Several treatment-associated symptoms and functioning detriments were found 5–15 years after diagnosis. The results emphasize the need of a comprehensive, individualized survivorship care, recognizing differential needs of long-term BC survivors according to age, treatment modalities, and disease status.

No conflict of interest.

172 (PB-085) Poster

Developing an effective self-management web-based intervention using co-designed patient and multidisciplinary research: ePainQ

S. Hartup[1], L. Ashley[2], M. Briggs[3], G. Velikova[4], M. Johnson[5]. *[1]Leeds Teaching Hospitals NHS Trust, Breast Research, Leeds, United Kingdom; [2]Leeds Beckett University, Psychology, Leeds, United Kingdom; [3]University of Manchester-Manchester University NHS Foundation Trust, Clinical Academic Centre for Nurses- Midwives &AHPs, Manchester, United Kingdom; [4]University of Leeds - Leeds Teaching Hospitals NHS Trust, Patient Centered Outcomes Research/Medical Oncology, Leeds, United Kingdom; [5]Leeds Beckett University, Centre for Pain Research, Leeds, United Kingdom*

Background: Breast cancer is the most common cancer in terms of newly diagnosed cases. Surgery is the mainstay of treatment but confers comorbidities including high rates of persistent post-surgical pain. The James Lind Alliance breast surgery priority setting partnership (2022) identified the need to support patients around the time of diagnosis, during and after treatment, asking what are the best methods to individualise information and support given to patients. Web-based interventions providing real-time symptom reporting support patients and clinicians to make early and effective decisions regarding care.

This describes the process of co-design and evaluation of a web-based intervention to meet this need and improve the care experience.

Material and methods: A multi-disciplinary, co-design approach was used to develop a web-based intervention (ePainQ) for the management of post-surgical pain in breast cancer. Stakeholder needs were elicited using mixed methodology including audit, service mapping, scoping and systematic reviews, focus groups and interviews. Needs were identified by patients, healthcare professionals (HCPs) including surgeons, oncologists, nurses, pharmacists, anaesthetists, GPs and academics. The findings were used to develop ePainQ which was tested for acceptability, usability and perceived usefulness in a prospective feasibility study.

Results: The scoping review identified a need to better understand efficacy and content of web-based interventions to underpin such systems into clinical settings. The service evaluation suggested shortened length of surgical inpatient stays have contributed to poor education and support, requiring the need for novel interventions. The systematic review provided tentative evidence of efficacy of WBIs in surgery but that further evidence was required.

Stakeholders contributed significantly to the design and content of ePainQ. Patients perceived the lack of advice limited their ability to self-manage effectively. ePainQ comprised a website and symptom reporting questionnaire which generated individualised advice. Results were linked to patient electronic records in real time.

The feasibility study recruited 69 patients and established ePainQ as acceptable, used and liked by those interacting with it. Patient and HCPs perceptions were that ePainQ 'plugged the gap' that currently exists. All criteria for progression to a phase III RCT to test effectiveness were met.

Conclusion: Effective pain and symptom management involves complex decision making about medication and non-pharmacological methods, which requires excellent HCP-patient communication. Web-based interventions could provide this support with patient-centred development ensuring balanced advice with motivation to self-manage. ePainQ was able to impart reliable, timely information and individualised advice to improve symptom self-management.

No conflict of interest.

173 (PB-086) Poster

Impact of musical training in breast cancer patients with post-treatment cognitive, funtional and emotional sequelae

J. Anchuelo[1,2], A. De Juan[3], E. Gómez[4], N. Sierrasesúmaga[1], L. Alonso[3], L. Ferreira[3], G. Martín[5], J. Madera[6], A. García[6], E. Gutierrez[7], C. Vázquez[8], J. Jimeno[9], A. Yorca[2], P. Navarrete[1], P. Galdós[1], P. Prada[1]. *[1]Hospital Universitario Marqués de Valdecilla, Radiation Oncology/Clinical Oncology, Santander, Spain; [2]IDIVAL, Research, Santander, Spain; [3]Hospital Universitario Marqués de Valdecilla, Medical Oncology, Santander, Spain; [4]Asociación española contra el Cancer, Psicooncología, Santander, Spain; [5]Hospital Universitario Marqués de Valdecilla, Hematology, Santander, Spain; [6]Hospital Universitario Marqués de Valdecilla, Neurology, Santander, Spain; [7]Hospital Sierrallana, Gynaecology, Torrelavega, Spain; [8]Hospital de Laredo, Gynaecology, Laredo, Spain; [9]Hospital Universitario Marqués de Valdecilla, Breast Unit, Santander, Spain*

Background: Cognitive deterioration due to the oncological process is one of the most limiting sequelae in breast cancer patients.

The objective of this study was to evaluate an intervention based on music training to reduce cognitive, functional and emotional sequelae in treated patients with no active disease.

Material and methods: Prospective clinical trial, awarded by a Spanish public research institution, carried out by a multidisciplinary team (cognitive stimulation with musical training with a piano and computer support).

Patients were considered for the study regarding: MFE test, MoCA test, Principal informant test, serologies (HIV, LUES), vitamin B12, folic acid and TSH and cancer in remission. All patients signed informed consent.

We evaluated each patient three times (before, during and after the study) with validated neuropsychological tests.

Results: 19 patients were recruited (median age 46.5, 33–57). 15 patients with breast cancer diagnoses (controlled disease and with no active treatment, only hormono therapy was allowed). All patients were treated with surgery. 9 patients wtih chemotherapy (8 adriamicine-cyclofosfamide (AC) + paclitaxel, one patient with AC + carboplatine-abraxane®) and 13 with hormonotherapy. All patients received radiotherapy.

We found favorable statistically significant differences with respect to the median scores of the Beck depression questionnaire, the informant's test, MFE-30 and modified IDDD.

In the cognitive evaluation, improvements were observed in the inverse digits test, categorical evocation, RALVT, delayed RALVT, Stroop, C:) and TMT B.

	INITIAL		FINAL		P
MEDIAN	INTERQUARTILE RANGE	MEDIAN	INTERQUARTILE	RANGE	
Beck's depression questionnaire	19	19.75	8	14	**0,011**
Adapted Informer's test	95	9	56	48	**0,004**
Beck's Anxiety Questionnaire	22.5	17.75	18	20	0.157
MFE-30	64	40.5	22	47	**0,012**
Modified IDDD	36	26.25	34	2	**0,008**
Direct digits	6	1.5	7	2	0,207
Indirect digits	4	2	6	1	**0,002**
Categorical evocation/animals	23	6.75	27	4	0.059
Categorical evocation/p	27.5	15.5	41	16	**0.009**
Números y símbolos	33	11	41	13	**0.013**
RALVT rey auditory	41	22	55	22	**0.005**
Delayed verbal memory	8.5	3.5	13	5	**0.011**
Stroop P	94.5	21	104	43	**0.028**
Stroop C	62	13.5	69	16.5	**0.009**
Stroop PC	39.5	23.5	47	18.5	**0.013**
Inferencia	4.29	11.97	7.53	26.03	0.182
TMT A (seconds)	26	15.5	23	4	0.23
TMT B (seconds)	58.8	43.75	45	28	**0.019**

Conclusions: Implementing a method based on musical training with piano in breast cancer patients reduces emotional and functional sequelae, in addition to reducing deficit in cognitive functions such as attention or working memory.

No conflict of interest.

174 (PB-087) Poster

Digital health applications to support patients with breast cancer: Effects of two tailored, dialogue-based programs on quality of life

F. Holtdirk[1], T. Zindler[1], A. Mehnert[2], O. Bültmann[1], M. Weiss[1], J. Mayer[1], B. Meyer[1], A. Specht[1], P. Bröde[3], M. Claus[3], C. Watzl[3], F. Cheng[1]. *[1]Gaia Group, Research Department, Hamburg, Germany; [2]University Hospital of Leipzig, Department of Medical Psychology and Medical Sociology, Leipzig, Germany; [3]Technical University of Dortmund, Leibniz Research Centre IfADo, Dortmund, Germany*

Background: Breast cancer patients often experience low quality of life (QoL) during and after cancer treatment, which may influence disease progression and survival. Behavioural interventions, such as cognitive behavioural therapy (CBT), could potentially help improve QoL, but they are not always available or offered to these patients. Internet-based behavioural

interventions could bridge such treatment gaps. In this set of studies, we investigated the effects of two novel CBT-based digital interventions ("optimune" and "lancivis"). Both of these digital interventions can be accessed via the Internet and engage patients in individually tailored "dialogues," in which personally relevant CBT techniques are conveyed.

Material and methods: The effect of optimune was investigated in a two-arm, parallel-groups, pragmatic randomized controlled trial (RCT), and lancivis was examined in a single-arm pre-post naturalistic study.

The optimune RCT included 363 female breast cancer survivors (age 30–70), who had completed the active treatment phase. Participants were randomly assigned to (1) an intervention group (n = 181), in which they received care as usual (CAU) plus 12-month access to optimune immediately after randomization, or (2) a control group (n = 182), in which they received CAU and optimune after a delay of 3 months. Primary endpoints were QoL (measured with the World Health Organization Quality of Life Questionnaire [WHOQOL-BREF]), physical activity, and dietary habits at 3 months.

The lancivis study included 176 patients with a broad range of confirmed cancer diagnoses (55.11% breast cancer, age >18) and reduced QoL (assessed by Functional Assessment of Cancer Therapy - General questionnaire [FACT-G], total score ≤81). Participants received access to lancivis, and online assessments were conducted at baseline and 3 months.

Results: For the optimune RCT, the intention-to-treat (ITT) analyses revealed significant effects on QoL (d = 0.27) and dietary habits (d = 0.36), the effect on physical exercise was not significant; and for the lancivis study, a statistically significant and clinically relevant pre-post improvement in QoL was observed (d = 0.47). A clinically relevant improvement was achieved by 42.6% of the patients.

Conclusions: These results suggest the effectiveness of 2 digital therapy programs optimune and lanvicis in facilitating improvements in QoL (and for optimune, also in dietary habits) in breast cancer patients. An RCT on the effects of lancivis is currently underway, given these promising findings from the single-arm naturalistic study. Efforts to disseminate these CBT-based digital interventions more broadly may be warranted.

No conflict of interest.

175 (PB-088) Poster

Capsaicin patch 179 mg (CP) for the management of localized neuropathic pain (LNP) after breast cancer (BC) treatment

J. Anchuelo[1,2], P. Galdós[1], P. Navarrete[1], L. Alonso[3], A. Rivero[1], A. De Juan[3], V. Cañon[1], J. Albendea[1], F. Pinto[1], M. García[1], J. Jimeno[4], L. Paz[4], E. Gutierrez[5], A. Muñoz[6], I. Díaz de Cerio[1], C. Vazquez[7], F. Borniquel[8], I. Morán[1], P. Prada[1]. *[1]Hospital Universitario Marqués de Valdecilla, Radiation Oncology, Santander, Spain; [2]IDIVAL, Research, Santander, Spain; [3]Hospital Universitario Marqués de Valdecilla, Medical Oncology, Santander, Spain; [4]Hospital Universitario Marqués de Valdecilla, Breast Unit, Santander, Spain; [5]Hospital Sierrallana, Gyanecology, Torrelavega, Spain; [6]Hospital Universitario Marqués de Valdecilla, Anesthesia, Santander, Spain; [7]Hospital de Laredo, Gynaecology, Laredo, Spain; [8]Hospital Universitario Lozano Blesa, Nursing, Zaragoza, Spain*

Backround: Pain is one of the most frequent symptoms in patients with cancer, and it entails a great impact on their quality of life. It can be due to the disease itself or iatrogenic. In patients with BC, it is multifactorial, mainly influenced by surgery, radiotherapy (RT) and its complications. Neuropathic pain is still a challenge for specialists, and shows a poor response to usual analgesics.

Material and methods: Retrospective, observational study of patients with BC and NLP treated with CP in a tertiary hospital. All patients completed the DN4 and LANSS questionnaires for the diagnosis of NLD and were seen by a specialized nurse in a room with appropriate ventilation, for the application of treatment after they gave informed consent.

Adequate cleansing of the skin and a correct mapping of the affected territory (pressure, puncture, temperature...) were carried out. Subsequently, nurses placed the patch covering the delimited area, with a margin of 1 cm. After an hour, the patch was removed, cleaning the area with a gel (2 minutes), soap and water. Follow-up was done by telephone.

Results: Between August 2020 and July 2022, 35 patients with BC and DNL were treated. Median age was 54 years (32–85). 11 patients received neoadjuvant chemotherapy (CT), 9 adjuvant CT and 25 hormonal therapy. 26 were treated with lumpectomy, 2 mastectomy, 4 with oncoplastic surgery and 3 with mastectomy and reconstruction.

Regarding axillary treatment, 6 underwent lymphadenectomy and 26 sentinel lymph node biopsy. Seven had postoperative complications (hematoma/seroma).

Prior to treatment with RT, 18 presented pain at the level of the breast/axilla. 16 patients took analgesic medication for other causes/diseases. Nine patients received partial irradiation, the rest, whole breast irradiation, 40 Gy in 15 fractions (fx).

The median time between the placement of the CP and the end of the RT was 27 months (4–70). 21 of the patients had erythema/burning sensation, no more than 24 hours after placement. 5 did not complete the hour due to a burning sensation (15–50 minutes).

29 of the patients showed great improvement and 2 patients did not improve (and refused a second application). 4 patients required a second application at 3 months.

Of the 21 patients who have required only 1 application, the median time without requiring a new patch is 11 months (1–29).

The mean VAS before the first application was 8 (5–9), achieving a maximum decrease of up to 2 (0–4).

Conclusions: Treatment of NLD in BC patients with CP is safe, effective, and long-lasting in most cases.

Conflict of interest:
Other Substantive Relationships: They have paid me an the registration to another congress (Spanish Society for Radiation Oncology, SEOR).

POSTER SESSION **17 November 2022**

Systemic Treatment

176 (PB-089) Poster

Quality of life in postmenopausal breast cancer patients with localized disease who finish endocrine treatment: a prospective study

J.I. Arraras[1], J.J. Illarramendi[2], A. Manterola-Burgaleta[3], S. de la Cruz[2], U. Zarandona[3], B. Ibañez[4], E. Salgado[2], I. Visus[3], M. Barrado[3], L. Teijeira[2], M.I. Martinez[3], E. Martinez[3], R. Vera[2]. *[1]Servicio Navarro de Salud/Hospital Universitario de Navarra, Oncology Departments, Pamplona, Spain; [2]Hospital Universitario de Navarra, Medical Oncology, Pamplona, Spain; [3]Hospital Universitario de Navarra, Radiotherapeutic Oncology, Pamplona, Spain; [4]Navarrabiomed- Departamento de Salud-UPNA, Methodology, Pamplona, Spain*

Objective: In the present study we assess Quality of Life of postmenopausal breast cancer patients who finish endocrine treatment. More Quality of Life information after endocrine therapy cessation is needed.

We examine Quality of Life in patients who had received endocrine therapy for five years, Quality of Life changes after endocrine therapy cessation, and the differences between the two endocrine therapy modalities.

Methods: Participating in the study were 158 postmenopausal patients who had received Tamoxifen or Aromatase Inhibitor (AI) for five years. In some cases, endocrine therapy may have changed during these five years.

Patients completed the EORTC QLQ-C30 and QLQ-BR45 questionnaires three times over one year of follow-up. Patients ≥65 years also completed the QLQ-ELD14.

Linear mixed effect models were used to evaluate longitudinal changes in Quality of Life and differences in Quality of Life between endocrine therapy modalities.

Results: Quality of Life scores for the whole sample throughout follow-up were high (>80/100 points) in most Quality of Life areas. Moderate limitations (>30 points) occurred in the QLQ-BR45 in sexual functioning and enjoyment, future perspective, and joint symptoms. Moderate limitations also occurred in the QLQ-ELD14 in worries about others, maintaining purpose, joint stiffness, future worries, and family support. In those who finished endocrine therapy, pain was reduced during the follow-up period in both groups. Tamoxifen patients showed better Quality of Life in seven functioning, symptoms and emotional areas.

Conclusions: Our results show that postmenopausal early-stage breast cancer patients adapted well to their disease and endocrine therapy treatment. Improvements in the follow-up period appeared in one key area, i.e. pain. Differences between endocrine therapy modalities favoured Tamoxifen.

No conflict of interest.

177 (PB-090) Poster

Residual Risk of Relapse: a Systematic Review and a Consensus Project on Unmet needs for HER2-positive non Metastatic Breast Cancer Patients

F. Miglietta[1,2], P. Pronzato[3], F. Girardi[4], G. Griguolo[4], V. Guarneri[4], G. Pappagallo[5], P. Conte[6], Periplo Foundation. *[1]Department of Surgery, Oncology and Gastroenterology (DISCOG), University of Padova, Padova,*

Italy; [2]Medical Oncology 2, Istituto Oncologico Veneto IOV-IRCCS, 35128, Padova, Italy; [3]IRCCS Ospedale Policlinico San Martino- Genova- Italy, UO Oncologia Medica 2, Genoa, Italy; [4]Istituto Oncologico Veneto IOV-IRCCS, Medical Oncology 2, Padua, Italy; [5]IRCCS "Sacred Heart-Don Calabria" Hospital, School of Clinical Methodology, Negrar di Valpolicella, Italy; [6]Istituto Oncologico Veneto- IRCCS, Rete Oncologica Veneta ROV, Padua, Italy

Background: Residual Risk of Relapse (RRR) is a project aimed to define unmet needs for patients (pts) with non-metastatic HER2-positive Breast Cancer (NMHER2+BC).

Material and Methods: A systematic literature review has been carried out according to the PRISMA methodology. Randomized clinical trials conducted specifically in NMHER2+BC have been considered provided that they included drugs now approved for this setting and show subgroups analyses. The 6 studies of interest were: HERA, BCIRG 006, NSABP B-31, NCCTG N9831, APHINITY and KATHERINE. Meanwhile, the EBCTCG metanalysis has been published and its consideration has been predominant in the analysis of risk, because of the higher value of individual data based metanalysis.

Finally, a scoping review aimed to identify real world data has been conducted. A group of medical oncologists expert in breast cancer treatment have been recruited in a panel in order to reach a consensus on the issues of RRR, utilizing the "Estimate-Talk-Estimate" (Mini-Delphi) methodology (ETE).

Results: The Panel has agreed on the level of 10% or more of Relapse as clinically relevant in the context of the RRR. The Panel, basing on the results of review, has identified two subgroups of pts at high risk of Relapse:

- Pts with 4 or more positive lymph nodes in spite of treatment with chemotherapy and Trastuzumab and Pertuzumab);
- Pts presenting with Tumor in stage ≥cT3 and/or ≥cN1,not achieving a Pathological Complete Response (pCR) with neoadjuvant chemotherapy and Trastuzumab (± Pertuzumab) also if treated postoperatively with Trastuzumab Emtansine.

Through the ETE emerged there is a higher number of pts with a risk of >10%.S, the panel finally agreed on the opportunity to pay attention on the following pts populations:

- Pts with any positivity of axillary lymph nodes;
- Pts with any presentation stage but not achieving pCR;
- Pts with Tumor in stage ≥cT3 and/or ≥cN1 even in case of pCR

The Panel has considered that limitations in reimbursement may condition the fully exploitment of available agents (specifically pertuzumab as neoadjuvant, and neratinib as extended adjuvant therapy).

The Panel has also outlined that the follow-up -in the APHINITY and KATHERINE trial- may be short for what regards the HER2 positive/HR positive cases.

Through the analysis of Real World studies an estimate of patients at risk of relapse has been performed: the rate is of 3–7% using the T distribution and 20–25% using the N distribution.

Conclusions: The panel has concluded that despite the available treatment options, there is still a significant medical need for some NMHER2+BC pts. In this scenario the full exploitment of the EMA approved drugs and the participation into clinical trials could help in reducing this clinical need.

No conflict of interest.

178 (PB-091) Poster

The impact of therapeutic drug monitoring-based tamoxifen dose-reductions on endocrine side effects in patients with primary breast cancer

S. Buijs[1], L. Braal[1], E. Oomen-de Hoop[1], M. van Rosmalen[1], J. Drooger[2], Q. van Rossum-Schornagel[3], M. Vastbinder[4], S. Koolen[1,5], A. Jager[1], R. Mathijssen[1]. *[1]Erasmus MC Cancer Institute, Department of Medical Oncology, Rotterdam, Netherlands; [2]Ikazia Hospital- Breast Cancer Center South Holland South, Department of Medical Oncology, Rotterdam, Netherlands; [3]Franciscus Gasthuis & Vlietland, Department of Internal Medicine, Schiedam, Netherlands; [4]IJsselland Hospital, Department of Internal Medicine, Capelle aan den IJssel, Netherlands; [5]Erasmus University Medical Center, Department of Hospital Pharmacy, Rotterdam, Netherlands*

Background: Adjuvant treatment with tamoxifen in hormone sensitive breast cancer substantially reduces recurrence. Unfortunately, many patients experience side effects which lead to almost 50% of non-compliance. Recent studies suggest fewer side effects after dose-reduction of tamoxifen but this is hardly studied in the adjuvant setting, and was not based on endoxifen plasma concentrations before.

Methods: The TOTAM study performed therapeutic drug monitoring in women using adjuvant tamoxifen (trial register; NL6918). Patients needed to have steady-state endoxifen levels (≥3 months of therapy) to be included. The effect of halving the tamoxifen dose was investigated in patients with endoxifen levels ≥32 nM (i.e. 2 × 16 nM, the assumed efficacy threshold) who 1. experienced bothersome side effects and 2. scored ≤72 points on the endocrine subscale (ES) of the Functional Assessment of Cancer Therapy questionnaire (FACT-ES). The effect of dose-reduction on side effects was assessed after 3 months. We strived to improve the ES with >0.5 SD (at least 4 points with an estimated baseline SD of 7–8 points; i.e. clinical relevant improvement) in more than 50% of dose-reduced patients. To test this hypothesis tamoxifen dose had to be reduced in ≥13 patients (1-sided α 0.05, β 0.2). Endoxifen levels were determined before and after dose-reduction. As secondary end points the individual differences in health-related quality of life (HR-QOL) scores measured with FACT-ES were determined and compared with >0.5 of definite SD and the within-group ES and HR-QOL differences before and after dose-reduction were determined using paired sample t-test or Wilcoxon signed rank tests. To check for a time effect, analyses were repeated in the group with side effects who remained on 20 mg tamoxifen at 3 months and 6 months of tamoxifen.

Results: Twenty patients with bothersome side effects and endoxifen levels ≥32 nM were reduced in tamoxifen dose whereof 17 were evaluable for side effect analysis. The ES improved with ≥6 points (>definite 0.5 SD) in 41% (90% CI 21–65%, p = 0.038) of the patients. HR-QOL improved with ≥6 points (>0.5 SD) in 65% (90% CI 42–83%) of the patients. There was a significant and clinical relevant improvement in ES (5.7 (mean), 95% CI −0.5–11.5) and HR-QOL (8.2 (mean), 95% CI 0.9–15.4) after dose-reduction. These changes were not seen in the patients who were not dose-reduced (N = 59). In 4 out of 19 patients in whom endoxifen levels were measured after dose-reduction endoxifen dropped slightly below the conservative threshold of 16 nM (12.8, 15.5, 15.8, 15.9 nM).

Conclusions: We demonstrated that dose-reduction in case of bothersome tamoxifen-related side effects can improve endocrine symptoms in almost half of patients and strongly increase HR-QOL in two-third of these patients. Endoxifen remained above or around threshold in the majority of patients.

Conflict of interest:
Advisory Board: RM takes place in advisory boards of Servier.
Corporate-sponsored Research: RM has contracted research with Astellas, Bayer, Boehringer-Ingelheim, Cristal Therapeutics, Novartis, Pamgene, Pfizer, Roche and Servier.
Other Substantive Relationships: LB is currently an employee of Eli Lily and Company. All declarations of interest are outside the submitted work.

180 (PB-093) Poster

Imaging findings for response evaluation of ductal carcinoma in situ in breast cancer patients treated with neoadjuvant systemic therapy: a systematic review and meta-analysis

R. Ploumen[1,2], C.M. de Mooij[1,2], S. Gommers[3], K. Keymeulen[1], M. Smidt[1,2], T. van Nijnatten[2,3]. *[1]Maastricht University Medical Centre+, Department of Surgery, Maastricht, Netherlands; [2]GROW, School for Oncology & Reproduction, Maastricht, Netherlands; [3]Maastricht University Medical Centre+, Department of Radiology and Nuclear Medicine, Maastricht, Netherlands*

Background: In approximately 45% of invasive breast cancer (IBC) patients treated with neoadjuvant systemic therapy (NST), a ductal carcinoma in situ (DCIS) component is present. Recent studies suggest response of DCIS to NST. The purpose of this study was to provide a systematic review and meta-analysis of the current evidence on imaging findings on mammography, breast MRI and contrast-enhanced mammography (CEM) for response evaluation of DCIS. In addition, the effect of pathological complete response (pCR) definition on diagnostic performance was investigated.

Materials and methods: PubMed and Embase databases were searched for studies investigating NST response of IBC, including information on DCIS. Screening and data extraction were performed independently by two reviewers. Imaging findings and response evaluation of DCIS were assessed for mammography, breast MRI and CEM. A meta-analysis was conducted per imaging modality to calculate pooled sensitivity and specificity for detecting residual disease between pCR definition no residual invasive disease (ypT0/is) and no residual invasive or in situ disease (ypT0).

Results: Thirty studies were included. Eleven mammography studies show that calcifications are related to DCIS, but can persist on post-NST mammography despite complete response of DCIS. In 19 breast MRI studies, an average of 57% of residual DCIS showed enhancement. A meta-analysis of 16 breast MRI studies confirmed higher pooled sensitivity (0.86 versus 0.82) and lower pooled specificity (0.61 versus 0.68) for detection of residual disease when DCIS is considered pCR (ypT0/is). The 2 included

CEM studies suggest the potential benefit of simultaneous evaluation of calcifications and enhancement to detect residual DCIS.

Conclusions: Current imaging findings are insufficiently accurate for response evaluation of DCIS to NST. The definition of pCR affects diagnostic performance of breast MRI.

No conflict of interest.

181 (PB-094) Poster

Concordance between manual pathologist scoring and an Artificial Intelligence Deep Learning-based algorithm for Ki-67 immunohistochemical scoring in breast cancer

N. M. Badr[1,2], T. W. Ramsing[3], A. Overgaard[3], J. Thagaard[3], D. Omanovic[3], I. Miligy[4], K. Hunter[5], D. Kearns[4], A. Shaaban[2,4]. *[1]Faculty of Medicine-Menoufia University, Department of Pathology, Shebin El-Kom, Egypt; [2]University of Birmingham, Cancer and Genomic Sciences, Birmingham, United Kingdom; [3]Visiopharm A/S, Agern Alle 24, 2970 Hørsholm, Denmark; [4]Queen Elizabeth Hospital Birmingham, Department of Pathology, Birmingham, United Kingdom; [5]University of Birmingham, Birmingham Tissue Analytics, Birmingham, United Kingdom*

Background: Ki-67 is an established prognostic marker in estrogen receptor (ER)+ breast cancer (BC). Different cut-offs for Ki-67 positivity have been proposed including the 20% cut off for the FDA approved adjuvant abemaciclib. Manual assessment of Ki-67 immunohistochemistry (IHC) is, however, challenging and time consuming limiting its implementation in routine practice especially in view of the pathology workforce shortage. Accurate automated systems for Ki-67 scoring are therefore urgently required. Artificial intelligence (AI) is a promising tool for fast integrated Ki-67 analysis. Validation and comparison with pathologists' scoring, as the gold standard, are needed prior to implementation.

Methods: In a retrospective design, sections from 66 primary BC cases diagnosed at a large UK tertiary referral hospital were stained with Ki-67 MIB monoclonal antibody as per the standard diagnostic protocol. Two pathologists, including a specialist breast pathologist, manually evaluated Ki-67 IHC staining by global eyeballing and hotspot assessment following the International Ki67 in Breast Cancer Working Group guidelines. The same slides were analysed using a Visiopharm automated scoring with a deep learning-based Ki-67, BC, AI APP, research use only (Visiopharm, Denmark), which outputs global and hotspot proliferation indexes in an automated approach without manual input. We compared the manual and automated scoring methods using the continuous output score with Spearman correlation analysis and assessed the agreement between both methods with the clinically relevant cut-offs of 14% and 20%.

Results: Patients' age ranged from 28–86 years with a mean of 60.6 years. Most carcinomas (n = 46, 70%) were of ductal no special type, grade 2 (n = 38, 57.5%) and ER+ (n = 53, 80.3%). An excellent correlation was observed between the Ki-67 AI APP and pathologist manual scores, when comparing both the global (r_s = 0.95, p < 0.0001) and hotspot scores (r_s = 0.95, p < 0.0001). For the global score, the Ki-67 AI APP generally scored lower than the pathologist, whereas the hotspot scores were similar.

For the global score, accuracy for the 14% cut-off was 0.93 (sensitivity = 0.91; specificity 0.97) and for the 20% cut-off the accuracy was 0.88 (sensitivity = 0.82; specificity 0.94). For the hotspot score, accuracy for the 14% cut-off was 0.84 (sensitivity = 0.92; specificity 0.65) and for the 20% cut-off the accuracy was 0.91 (sensitivity = 0.96; specificity 0.81).

Conclusions: The study shows a reassuring strong correlation between an AI-based fully automated algorithm and pathologists' scoring of Ki-67 IHC sections of BC. No data from the site was used for the development of the APP and therefore the cohort served as an external test set. Testing of the APP in a hospital setting is currently underway to confirm its value and impact on Ki-67 reporting turnaround times.

Conflict of interest:
Other Substantive Relationships: This is a collaborative work between a UK academic institution and Visiopharm, Denmark testing a deep learning-based Ki-67, breast cancer, AI APP currently for research use only.

182 (PB-095) Poster

Genomic signature to guide adjuvant chemotherapy treatment decisions for early breast cancer patients in France: a cost-effectiveness analysis

E. Curtit[1], M. Bellanger[2], V. Nerich[3], D. Hequet[4], J.S. Frenel[5], O. Cristeau[6], R. Rouzier[7]. *[1]Université de Bourgogne-Franche-Comté- Centre Hospitalier Universitaire, Medical Oncology, Besançon, France; [2]Ecole des Hautes Etudes en Santé Publique, Public Health, Rennes, France; [3]Université de Bourgogne-Franche-Comté- Centre Hospitalier Universitaire- Pharmacy, Besançon, France; [4]Clinique Saint Jean de Dieu, Medical Oncology, Paris, France; [5]Institut de Cancérologie de l'Ouest, Medical Oncology, Saint Herblain, France; [6]Creativ-Ceutical, Modelling, Paris, France; [7]Centre François Baclesse, Medical Oncology, Caen, France*

Background: The indication for adjuvant chemotherapy (CT) in ER+/HER2-negative (HER2-neg) early breast cancer (BC) remains controversial. Oncotype Dx® (ODx) is a genomic signature developed and validated as a predictive tool of adjuvant CT benefits in these patients. No economic evaluation of this signature was recently conducted in France.

The aim of this study was to assess the cost-effectiveness of ODx compared to standard of care (SoC; clinico-pathological risk appraisal only), in French women with early ER+/HER2-neg BC at high risk of distant recurrence using the most recent evidences.

Material and methods: We developed a cost-effectiveness model based on the French context estimating costs and health outcomes accumulated over a lifetime horizon with both strategies.

The study population consisted of women with ER+/HER2-neg early BC, node-negative (N0) stratified by age (<50 years and ≥50 years, 41.2%, 16.7%, respectively) and node-positive with 1 to 3 invaded nodes (N1) aged 50 years or older (42.1%). We derived the population distribution from French administrative data.

The model was designed with a decision-tree followed by a five health states Markov structure: recurrence-free, distant recurrence, acute myeloid leukaemia (AML), chronic heart failure (CHF) and death. Probabilities were derived from TAILORx and RxPONDER studies, respectively for N0 and N1 patients.

We conducted our analysis from a collective perspective and discounted future costs and health outcomes at a rate of 2.5% for the first 30 years of the time horizon, then at 1.5%, as recommended by the French health technology assessment body.

The perspective included direct medical costs, transportations, and CT related sick leave costs. Costs were valued in € 2022 from the French real-life study OPTISOINS for the first year following surgery and the most recent open data from the French national health insurance.

Model outcomes included differences in costs and quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios (ICERs). Uncertainty was assessed with deterministic sensitivity analysis and scenario analyses were carried out using Clalit registry data.

Results: With 55.2% CT avoided, ODx was associated with lower costs than SoC (-3,524€) and higher QALYs (+0.34 QALYs). Therefore, looking at ICER, ODx was dominant. Additionally, ODx would decrease the number of patients with AML and CHF by 54.9% and 11.7% respectively. Sensitivity analyses confirmed the results.

Conclusions: In French practice, ODx was shown to be a dominant strategy compared to SoC.

The generalisation of the test to the studied population could optimise treatment prescriptions by avoiding unnecessary CT and life-threatening adverse events without survival loss for patients. The use of ODx signature would improve patient's care and result in cost savings for the national health insurance.

Conflict of interest:
Advisory Board: Experts (EC, MB, VN, DH, J-SF and RR) received fees from Creativ-Ceutical for their participation in the scientific committee. EC was part of advisory boards for AstraZeneca and Novartis VN provided her expertise for Takeda.
Other Substantive Relationships: Creativ-Ceutical was paid by Exact Sciences for carrying out this modelling project.

183 (PB-096) Poster

Abemaciclib for treating patients with HR+, HER2- advanced/metastatic breast cancer in Spain: a real-world study

I. Blancas[1], W. Fakhouri[2], A. Molero[3], S. Díaz-Cerezo[3], J.M. Haro[4], L.H. Faris[5], R. Sánchez-Bayona[6]. *[1]Hospital Universitario San Cecilio, Oncology, Granada, Spain; [2]Eli Lilly and Company, Rheumatology, Indiana, USA; [3]Eli Lilly and Company, Health Outcomes & Real World Evidence, Indiana, USA; [4]Institut de Recerca Sant Joan de Déu, Medicine, Barcelona, Spain; [5]Institut de Recerca Sant Joan de Déu, Psychology, Barcelona, Spain; [6]Hospital Universitario 12 de Octubre, Oncology, Madrid, Spain*

Background: We report the demographic and clinical characteristics, treatment patterns, and treatment outcomes of female patients with hormone receptor positive (HR+), human epidermal growth factor 2 negative (HER2-) advanced/metastatic breast cancer (ABC/MBC) treated with abemaciclib in a real-world setting in Spain.

Material and methods: A multicenter retrospective observational chart review was undertaken of women in Spain with HR+, HER2- ABC/MBC treated with abemaciclib-containing regimens (any line). Descriptive statistics were used to summarize patient characteristics, treatment, and outcomes (tumor response and progression free survival; PFS) in the study period from 08/2018 to 05/2022 in patients with ≥3 months' follow-up data post-abemaciclib initiation (regardless of abemaciclib discontinuation). Kaplan-Meier methods were used to estimate PFS with 95% confidence intervals (CIs).

Results: 175 adult women from nine institutions across Spain were included. Median patient age at abemaciclib initiation was 58 years (interquartile range: 50–68 years). The Eastern Cooperative Oncology Group performance status score at the start of treatment was 0 for 71 of 150 patients with these data (47.3%), 1 for 68 (45.3%) and 2 for 11 (7.3%). Eighty-six percent of 172 patients with data had an abemaciclib starting dose of 150 mg, 12.8% a dose of 100 mg or 75 mg, and 1.2% another dose; treatment was twice daily for all but one patient. Mean treatment duration was 11.4 months (standard deviation; SD 8.1 months). Abemaciclib was 1st, 2nd, 3rd, 4th, or 5th line treatment for 52.6%, 18.9%, 15.4%, 5.7% and 5.7% of all patients (n = 175), respectively. The most frequent hormone therapies given in combination with abemaciclib treatment (across all lines of therapy) were aromatase inhibitors (AIs; anastrozole, exemestane or letrozole [54%]) and fulvestrant (38%). Tumor response was available for 124 patients, 42.8% of whom had complete or partial response (Table). Median PFS was 21.5 months across all patients (95% CI 15.8 months–not reached), with 1-year PFS of 70.3%. Median PFS ranged from 26.0 months (95% CI 15.8–not reached) in the 1st-line setting to 15.3 months (95% CI 8.7–not reached) in the 3rd- or subsequent-line setting.

Conclusions: Abemaciclib, used in different lines of treatment and mostly in combination with AIs or fulvestrant, in a real-world setting in patients with HR+, HER2- ABC/MBC in Spain, was associated with a median PFS of 21.5 months and complete or partial response of 42.8%. These data are comparable to data from clinical trials supporting the benefit of abemaciclib for patients with HR+, HER2- ABC/MBC.

Table: Treatment responses while receiving abemaciclib (N = 124)

Best treatment response	% of patients
Complete response	8.1
Partial response	34.7
Stable disease	41.9
Progressive disease	15.3

Conflict of interest:
Ownership:
Walid Fakhouri, Alberto Molero, and Silvia Díaz-Cerezo are employees and shareholders of Eli Lilly and Company Ltd.
Corporate-sponsored Research:
Isabel Blancas has received grants and research support to the institution from AstraZeneca, Eli Lilly, Roche and Agendia, and honoraria (advisory) from AstraZeneca, Roche, Novartis, Eisai, Celgene, Pfizer, Eli Lilly, Pierre-Fabre, Bristol-Myers Squibb, Daiichi Sankyo, Grünenthal, Seagen and Veracyte.
Other Substantive Relationships: Josep Maria Haro and Lydia Hanaa Faris are employees of Fundació Sant Joan de Déu who conducted the field work for this research under contract to Eli Lilly and Company Ltd. Rodrigo Sánchez-Bayona has received honoraria from Eli Lilly (advisory, speaker), Novartis (advisory, speaker), AstraZeneca (speaker), Seagen (speaker), Clovis Oncology (speaker), and GSK (advisory, speaker).

184 (PB-097) Poster

A Phase III, Randomized, Multicenter, Double-blind Study to Compare Efficacy and Safety of EG12014 (EirGenix Trastuzumab) with Herceptin® as Neoadjuvant Treatment in Combination with Anthracycline/Paclitaxel-based Systemic Therapy in Patients with HER2-positive Early Breast Cancer

J. Henneberg[1], B. Grohmann-Izay[1], C.S. Huang[2], C. Schulze[1], N. Llinas[3], D. Giorgi[4], A. Misra[5], D. Pominchuk[6], A. Prokhorof[7], B. Rapoport[8], V. Semiglazov[9], L.M. Tseng[10], E. Yanez Ruiz[11], S. Loibl[12]. *[1]EirGenix GmbH, EirGenix, Munich, Germany; [2]National Taiwan University Hospital, National Taiwan University Hospital, Taipei, Taiwan; [3]Clinic Life Foundation, Clinic Life Foundation, Medellin, Colombia; [4]LTD, S.Khechinashvili University Hospital, Tbilisi, Georgia; [5]King George's Medical University, Department of Endocrine Surgery- Shatabdi Phase II, Uttar Pradesh, India; [6]Medical Center VERUM, Limited Liability Company, Kyiv, Ukraine; [7]Oncology Center, Minsk City Clinical, Minsk, Belarus; [8]Centre of Rosebank, Medical Oncology, Johannesburg, South Africa; [9]Oncology, National Medical Research Centre, St Petersburg, Russia; [10]Taipai Veteran General Hospital, Taipai, Taiwan; [11]Limited Medical Research Society, Temuco, Chile; [12]GBG Forschungs GmbH, Neu-Isenburg, Germany*

Background: Amplification and/or overexpression of HER2 in breast cancer (BC) patients is associated with aggressive disease and poor prognosis. Herceptin® (trastuzumab), a monoclonal antibody targeting HER2 in combination with anthracycline- and taxane-based neoadjuvant treatment in women with HER2-positive BC has resulted in improvements in pathological complete response (pCR), event-free survival (EFS) and overall survival (OS). This study was designed to compare efficacy (pCR) and safety between the originator Herceptin® and the proposed trastuzumab biosimilar EG12014. The study was conducted at 89 study sites in 10 countries in Europe, South America, South Africa, and Asia.

Methods: *Neoadjuvant phase*: 807 patients were randomized (1:1) into 2 arms receiving epirubicin (90 mg/m^2) and cyclophosphamide (600 mg/m^2) every 3 weeks for 4 cycles, followed by EG12014 (arm 1) or Herceptin (arm 2) (both at loading dose: 8 mg/kg and maintenance dose: 6 mg/kg) and paclitaxel (175 mg/m^2) every 3 weeks for 4 cycles. Subsequently, the patients underwent surgery, and primary endpoint (pCR [ypT0/is ypN0]) was assessed. *Adjuvant phase*: After surgery, the patients received EG12014 or Herceptin with a switch to EG12014 of half of the patients previously receiving Herceptin through a 2nd randomization (both at loading dose: 8 mg/kg and maintenance dose: 6 mg/kg) to complete 12 months of overall trastuzumab treatment, followed by a 20-week safety follow-up after the final dose of the study drug.

Results: Study population: the mean age was 50 years, the majority of the enrolled patients were Caucasians with tumor stage II, estrogen receptor positive and progesterone receptor negative. The median time from date of first diagnosis was 0.5 months. Primary endpoint pCR (ypT0/is ypN0) was reached with relative risk ratio (RR) for the full analysis set: 0.992 (90% CI 0.880 to 1.118) between the 2 treatment arms. Secondary pCR endpoints (defined as ypT0 ypN0 and ypT0/is) were also reached, with RR between the treatment arms: 0.917 and 0.992, respectively. Objective clinical response prior to surgery was similar for the 2 treatment arms: 83.8% and 83.6%, respectively. EFS, OS, safety endpoints (e.g., adverse events, serious adverse events, and deaths), and toxicity assessments, supported similarity between EG12014 and Herceptin. Immunogenicity of EG12014 and Herceptin was low and comparable during the entire study.

Conclusion: This study demonstrated that EG12014, a proposed trastuzumab biosimilar, matches reference trastuzumab in terms of efficacy, safety, PK and immunogenicity.

No conflict of interest.

185 (PB-098) Poster

Cost-effectiveness of abemaciclib in early breast cancer patients: one size fits all or tailoring to patients' needs

L. Jongbloed[1], H.M. Blommestein[2], H. van Schoubroeck[2], J.W.M. Martens[1], S.M. Wilting[1], C.A. Uyl-de Groot[2], A. Jager[1]. *[1]Erasmus MC Cancer Institute, Medical Oncology, Rotterdam, Netherlands; [2]Erasmus University Rotterdam, Erasmus School of Health Policy and Management, Rotterdam, Netherlands*

Background: The addition of two years of abemaciclib treatment to standard adjuvant endocrine therapy in all patients with high risk ER+, HER2- early-breast cancer (EBC) has been approved by the European Medicines Agency (EMA). Implementation of this treatment in this setting creates additional burden on patients and will increase health care costs. Pre-selection of high-risk patients using detection of minimal residual disease (MRD) by determination of circulating tumor DNA (ctDNA) in plasma during follow-up is highly promising and could select the patients who will benefit from abemaciclib treatment. Here we investigate the cost-effectiveness of the addition of two year abemaciclib to endocrine therapy in all high risk ER+, HER2- EBC patients (new standard) and in MRD-guided high risk patients only.

Material and methods: Two semi-Markov models were developed to evaluate the cost-effectiveness of adding two years of abemaciclib to standard adjuvant endocrine therapy: 1) 'abemaciclib all' and 2) 'MRD-guided abemaciclib' using MRD-guidance. A lifetime horizon was implemented and the analysis was conducted from a societal perspective. Data of the MonarchE trial were used to model the invasive disease free survival (iDFS). Since iDFS and overall survival (OS) data of abemaciclib were currently limited, abemaciclib effects were extrapolated using three different effect scenarios using a most unfavorable, an intermediate and a most favorable scenario regarding long-term effects.

Results: The addition of abemaciclib prolonged iDFS slightly, resulting in 0.04 additional life years (LYs) and 0.04 additional quality adjusted life years (QALYs) compared to standard treatment, but also increased costs, resulting in an ICER of €1 551 876 /QALY for the unfavorable effect scenario. Even in the most favorable effect scenario in which 1.30 LYs and 1.09 QALYs were gained the addition of abemaciclib did not lead to an acceptable ICER (€62 935/QALY) when using a willingness-to-pay threshold of €50.000/QALY. The 'MRD-guided abemaciclib' strategy resulted in an increase in LYs and QALYs (1.18, 1.69, 1.95 LYs and 1.26, 1.67, 1.88 QALYs for respectively the unfavorable, intermediate and the favorable effect scenarios) and a decrease in costs (-€33 619; -€28 936 and -€25 455 for respectively the unfavorable, intermediate and favorable abemaciclib effect scenarios) compared to standard endocrine treatment.

Conclusion: The addition of two years of abemaciclib to adjuvant endocrine therapy in all high risk ER+, HER2- EBC patients is not cost-effective. However, using MRD detection to justify the addition of abemaciclib treatment dominates standard treatment in this cost effectiveness analysis. Further evaluation of MRD detection in EBC by means of prospective clinical trials assessing the clinical utility is highly recommended and promising in terms of cost-effectivity.

No conflict of interest.

186 (PB-099) Poster

PRO Hair Safe Study: The patient's perspective on the effects of scalp cooling on hair preservation

C. Brunner[1], D. Egle[1], M. Ritter[1], R. Kofler[1], B. Pichler[1], M. Sztankay[2], L. Schneitter[1], J. Giesinger[2], S. Abdel Azim[1], A. Oberguggenberger[2].
[1]Department of Gynecology and Obstetrics, Medical University of Innsbruck, Innsbruck, Austria; [2]Department of Psychiatry, Psychotherapy, Psychosomatics and Medical Psychology, Psychiatry II, Medical University of Innsbruck, Innsbruck, Austria

Background: Scalp cooling (SC) has been reported to be an effective and safe intervention to prevent chemotherapy-induced alopecia in breast cancer patients (BCP) - a distressing side-effect highly relevant for a patient's quality of life (QOL). However, data on the patient's perspective on effectiveness and applicability of SC in a clinical routine setting are scarce. In this comparative study, we aimed at a longitudinal assessment of patient-reported outcome (PRO) data on the effect of SC on hair preservation and its effect on QOL when applied in clinical routine.

Material and methods: In this non-randomized intervention study, all BCPs treated at the Department of Gynecology and Obstetrics, Innsbruck, receiving taxane or antracycline- based chemotherapy known to be associated with alopecia, were allocated either to the intervention group receiving SC or to the control group (no SC) based on patient preference. All patients completed PRO measures on hair preservation (PRO-CTCAE hair loss items, EORTC Item Library items on hair loss), QOL measures (EORTC QLQ-C30 and -BR23) and the Body Image Scale (BIS). Outcomes were assessed at chemotherapy start (baseline), mid-chemotherapy, last chemotherapy cycle, 3 months follow-up and 6–9 months follow-up.

Results: Overall, we included 113 patients, 75 patients underwent SC (mean age = 51.3 years, 52.7% premenopausal), 38 patients standard care (mean age = 55.6 years, 39.5% premenopausal). A total of 53 patients (70.7%) discontinued SC, with 39 patients (73.5%) stating alopecia as the primary reason. On average, BCP stayed on treatment with the cooling cap for 40.2% of the duration of their chemotherapy (SD 25.3%). In an intention-to-treat analysis, we found no difference between the SC- and the control group with regard to their self-reported hair preservation ($p = 0.831$) across the observation period. Overall QOL ($p = 0.602$), emotional functioning ($p = 0.737$), social functioning ($p = 0.635$) and body image ($p = 0.463$) did not differ between groups.

Conclusions: The majority of BCPs terminated SC treatment early as a result of alopecia. No beneficial effects for QOL including the emotional or social domain as well as body image were observed. This might result from the early discontinuation of SC. In this study sample, the efficacy and tolerability of SC applied in a clinical routine setting proved to be limited. The further determination and up-front definition of criteria prognostic for effectiveness of SC may be helpful to identify patient subgroups that may experience a treatment benefit.

No conflict of interest.

187 (PB-100) Poster

Breast cancer after In Vitro Fecundation: Ovary response and prognostic factors

M. Izquierdo[1]. *[1]Institut Universitari Dexeus, Gynaecology, Barcelona, Spain*

Aims: The follicular response is related with estradiol level. Study in breast cancer patients after In Vitro Fecundation (IVF) if ovarian response or number of IVF cycles affects the prognostic factors.

Methods: Patients with breast cancer who underwent IVF are studied the prognostic factors (Ki67, HER2, estrogen receptor (ER), progesterone receptor (PR), oncogene p53, histologic grade) in relation to the ovary response and number of IVF cycles.

Results: 73 patients with breast cancer after IVF are studied. They performed 135 cycles of IVF, 36 (49'3%) with 1 IVF and 37 (50'7%) with more than one IVF. Hyper response was present in at least one IVF in 24 (32.9%) patients and there was no hyper response in any IVF in 49 (67.1%) patients. The prognostic factors were: Ki 67> 20 in 31'91% (15/47) Ki 67 ≤20 in 68'08% (32/47), HER2 + 31'94% (23/72) HER2- 68'05% (49/72), p53 + 45'09% (23/51), p53-54'90% (28/51), HG II-III 56'36% (31/55), HG I 43'63% (24/55), RE + 87'5% (63/72), RE- 12'5% (9/72), RP + 76'38% (55/72), RP-23'61% (17/72). None of prognostic factors varied with the ovary response (hyper response in at least one IVF cycle, normal response, normal or low response) ($p = ns$). The only prognostic factor that varied with the IVF number was p53 +. Patients with p53 + (23/51), 7 (30'43%) has one IVF, and 16 (69'53%) have more one IVF ($p < 0'05$).

Conclusion: The ovary response not affect Ki67, HER2, estrogen receptor, progesterone receptor, p53, and histologic grade. Patients with more than one IVF, p53 is more frequent.

No conflict of interest.

189 (PB-102) Poster

Ovarian function suppression in early & locally advanced breast cancer: an audit of practice

N. Roberts[1], S. Kumar[2], S. Scanlon[3]. *[1]Leeds Cancer Centre- St James's University Hospital, Radiotherapy, Leeds, United Kingdom; [2]St James's University Hospital, Clinical Oncology, Leeds, United Kingdom; [3]St James's University Hospital, Pharmacy, Leeds, United Kingdom*

Background: Tamoxifen has been considered the mainstay of adjuvant endocrine therapy for premenopausal women diagnosed with early and locally advanced breast cancer for many years. However, a long standing debate over the potential benefit of ovarian function suppression (OFS) has resulted in recently updated national clinical guidelines. Trials investigating the use of OFS plus either tamoxifen or an aromatase inhibitor (AI) demonstrated improved disease free survival (DFS) and lower recurrence rates in those having had the combination of OFS and hormone therapy. This DFS benefit can be optimised with diligent patient selection and with AI over tamoxifen, although the potential side effect profile of this combination treatment should not be underestimated. Careful patient selection, holistic management and liaison with primary care providers should all be taken into account by the Cancer Centre when developing this treatment pathway. It is from this background that an audit of local practice in a large regional Cancer Centre was undertaken.

Material and methods: A retrospective audit was carried out using the patient management systems; Patient Pathway Manager & Chemocare (CIS Oncology®). All patients diagnosed with early and locally advanced breast cancer under the age of 55 and who had commenced OFS with a gonadotrophin releasing hormone (GnRH) analogue between January 1st–December 31st 2021 were included. Data points included: type of GnRH analogue and dose regimen, type of endocrine treatment and time to switch if commenced on tamoxifen, hormone blood monitoring, bone health management and GP compliance with OFS administration.

Results: 80% of those commencing OFS during this period also had chemotherapy (n = 39), 65% of whom had adjuvant and 35% neo adjuvant chemotherapy. The average patient age was 45 (32–53 yrs). A third of patients (33%) switched from 3 weekly goserelin to 3 monthly leuprorelin with average times to switch of 3 months. The majority of patients started on tamoxifen prior to OFS (67%) and of this group 77% switched to an AI + OFS with average times to switch of 33 weeks (4–163 wks). Just over half the population (58%) were also treated with bisphosphonates but only 28% had bone density scans with a similar proportion having hormone blood assays checked (36%). Less than one fifth of patients (18%) had OFS administered in the primary care setting.

Conclusion: Compliance against national guidance has been demonstrated with regards to patient selection for OFS but further work is advised to improve the monitoring and holistic care of these patients, including liaison with primary care. An updated clinical protocol should provide more consistency in the local approach to patients requiring OFS.

No conflict of interest.

190 (PB-103) Poster

Quality of Life of breast cancer patients with COVID-19 disease

J. I. Arraras[1], J. J. Illarramendi[2], A. Manterola-Burgaleta[3], S. de la Cruz[2], U. Zarandona[4], B. Ibañez[5], E. Salgado[2], I. Visus[3], M. Barrado[3], L. Teijeira[2], E. Martinez[3], R. Vera[2]. *[1]Servicio Navarro de Salud/Complejo Hospitalario de Navarra, Oncology Departments, Pamplona, Spain; [2]Hospital Universitario de Navarra, Medical Oncology, Pamplona, Spain; [3]Hospital Universitario de Navarra, Radiotherapeutic Oncology, Pamplona, Spain; [4]Hospital Universitario de Navarra, Oncology Departments, Pamplona, Spain; [5]Navarrabiomed- Departamento de Salud-UPNA, Methodology, Pamplona, Spain*

Background: To study the Quality of Life (QOL) of breast cancer patients who are also diagnosed of COVID-19 disease.

Materials and methods: 260 patients diagnosed of breast cancer (90.8% I–III stages) and COVID 19 disease (85% light/moderate) were included between February and September 2021. Patients were receiving treatment for their cancer (mainly hormonotherapy) or were in the follow-up period.

Patients were organised in three groups based on the date of their COVID-19 diagnoses: first wave (between March and May of 2020, first group), second wave (June–December 2020 second group); third wave (January–September 2021, third group).

Patients completed the QLQ-C30, QLQ-BR45, and the Oslo COVID-19 QLQ-PW80 questionnaires twice over four months. Patients ≥65 years also completed the QLQ-ELD14.

First group completed the QOL questionnaires 10 months after the COVID-19 diagnoses; second group, after seven months; third group two weeks after the diagnoses.

QOL of the patients from the three COVID-19 groups were compared and changes in the QOL of the whole sample (non-parametric tests),

Univariate logistic regression analyses were performed to identify which patients' characteristics were related to low global QOL scale, and also, to changes in this scale between the two assessments.

Results: Moderate limitations in the global sample (>30 points) appeared in Global QOL (QLQ-C30), sexual scales (QLQ-BR45); three QLQ-ELD14, and in thirteen symptoms and emotional COVID-19 areas.

Differences among the three COVID-19 groups appeared in two QLQ-C30 and four QLQ-BR45 areas, with no differences in the QLQ-ELD14 or Oslo COVID-19 questionnaire.

Low global QOL in the Oslo COVID-19 were related to thirteen QLQ-C30 areas, twelve QLQ-BR45, six Oslo COVID-19 areas, cancer treatment, and toxicity.

The best multivariate model to explain global QoL was a combination of emotional functioning and fatigue (QLQ-C30), endocrine treatment (QLQ-BR45), gastrointestinal (COVID-19 questionnaire) having received targeted therapy (R2 = 0.393).

QOL improvements between the two assessments appeared in six QLQ-C30, four QLQ-BR45 and twenty (worsening in two) COVID-19 questionnaire areas.

Changes in the global QOL scale were related to eleven QLQ-C30 areas, five QLQ-BR45 areas, twenty-three Oslo COVID-19 areas, cancer treatment and toxicity.

The best multivariate models to explain changes in the global QoL was a combination of physical and emotional functioning (QLQ-C30), malaise and sore eyes (COVID-19 questionnaire) (R2 = 0.575).

Conclusions: Breast cancer with COVID-19 patients adapted well to their disease. Few differences between waves based groups could be related to second and third waves being vaccinated, having less COVID restrictions and more positive COVID information. More limitations in COVID than cancer related areas could be associated to most patients receiving just endocrine treatment.

No conflict of interest.

191 (PB-104) Poster

Anthracycline versus no anthracycline neoadjuvant therapy for HER2 breast cancer: real world evidence

I. Soares De Pinho[1], D. Simão[2], M. Roldán Galanares[3], R. Lopes-Brás[1], V. Patel[1], M. Esperança-Martins[1], L. Gonçalves[1], L. Alves[4], I. Fernandes[5], S. Gamez Casado[6], S. Artacho Criado[7], J. Baena Cañada[6], J. Costa[8], A.S. Fernandes[8], R. Teixeira de Sousa[1], L. Costa[1], P. Luz[9]. *[1]Centro Hospitalar Universitário Lisboa Norte, Medical Oncology, Lisbon, Portugal; [2]Centro Hospitalar Lisboa Central, Medical Oncology, Lisbon, Portugal; [3]Hospital Virgen de Valme, Phamarcy Department, Seville, Spain; [4]Centro Hospitalar Universitário do Algarve, Medical Oncology, Faro, Portugal; [5]Centro Hospitalar Barreiro-Montijo, Medical Oncology, Montijo, Portugal; [6]Hospital Universitário Puerta del Mar, Medical Oncology, Cádiz, Spain; [7]Hospital Virgen de Valme, Pharmacy Department, Seville, Spain, [8]Universidade Lusófona, CBIOS - Universidade Lusófona's Research Center for Biosciences & Health Technologies, Lisbon, Portugal; [9]Universidadade Lusófona, CBIOS - Universidade Lusófona's Research Center for Biosciences & Health Technologies, Lisbon, Portugal*

Background: Several neoadjuvant de-escalation strategies have been investigated in pursuit of reducing the use of chemotherapy, particularly the use of anthracyclines, in HER2+ early breast cancer (EBC).The main objective of our study was to evaluate pathological complete response (pCR) and event-free survival (EFS) of an anthracycline-free and anthracycline-containing regimen with dual HER2 blockade in patients with HER2+ EBC from an Iberic real-world database.

Methods: We conducted a retrospective multicentric analysis of patients with HER2+ EBC diagnosed and treated in 6 Portuguese and Spanish centers, between January 2018 and December 2021. Our study included patients treated with neoadjuvant therapy with double anti-HER2 blockade with trastuzumab and pertuzumab and chemotherapy followed by surgery. Patients who progressed during neoadjuvant therapy were excluded. The following parameters were analyzed: initial stage, chemotherapy regimen, expression of hormone receptors, Ki-67, type of surgery, type of adjuvant therapy, distant recurrence, and pathological response. Associations between categorical outcome measures, such as stage and pCR were evaluated by chi2 or Fisher's exact test. The survival analyses were performed for EFS according to the Kaplan-Meyer method.

Results: A total of 287 women were included, with 227 in the anthracycline group (mean age of 52.8) and 60 in the non-anthracycline group - carboplatin, docetaxel and double blockade (TCHP) (mean age of 51). A pCR was recorded in 132 (58.1%) patients in the anthracycline group and in 32 (53.3%) in the non-anthracycline group (p-value = 0.79). The median follow-up for all patients was 3.1 years. A total of 16 EFS events (7.1%) occurred in the anthracycline group and 4 EFS events (6.7%) occurred in the non-anthracycline group (p-value = 0.69). The results were independent of tumor size, hormone receptor and nodal status.

Conclusion: Our pilot study adds new evidence about the efficacy of TCHP compared to an anthracycline-based regimen for HER2+ EBC. Both groups had young patients with similar median ages and few comorbidities, setting up an important rationale in favor of de-escalation with TCHP in this subgroup, thus avoiding the anthracycline-related toxicities.

No conflict of interest.

192 (PB-105) Poster

Neoadjuvant treatment for breast cancer patients in a Venezuelan breast center. Pathologic complete response: is it worth it?

V. Acosta-Marin[1], V. Acosta Freites[1], A. Ramirez[2], C. E. Marin[2], A. Contreras[1], I. Longobardi[3], O. Martinez[3], V. Maldonado[3], M. Acosta[2], J. Perez Fuentes[3]. *[1]Ceclines, Breast Surgery, Caracas, Venezuela; [2]Ceclines, Breast Pathology, Caracas, Venezuela; [3]Ceclines, Breast Radiology, Caracas, Venezuela*

Background: Neoadjuvant therapy (NAT) increases the probability of breast-conserving surgery, establishing NAT as a viable option in patients who are not eligible for breast-conserving surgery when first diagnosed. NAT also allows an increase in rates of complete pathological response (pCR). We analyzed two groups of patients with breast cancer treated with NAT, one group showed pCRversus a second group that showed partial pathological response (pPR). We determined clinicopathological characteristics associated with pCR, as well as its role as a prognostic factor for disease-free survival (DFS).

Materials and Methods: A prospective study of 371 patients with breast cancer receiving NAT. According to the pathological response, pCR and pPR, two subgroups of 83 patients each, who met all eligibility criteria, were

established. The two groups were homogeneous with respect to age and tumor extension before NAT. Patients were mainly treated with sequential of anthracyclines and taxanes (8 cycles) (87.9%, 146/166).

Results: Tumors Triple negative (TN) (OR: 2.6; p = 0.01), with HER2 overexpression (OR = 2.2; p = 0.043), with estrogen receptor (ER) negative expression (ER-negative) (OR = 2.3; p = 0.008), with progesterone receptor (PR) negative expression (PgR-negative) (OR = 4.3; p = 0), and with Ki67 expression (OR = 2.2; p = 0,032) were identified as predictive factors of pCR after NAT. Axillary lymph node (ALN) negativizationrate was nearly 50% after NAT [(pCR: 49.4% (41/83), pPR: 42.2% (35/83)]. DFS was better in the pCR group than in the pPR group (5-year DFS: 87.4% vs. 81.6%), although not statistically significant (p = 0.309). In patients with ER negative expression, pCR was predictive of better 5-year DFS (pCR: 91.3%, pPR: 78.1%; p = 0.044).

Conclusion: Patients with ER- TN and HER2 positive tumors who receive TNA have a high probability of obtaining pCR, which translates into a greater possibility of conservative surgery. ALN negativization rate after NAT was close to 50%, this implies the possibility of omitting ALN dissection in these patients. Patients with ER-negative breast cancer who could achieve pCR could attain higher DFS after NAC.

No conflict of interest.

194 (PB-107) Poster

Retrospective thorough analysis of regional lymph node recurrence in breast cancer patients (REASON Trial)

A. Liapi[1], A. Stravodimou[1], V. Aedo[1], W. Jeanneret Sozzi[2], J. Prior[3], M. Nicod Lalonde[3], I. Treboux[4], L. Lelievre[4], L. Rossier[5], A. Goupil[5], M. Bergomi[5], J.P. Rivals[5], J.P. Brouland[6], E. Curtit[7], J.Y. Meuwly[8], K. Zaman[1]. *[1]CHUV, Oncology, Lausanne, Switzerland; [2]CHUV, Radiotherapy, Lausanne, Switzerland; [3]CHUV, Nuclear Medicine and Molecular Imaging, Lausanne, Switzerland; [4]CHUV, Service of Gynecology, Lausanne, Switzerland; [5]CHUV, Center of Experimental Therapeutics Department of Oncology, Lausanne, Switzerland; [6]CHUV, Institute of Pathology, Lausanne, Switzerland; [7]CHUV, Oncology, Besancon, France; [8]CHUV, Radiology, Lausanne, Switzerland*

Background: De-escalation of axillary surgery reduces morbidities without altering survival. Despite of a relatively high rate of residual disease in the axilla after sentinel lymph node (SLN) procedure, the risk of regional lymph node recurrence (RLNR)is very low, due probably to adjuvant radiotherapy and systemic treatments. The characteristics of the small percentage of patients with RLNR are not well known. We performed a retrospective thorough analysis of patients with RLNR.

Materials and Methods: Individual characteristics, radiological and surgical files, histopathology and adjuvant treatments were reviewed in patients presenting a RLNR as 1st event between 2009 and 2020. MammaPrint & BluePrint analyses (MB) was performed in available primary cancer tissues.

Results: Forty patients with a median age of 51 were analyzed. Median follow up was 8.7 years (range 0.6–34). Most of the patients (65%) had no special type (NST) breast cancer (BC). Majority (72.5%) had primary hormone receptor positive-HER2 negative (HR+/HER2-) BC, 12.5% triple negative (TN), 2.5% HR+/HER2+, 2.5% HR-/HER2+, 7.5% ductal carcinoma in situ and 2.5% unknown. The median size of the primary tumor was 1.8 cm (range 0.3–7.0) and 57% had no initial lymph node (LN) involvement. Lymphovascular invasion was present in 27.5% of patients. 45% had primary SLN procedureand 53% axillary LN dissection (ALND); 1 patient had no axillary surgery. Half of the patients received neo-/adjuvant chemotherapy, 62.5% adjuvant endocrine therapy and 67.5% adjuvant radiotherapy (50% only in breast). Among patients treated with neoadjuvant chemotherapy, all had residual disease after surgery. Recurrence was detected by clinical examination in half of patients. Sixty three percent had only RLNR; 38% had concomitant distant metastases. Among irradiated patients, 63% had some relapse in the radiation field.

MammaPrint & BluePrint classified 70% of the analyzed cancers as low-risk luminal A (82% in HR+/HER2- subgroup), 15% high-risk luminal B, 10% high-risk basal type (TNBC), and 5% high-risk HER2 type (HER2+).

Conclusions: In this study with long follow up, most of the patients with regional lymph node recurrence had HR+/HER2- disease and were classified as low-risk luminal A by genomic signature. There is currently a lack of information regarding the small number of patients, who present with regional lymph node recurrence. The goal of the trial was to investigate a small sample of patients, but very thoroughly in order to generate hypothesis. Complete results will be presented.

No conflict of interest.

195 (PB-108) Poster

Clinical benefit and tolerability of CDK4/6 inhibitors in the treatment of breast cancer advanced in the geriatric population – real life data from a Hospital Center

M. Costa[1], A.C. Valente[1], M. Freitas[1], C. Almeida[1], C. Teixeira[1], M. Gonçalves[1], N. Tavares[1], D. Almeida[1], C. Caeiro[1], I. Augusto[1], I. Sousa[1], M. Barbosa[1]. *[1]Centro Hospitalar e Universitario São João - Porto, Medical Oncology, Porto, Portugal*

Background: Several phase 3 clinical trials have demonstrated the benefit of CDK4/6 inhibitors (iCDK4/6) associated with endocrine therapy on survival outcomes, with a manageable toxicity profile. Despite the high prevalence of breast cancer patients over 65 years, this population is usually under-represented in trials, which leads to an extrapolation of data from younger and healthier patients. However, the geriatric population is heterogeneous in terms of comorbidities and performance status. The aim of this study is to evaluate the clinical benefit (CB) and toxicities of ribociclib (R) and palbociclib (P) in the elderly population of our Center.

Materials and methods: Retrospective study of clinical data of patients aged ≥65 years, treated with iCDK4/6≥1 month, between February 2017 and July 2020. Time to treatment failure (TTF) was defined as the period of time between the start of treatment and its discontinuation. CB was defined as stable disease in a period ≥6 months. Statistical analysis was performed with SPSS® software (V27).

Results: All patients were female, with a median age of 69.5 y [65–85] at initiation of treatment with iCDK4/6. Half had between 65 and 69 y (n = 11), 45% between 70 and 79 (n = 10) and one ≥80 years old. All patients had ECOG PS 0–1, except the oldest. Of patients aged 65–69 y, 36.4% (n = 4) had advanced disease at diagnosis. The median time from diagnosis to distant metastasis was 78 months [0–208]. Regarding the location of metastases, 45.5% (n = 5) only had bone disease. iCDK4/6 was proposed in 1st line in 63.6% (n = 7) of patients. Of patients aged 70–79, 20% (n = 2) had advanced disease at diagnosis. The median time from diagnosis to distant metastasis was 74.5 months [0–258], with half of the patients having metastasis of ≥ one organ. iCDK4/6 was proposed in the 1st line in half of the patients. Of the patients treated with iCDK4/6 in 1st line(n = 13), 53.8% had multiple metastases, in 92.3% ≥3 sites. About 54% of patients were treated with R. The most common G3 toxicity was hematological (neutropenia in 30.8%) and cardiac (15.4%), requiring dose reduction in 30.8%. The CB rate (CBR) was 92.3%. TTF md was 16 months [4–34]. There was disease progression in 38.5%. In patients treated with iCDK4/6 in 2nd line (n = 9), all were treated with P. The most frequent G3 toxicity was hematological (neutropenia in 66.7%) which is why there was a 1st reduction dose by 33.3% and a 2nd reduction by 22.2%. CBR was 66.7%. The TTF median was 7 months [3–35]. There was disease progression in 88.9%.

Conclusion: Although the sample size does not allow definitive conclusions, the results of BC and toxicity profile in the geriatric population treated with iCDK4/6 are in agreement with the literature. It is necessary to include this population in future studies, with an optimized geriatric evaluation, for better treatment of these patients.

No conflict of interest.

196 (PB-109) Poster

The relationship among bowel FDG-PET uptake, pathological complete response, and eating habits in breast cancer patients undergoing neoadjuvant chemotherapy

P. Tiberio[1], L. Antunovic[2], M. Gaudio[1], A. Viganò[3], M. Pastore[1], C. Miggiano[1], F. Jacobs[1], C. Benvenuti[1], E. Farina[3], A. Chiti[2], A. Santoro[1], R. De Sanctis[1]. *[1]IRCCS Humanitas Research Hospital, Medical Oncology and Hematology Unit, Rozzano MI, Italy; [2]IRCCS Humanitas Research Hospital, Nuclear Medicine Unit, Rozzano MI, Italy; [3]IRCCS Fondazione Don Carlo Gnocchi, Neurology Unit, Milano MI, Italy*

Background: In the last decades, the impact of patients' lifestyle behaviors, including eating and exercise habits, on breast cancer (BC) management have been deeply explored. Several studies have demonstrated that healthy diet and exercise might improve overall survival after BC diagnosis and patients' quality of life, by reducing chemotherapy side effects, limiting comorbidities, and enhancing therapeutic efficacy. Besides their impact on BC management, dietary components have also been found to have profound effects on inflammation. In this study, we investigated whether pro-inflammatory behaviors could correlate with bowel FDG uptake and the latter, in turn, with pathological Complete Response (pCR) to standard neoadjuvant chemotherapy (NAC).

Material and methods: The study included stage I-III BC patients undergoing NAC at IRCCS Humanitas Research Hospital in Rozzano, Italy.

At baseline, patients fulfilled a survey concerning eating and lifestyle habits. In the absence of data on the effects of individual foods, the frequency of consumption of specific food items were aggregated for their inflammatory properties: alcohol and spirits as "pro-inflammatory drinks," red and cured meats as "pro-inflammatory foods," fruits and vegetables as "anti-inflammatory foods." Before NAC, women performed a whole-body staging [18]F-FDG PET/CT scan. On PET/CT images, two regions of interest were designed on the area of highest uptake in the rectum-sigmoid district and in the colon, respectively, and radiotracer mean standardized uptake values (SUV_{mean}) were extracted.

Results: Data were completely recorded for 82 women (median age: 48 years), of whom 29 were diagnosed with triple-negative BC, 45 with a HER2-positive BC, 7 presented a Luminal B tumor, and 1 had a Luminal A BC. At baseline, most women showed a correct intake of alcohol and spirits, fruits and vegetables, and cereals, and exercised regularly. However, we noticed that only 3.7% of patients followed a healthy diet before BC diagnosis. We found positive correlations between colon SUV_{mean} and pro-inflammatory drinks ($r = +0.33$, $p = 0.01$) and foods ($r = +0.25$, $p = 0.04$) and a significant negative correlation between rectum SUV_{mean} and anti-inflammatory foods ($r = -0.23$, $p = 0.04$). No statistically significant associations emerged with BMI, smoke, or exercise. Furthermore, colon SUV_{mean} was significantly lower in patients with pCR compared with non pCR ($p = 0.02$).

Conclusions: Our study showed, for the first time, that bowel FDG uptake was affected by patients' anti- and pro-inflammatory eating habits and that colon SUV_{mean} correlated with pCR, thus proposing a new role for colon inflammation, and potentially for unhealthy foods and drinks causing it, in NAC response. Furthermore, our findings suggested that PET scan could be an easy instrument for identifying patients presenting unhealthy lifestyle habits.

No conflict of interest.

197 (PB-110) Poster

Agreement on risk assessment and chemotherapy recommendations among breast cancer specialists: a survey within the MINDACT cohort

J. Lopes Cardozo[1], S. Veira[1], L. Ait Hassou[2], A. Uwimana[2], I. Božović-Spasojević[3], J. Bogaerts[2], F. Cardoso[4], M. Schmidt[5], E. Rutgers[1], C. Poncet[2], C. Drukker[1]. *[1]Netherlands Cancer Institute, Surgical Oncology, Amsterdam, Netherlands; [2]European Organisation for Research and Treatment of Cancer Headquarters, Statistical Department, Brussels, Belgium; [3]Institute for Oncology and Radiology of Serbia, Medical Oncology, Belgrade, Serbia; [4]Champalimaud Clinical Center/Champalimaud Foundation, Breast Unit, Lisbon, Portugal; [5]Netherlands Cancer Institute, Department of Molecular Pathology and Division of Psychosocial Research and Epidemiology, Amsterdam, Netherlands*

Background: Tailored recommendation for adjuvant chemotherapy in breast cancer patients is of great importance. Gene signatures, such as the 70-gene signature (MammaPrint®), have shown to provide additional prognostic information and are used to refine risk estimations and adjuvant chemotherapy recommendations for individual patients, and have been incorporated in international guidelines. This survey assessed agreement among oncologists on risk assessment and chemotherapy recommendation, the impact of adding the 70-gene signature result to clinical-pathological characteristics, and changes over time.

Material and methods: A survey consisting of 37 discordant patient cases (e.g., clinical high/genomic low risk or clinical low/genomic high risk) from the EORTC 10041/BIG 3-04 MINDACT study (T1-3N0-1M0) was sent to European breast cancer specialists from 13 countries for assessment of risk (high or low) and chemotherapy administration (yes or no). In 2015 the survey was sent twice (survey 1 and 2), several weeks apart, and in 2021 a third time (survey 3). Only the second and third surveys included the 70-gene signature result. Overall agreement among breast cancer specialists and agreement with the 70-gene signature were measured as concordance, and compared between the three surveys. Furthermore, the overall number of high or low risk assessments and chemotherapy recommendations were evaluated.

Results: 82 breast cancer specialists participated in the first survey, and 41 participated in all three surveys. Overall agreement between respondents on risk assessment decreased slightly between survey 1 and 2 (from 66.5% to 60%), but increased again in survey 3 (66.9%). Over time there was an increase in agreement with the 70-gene signature result on risk assessment, from 37% in survey 1 to 60% in survey 2, further increasing to 71% in survey 3. With information available indicating a low risk 70-gene signature (n = 25 cases), 20% of risk assessments changed from high to low and 19% of recommendations changed from yes to no chemotherapy in survey 2 versus 1, further increasing with 18% and 21%, respectively, in survey 3 versus 2. For all cases, the number of high risk assessments decreased from 64% in survey 1 to 34% in survey 3, and the chemotherapy recommendations decreased from 67% in survey 1 to 26% in survey 3.

Conclusion: There is a variability in risk assessment of early-stage breast cancer patients among breast cancer specialists. The 70-gene signature provided valuable information, resulting in fewer patients being assessed as high risk and fewer recommendations for chemotherapy, increasing over time. Importantly, this study also shows the impact that large clinical trials investigating the use of gene signatures have had on the international care for early-stage breast cancer patients.

Conflict of interest:
Other Substantive Relationships: Ivana Božović-Spasojević has received personal fees from Pfizer, Novartis, AstraZeneca, Gilead and Roche, outside the submitted work. Fatima Cardoso has received personal fees from Amgen, Astellas/Medivation, AstraZeneca, Celgene, Daiichi-Sankyo, Debiopharm, Eisai, GE Oncology, Genentech, GlaxoSmithKline, Iqvia, Macrogenics, Medscape, Merck-Sharp, Merus BV, Mylan, Mundipharma, Novartis, Pfizer, Pierre-Fabre, prIME Oncology, Roche, Sanofi, Samsung Bioepis, Seagen, Teva and Touchime outside the submitted work. Emiel Rutgers has received personal fees from Guerbet outside the submitted work. The other authors report no conflicts of interest.

198 (PB-111) Poster

Prediction of axillary complete pathological response after neoadyuvant treatment in breast cancer cN1 patients

J. Jimeno Fraile[1], S. Hermana[2], S. Sánchez[3], J. Anchuelo[4], C. Hinojo[5], F. Hernanz[1]. *[1]Hospital Universitario Marqués de Valdecilla, General Surgery, Breast Unit, Santander, Spain; [2]Hospital Universitario Marqués de Valdecilla, Pathology, Santander, Spain; [3]Hospital Universitaro Marqués de Valdecilla, Radiology, Santander, Spain; [4]Hospital Universitaro Marqués de Valdecilla, Radiation Oncology, Santander, Spain; [5]Hospital Universitario Marqués de Valdecilla, Medical Oncology, Santander, Spain*

Introduction: Primary systemic therapy (PST) treatment may allow to decrease tumor breast size and clinic axillary disease. This situation favors the "rescue" of surgical patients with axillary node disease. There are immunological parameters, including Tumour-infiltrating lymphocytes (TILs), which have been identified as predictors of the radiological and pathological response to neoadjuvant chemotherapy in the breast cancer patients. We are interested in assessing the relationship between Tumour-infiltrating lymphocytes (TILs) and pathological response in axillary disease breast cancer patients after PST.

Aim: To assess the relationship between pretreatment peritumoral lymphocytic infiltration (TILs) in biopsy specimens and axillary response in "N1" patients after PST.

Methods: We performed an observational study of breast cancer patients operated after neoadyuvant treatment (NT) in a University Breast Unit from January 2018 to December 2019. TILs were estimated in corebiopsy specimen before PST and after the treatment in breast surgical specimens. The tumor response to the NT was also assessed by Miller and Payne (M&P) system and the residual cancer burden (RCB). MRI and ultrasonography were performed before and after NT to assess the breast and axillary radiological response to the treatment.

Results: In this period 105 patients were included. The average age was 49 (32–68) year old. The most frequent histological type was invasive ductal carcinoma (83 and the distribution of intrinsic phenotypes was luminal A 11.4%, luminal B 60%, HER-2 12.4% and triple negative 16.2%. The average ki 67 was 38.8 ± 22. TILs were observed in 74.2% of patients with an average infiltrative lymphocytes percentage of 30.3 ± 28%. 48 patients of the 105 patients treated with TSP were "cN1" at the cancer diagnosis time. In the other 57 "initially" cN0 patients, it was found 9 axillary positive patients, in the sentinel node biopsy performed after the PST. Finally, 57 (48 + 9) patients with axillary disease were included in the study. 29.8% patients showed axillary complete pathological response (axCPR) after PST (ypN0). ypN0 patients associated a higher percentage of TILs (40.3 ± vs 22.3 ± 1; $p = 0.032$), a higher ki67 (46.2 ± 5 vs 28.7 ± 2; $p = 0.001$) and a higher nuclear grade (2.47 ± 0.2 vs 2.03 ± 0.1; $p = 0.068$). Furthermore, the number of positive lymph nodes, after PST, was inversely correlated to the percentage of TILs ($R = -0.272$; $p = 0.047$) and the ki67 ($R = -0.356$; $p = 0.007$). In the

multivariate study, we observed only nuclear grade as a clear independent factor of yp0 (B = 0.187 p = 0.044).

Conclusions: TILs, ki67 and nuclear grade in the initial biopsy could help us to predict the axillary response to PST. The use of these "biomarkers" can help select patients who benefit from PST in order to reduce the aggressiveness of surgery.

No conflict of interest.

199 (PB-112) Poster

A systematic review on management of breast cancer patients during the covid 19 pandemic: To assess if there was a clinical delay in treatment and patient perception on delayed treatment. Literature review of the current covid 19 management guidelines for breast cancer patients

R.N. Shah[1], B. Patel[1]. [1]*Queen Mary University, Surgical Skills, London, United Kingdom*

Background: During the peak of Covid19 pandemic, healthcare organizations had to restructure to ensure management of covid 19 patients as well as cancer patients. The aim of this study is to assess if there were delays in the management of breast cancer patients in the United States of America, the United Kingdom and the Europe and did the patient report that there were delays in their treatment during the pandemic compared to pre pandemic.

Methods: A systematic review was conducted in 2021 after an extensive search in PubMed (Medline) and Ovid (Cochrane) databases. The articles were extracted in the first stage based on titles and in the second stage they were extracted by titles and abstracts. 21 articles were assessed out of which 10 articles were further evaluated via Quads-2 tool quality assessment tool. The inclusion criteria were that the studies that were published between March 2020–March 2021, and were conducted in the United States of America, the United Kingdom and Europe. They were written in English language.

Results: 744 articles were found, out of which 723 studies were excluded during screening and remaining 21 studies were selected for full text reading out of which 11 studies didn't meet the criteria and finally 10 studies were selected for quality assessment. Breast outpatient clinics services saw an increase in delays during the covid 19 pandemic followed by breast imaging whilst breast cancer surgeries were not affected significantly. Similarly, the patients reported maximum delays in breast cancer outpatient follow up followed by breast imaging and breast cancer surgery.

Conclusion: The services affected with the most delays were in coherence with the guidelines set out by the American Society of breast Surgeons, The European society for Medical Oncology and the European consortium.

No conflict of interest.

200 (PB-113) Poster

Systemic therapies post progression on CDK4/6 inhibitors in patients with oestrogen receptor positive metastatic breast cancer: Real world data from Guy's Cancer Centre

C. Gousis[1], K. Michoglou[1], H. Lowe[1], M. Akay[1], M. Kapiris[1], V. Angelis[1]. [1]*Guy's and St Thomas' NHS Foundation Trust, Medical Oncology Department, London, United Kingdom*

Background: There is no prospective data to guide treatment strategies after progression on cyclin dependent kinases 4 and 6 inhibitors (CDK4/6i) in oestrogen receptor positive (ER+) metastatic breast cancer. Here we present a single-institution experience to assess prescribing patterns and outcomes with subsequent therapies post CDK4/6i progression.

Material and methods: We identified 248 eligible patients with ER+ HER2 negative metastatic breast cancer who received CDK4/6i between February 1st, 2020, and February 1st, 2021. Hormone partner to CDK4/6i was an aromatase inhibitor in 161 patients (cohort A) and fulvestrant in 87 patients (cohort B). At the time of analysis (February 2022), 75/161 (47%) cohort A and 60/87 (69%) cohort B patients had discontinued treatment with CDK4/6i, mainly due to disease progression. Epidemiological and clinical data were collected. Statistical analysis was performed using the software GraphPad Prism v9.3.1.

Results: In cohort A, 56 patients received a subsequent treatment line, of which, 33 (59%) chemotherapy (18 capecitabine, 14 paclitaxel, 1 other), 18 (32%) endocrine therapy (11 fulvestrant, 6 exemestane/everolimus, 1 tamoxifen) and 5 (9%) other treatment (4 clinical trial, 1 rucaparib).

Respectively in cohort B, 42 patients received subsequent treatment, of which, 33 (79%) chemotherapy (18 capecitabine, 10 paclitaxel, 5 other), 8 (19%) endocrine therapy (6 exemestane/everolimus, 1 letrozole, 1 bicalutamide) and 1 patient rucaparib.

16 patients in total in both cohorts were in visceral crisis at the time of initiation of the post-CDK4/6i treatment and 88% of them received chemotherapy. Only 6 patients in both cohorts underwent next generation sequencing, but in half of them a *PIK3CA* mutation was identified.

In cohort A, the progression free survival of the post-CDK4/6i treatment (PFS) was 23.4 weeks in the chemotherapy vs 15 weeks in the endocrine therapy group (HR 0.67, 95% CI:0.31–1.43, p = 0.3). Patients on subsequent endocrine therapy with fulvestrant had longer PFS compared to exemestane/everolimus (19.9 vs 11 weeks respectively, HR 0.26, 95% CI:0.06–1.13, p = 0.073), although this observation is based on a small sample and not statistically significant.

In cohort B, PFS was 32.3 vs 14.6 weeks in the chemotherapy and endocrine therapy groups respectively (HR 0.22, 95% CI:0.06–0.74, p = 0.015).

Conclusions: Treatment strategies beyond CDK4/6i progression remain challenging, as historical trials did not incorporate previous CDK4/6i exposure. In the absence of prospective data, real world data can be valuable and further research on biomarkers (e.g., *PIK3CA*, *ESR1*) and responses to subsequent treatments is needed to refine treatment sequencing.

No conflict of interest.

201 (PB-114) Poster

Evaluation of neoadjuvant chemotherapy response in breast cancer: radiological and pathological concordance

M. Martínez Pairés[1], J. Astor Alcaine[1], E. Baeza Lorente[1], A. Recoder Fernández[1], M.F. Gil Molano[1], E. Pessarrodona Zaragoza[1], F. Ojeda Pérez[1]. [1]*Fundació Privada Hospital Asil de Granollers, Obstetrics and Gynecology, Barcelona, Spain*

Background: MRI is the most used test for the evaluation of neoadjuvant chemotherapy (NAC) response in breast cancer. However, sometimes the pathological analysis of surgical piece revels discordance with pre-surgical radiological result. The purpose of the study was to evaluate radiological-pathological concordance of NAC response and to define which factors are associated with this coincident result.

Material and methods: A retrospective observational study was conducted including 233 patients with breast cancer who received NAC treatment in a regional hospital between September 2009 and January 2022. Breast MRI before surgery was practiced to all cases included in order to evaluate chemotherapy response. Data collected over this period were retrieved from the breast pathology department's computerized database. Multivariate logistic regression was performed including the variables associated significantly to higher radiological-pathological concordance in univariate analysis.

Results: Of 233 patients, 161(69.1%) present a concordant result in pre-surgical MRI and surgical piece biopsy while 72 (30.9%) were non coincident: 52 (72.2%) false negatives and 20 (27.8%) false positives. Univariate analysis showed statistically higher concordance in patients with palpable tumor ($p = 0.007$), HER 2 and triple negative phenotypes ($p = 0.032$) and partial response result on pre-surgical RMI ($p < 0.001$). However, non-statistical differences were detected on age, tumor diameter, microcalcifications, axillary affection and cellular type. On multivariate analysis, radiological and pathological response concordance was statistically related to palpable tumor ($p = 0.003$) and HER2 ($p = 0.008$) or triple negative ($p = 0.001$) phenotypes.

Conclusions: MRI presented a high positive predictive value (82%) while negative predictive value seems to be more limited (56%), so in cases with pathological detection on MRI the concordance with biopsy of surgical piece will be probably higher. Also tumor palpation and phenotype are factors associated to higher concordance of both results as is well known in literature.

	MRI-AP concordance N = 161 (69.1%)	MRI-AP discordance N = 72 (30.9%)	p-value
Age (years)	52 ± 12.3	49 ± 10.8	0.123
Palpable			
No	18 (50%)	18 (50%)	
Yes	145 (73.6%)	52 (26.4%)	
Diameter (mm)	41.6 ± 23.21	41.93 ± 20.08	0.916
Microcalcifications			0.504
No	149 (69.95%)	64 (30.05%)	
Yes	12 (60%)	8 (40%)	
Axilla			0.478
Non malignant	65 (72.22%)	25 (27.78%)	
Malignant	95 (66.43%)	48 (33.57%)	
Phenotype			0.032
Luminal	78 (65.55%)	41 (34.45%)	
Luminal/HER2 pos	20 (55.55%)	16 (44.45%)	
HER2	18 (81.81%)	4 (18.19%)	
Triple negative	45 (80.36%)	11 (19.64%)	
Biopsy			0.647
CDI	145 (70.05%)	62 (29.95%)	
CLI	12 (63.16%)	7 (36.84%)	
Others	4 (57.14%)	3 (42.86%)	
MRI response to NAC			1.186e-05
Complete response	67 (55.83%)	53 (44.17%)	
Major partial response	37 (72.55%)	14 (27.45%)	
Minor partial response	52 (92.86%)	4 (7.14%)	
Local progression	5 (83.33%)	1 (16.67%)	

No conflict of interest.

202 (PB-115) Poster

Pathologic complete response in triple negative breast cancer - A single Portuguese center experience

A. Pina[1], P. Freitas[1], C. Cardoso[1], E. Gouveia[1], F. Vaz[1], I. Miguel[1], M. Santos[1], M.B. Mira[1], M.T. Alexandre[1], A. Moreira[1], M. Brito[1], H. Nunes[1]. [1]*Instituto Português de Oncologia de Lisboa Francisco Gentil, Medical Oncology, Lisbon, Portugal*

Background: Triple-negative breast cancer (TNBC) accounts for 15–20% of all invasive breast cancer (BC) and is frequently associated with adverse prognosis. Pathologic complete response (pCR) has been associated with improved survival in early-stage BC. While anthracycline and taxane-based neoadjuvant chemotherapy (NCT) remains the standard of care, addition of platinum seems to increase pCR rate, with no significant difference in survival. Objectives of this study are to review clinical decisions regarding NCT and to evaluate the pCR rate in TNBC patients (pts) in our centre.

Material and methods: A retrospective study was performed on pts diagnosed with stage I–III TNBC who received neoadjuvant therapy followed by surgery at our centre between Jun/2019 and Oct/2021. TNBC was defined as ER/PR 0–10%, and HER2 negative (0) or low (1+ and 2+ with negative SISH). PCR was defined as disappearance of all invasive cancer in the breast and axilla. Data was collected from the medical records.

Results: A total of 109 female pts was included in this study. Median age at diagnosis was 52.2 years (21–87). For pts consenting on genetic testing (n = 77, 84%), 16% were confirmed as hereditary BC (*BRCA1* in 12, other in 5). Histological subtype was invasive ductal carcinoma in 95%, tumour grade was 3 in 84%, median Ki67 was 80% (17–95); 5% of pts had ER/PR low expression and 22% HER2 low. Clinical stage was T3/4 in 24% and N+ in 51%. NCT was platinum based in 57% (n = 62), anthracycline followed by taxane (EC/AC + paclitaxel/docetaxel) in 28% (n = 31), dose dense (AC + paclitaxel) in 8% (n = 9), and other regimens in 7% (n = 7). Adverse events led to dose reduction in 13% and discontinuation of NCT in 17%. Breast conservative surgery was performed in 54% and sentinel lymph node biopsy in 44%. PCR was achieved in 54% of the pts. Platinum based NCT led to pCR in 65% (n = 40), dose dense in 67% (n = 6), and no dose dense in 43% (n = 13). In hereditary BC, the pCR was 65% (platinum based NCT in 71%). Baseline characteristics of platinum based and anthracycline + taxane NCT pts are similar, although the first group had more grade 3 and more N0 cancers. In a median follow-up of 18.6 months (5.3–35.0), 8 pts had disease recurrence, and 4 pts died of BC.

Conclusions: In this cohort, overall pCR rate after NCT in TNBC was 54%. The pCR rate after neoadjuvant platinum-based regimens is particularly high, reaching 65%, comparing with those of important neoadjuvant trials. This is possibly explained by high prevalence of grade 3/high Ki67 tumours. This cohort will be interesting to follow, as a high event-free survival is expected after a longer follow up is achieved. This is particularly interesting because pCR rate could not be validated as a surrogate endpoint for survival, although it is increasingly used as a primary endpoint in neoadjuvant clinical trials.

No conflict of interest.

203 (PB-116) Poster

Axillary Nodal Management in the setting of Neoadjuvant Chemotherapy

S. Pérez Cartón[1,2], S. Fernández-González[2], C. Falo[3], M.J. Pla Farnós[2], M. Campos Delgado[2], J. Ponce Sebastia[4], M. Bajen[5], P. Anna[6], M. Laplana[7], R. Ortega[8], A. García-Tejedor[2]. [1]*Hub.Idibell, Gynecology, Barcelona, Spain;* [2]*Hospital Universitari Bellvitge, Gynecology, Barcelona, Spain;* [3]*Hospital Universitari Bellvitge, Medical Oncology, Barcelona, Spain;* [4]*Hospital Universitari Barcelona, Gynecology, Barcelona, Spain;* [5]*Hospital Universitari Bellvitge, Nuclear Medicine, Barcelona, Spain;* [6]*Hospital Universitari Bellvitge, Pathological Anatomy, Barcelona, Spain;* [7]*Hospital Universitari Bellvitge, Radiotherapy and Oncology, Barcelona, Spain;* [8]*Hospital Universitari Barcelona, Radiology, Barcelona, Spain*

Background: In patients with breast cancer candidates to neoadjuvant therapy (NAT), the timing to perform sentinel lymphatic node biopsy (SLNB) remains controversial. The aim of this study was to compare the advantages and disadvantages of SLNB performed before and after NAT regarding the delay in starting NAT, the identification rate of SLNB and the reduction in axillary lymphadenectomies.

Material and methods: A total of 310 patients diagnosed of T1-T4 N0 breast cancer candidates to NAT were included. We compared the outcomes of two groups: [A] 107 patients whom SLNB was performed before NAT from December 2006 to April 2014; [B] 203 patients with SLNB performed after NAT from May 2014 to May 2018. Survival in both groups were compared after a propensity score matching.

Results: SLNB after NAT decreases the delay in starting NAT from 24 to 17 days of median ($p < 0.001$). The identification rate was 100% when SLNB was performed before NAT and 99% after NAT. The SNLB was positive in 45/107 (42.1%) before NAT (29% macrometastases and 13.1% micrometastasis) versus 25/203 (12.3%) after NAT (5.42% macrometastases and 6.9% micrometastasis); therefore, lymphadenectomy rate was significantly higher in the SLNB before NAT group: 29.9% vs 7.39%.

After a median follow up of 4 years and balancing according to the propensity score, Overall Survival (OS) at 4 years was 88% (95% CI 82–95) before NAT vs 99% (95% CI 97–100%), $p = 0.002$.

Conclusions: SLNB after NAT reduces significantly the lymphadenectomy's rate and allows to start earlier the systemic treatment, and may even improve survival. SLNB after NAT seems to have more advantages for the patients than before NAT.

No conflict of interest.

204 (PB-117) Poster

North East England outcomes in node positive breast cancer from the real world use of 21 gene recurrence score testing

A. Gault[1], J. Veeratterpillay[2], W. Taylor[2]. [1]*Northern Centre for Cancer Care, Medical Oncology, Newcastle Upon Tyne, United Kingdom;* [2]*Northern Centre for Cancer Care, Clinical Oncology, Newcastle Upon Tyne, United Kingdom*

Background: 21 gene recurrence score (RS) testing is routinely used to help decide management of early, hormone receptor positive, HER2 negative breast cancer without nodal spread. Recent data from Kalinsky et al (2021) has suggested value from RS testing in the management of patients with node positive disease, permitting postmenopausal women with stage N1 disease and a RS 0–25 to avoid toxic adjuvant chemotherapy safely.

Methods: We recently studied the real-world outcomes from adjuvant treatment of unselected breast cancer patients in those who had a genomic RS performed by the oncology team based at the Northern Centre for Cancer Care (NCCC) in Newcastle Upon Tyne from 2011–2021. We were keen to investigate the benefit to those patients in our cohort with nodal spread to determine the benefit for our patients of RS testing in this setting, by reviewing the outcomes, via disease free and overall survival for those who have completed 3 years or more of follow up. The data from 974 recurrence

scores in the entire cohort were reviewed to determine patients who had undergone testing with node positive disease.

Results: Two hundred and thirty two tumours were node positive (80 had micrometastases, 148 had 1–3 nodes, and 4 tumours had more than 4 involved nodes). These tumours came from 225 patients; of these 83 were pre/peri-menopausal patients (37%). 53 patients had a low RS, 130 intermediate and 42 a high RS. Mean RS was 19 (range 4–43).

From the postmenopausal patients, there were no local recurrences, and 4 distant recurrences; half of these had a high RS and half an intermediate RS (1% of postmenopausal group for each category of RS). From the premenopausal patients, only 8 patients had ovarian function suppression (OFS) documented as part of their endocrine therapy (10%). In the intermediate risk group, only 1 patient had a local recurrence, and there were no distant recurrences.

Conclusions: Whilst our population under investigation was limited as 21 gene RS testing was not approved within the NHS at the time of this study, the aim is to share results from this real-world dataset to enable comparison with emerging data in this field. Our data compliments published data suggesting benefit of RS testing in the management of patients with early, node positive breast cancer.

No conflict of interest.

205 (PB-118) Poster

Behavior of locally advanced invasive lobular carcinoma according to primary treatment

M.R. Sanchez Mateos Enrique[1], C. Julia Torres[2], M.A. Garcia Tejedor[1], C. Falo Zamora[1], A.R. Guijarro Campillo[1], M. Campos Delgado[1], A. Guma Martinez[1], M.T. Soler Monso[1], J. Ponce Sebastia[3], M.J. Pla Farnos[1]. *[1]Hospital universitario de Bellvitge, Breast Unit, Barcelona, Spain; [2]Hospital de Viladecans, Breast Unit, Barcelona, Spain; [3]Hospital universitario de Bellvitge, Gynecology Oncology, Barcelona, Spain*

Background: Currently the management of BC does not differ according to histology, although ILC is considered a different clinical entity and its study and treatment should be better defined. There is controversy about the benefit of using neoadjuvant systemic therapy with chemotherapy (CT) or hormonal therapy (HT), so therefore, a deeper analysis of the behavior of this BC histology is needed.

Material and methods: A retrospective observational cohort study of patients affected by locally advanced ILC of our breast unit. The cohort were grouped in 3 according to the primary therapies: surgery, chemotherapy or hormonal therapy. Comparisons of clinical characteristics between the 3 study groups were analyzed using Student's t-test for continuous variables and Chi-square or Fisher's tests for qualitative variables. The primary endpoint of this study was overall survival (OS) and disease-free survival (DFS). OS and DFS curves were obtained using the Kaplan-Meier methods and the impact of risk factors was evaluated in univariate and multivariate Cox regression models.

Results: Patients treated with surgery had more favorable baseline prognostic factors, compared to those treated with CT who had worse baseline characteristics (postmenopausal p = 0.001), lymph node involvement p = 0,001, lymphovascular invasion p = 0.002). OS and DFS at 5 years were higher in the CX group (OR, 92%; 95% CI, 85.2–99,6; p = 0.03 and OR, 89%; 95% CI, 80,4–97,4; p = 0.04, respectively) (table 1). Pathological lymph node involvement ≥N2 (OR, 9.76; 95% CI, 2.38–39.95; p = 0.002) and the use of adjuvant CT (OR, 4.34; 95% CI, 1.01–18.71; p = 0.04) appeared to be independent risk factors for recurrence. The use of adjuvant hormonal therapy for 5 years was a protective factor for recurrence (p = 0.03) and prolonged use of it (5–10 years) could offer even more protection (p = 0.06).

Conclusions: The prognosis of locally advanced ILC in our population was better in the group treated with primary surgery. Although we should consider this group had better baseline characteristics, compared to HT and CT group, which was the one with the worst prognostic factors. Prolonged HT more than 5 years could be a protective factor for recurrences.

Table 1.

	5-years DFS	OR	CI	p-value	5-years OS	OR	CI	p-value
Surgery	88.9%	89%	80.4%–97.4%	0.04	92.4%	92%	85.2%–99.6%	0.03
CT	71.4%	71%	69.7%–98.5%	0.07	85.7%	86%	73.8%–97.6%	0.06
HT	84.1%	84%	69.7%–98.5%	0.07	81.7%	82%	67.1%–96.4%	0.07

SLE: disease-free survival, OR: Odds ratio, CI: confidence interval, OS: overall survival, CT: chemotherapy, HT: hormone therapy.

No conflict of interest.

POSTER SESSION **18 November 2022**

Advanced Disease

206 (PB-030) Poster

Cost-effectiveness of first-line ribociclib use vs palbociclib in the treatment of postmenopausal women with HR+/HER2− advanced breast cancer: analysis based on final OS results of MONALEESA-2 and PALOMA-2

D.A. Cameron[1], V.K. Sharma[2], C. Biswas[2], C. Clarke[3], D. Chandiwana[4], P. Pathak[4]. *[1]Edinburgh Cancer Research Centre- University of Edinburgh, Oncology, Edinburgh, United Kingdom; [2]Novartis Healthcare Pvt Ltd, Oncology, Hyderabad, India; [3]Novartis Pharmaceuticals UK Limited, Oncology, London, United Kingdom; [4]Novartis Pharmaceuticals Corporation, Oncology, East Hanover, USA*

Background: The combination of a cyclin-dependent kinase 4/6 inhibitor (CDK4/6i) plus aromatase inhibitor is the standard of care in first-line (1L) treatment of hormone receptor–positive/human epidermal growth factor receptor–negative (HR+/HER2−) advanced breast cancer (ABC). Among the 3 CDK4/6is, only ribociclib has shown a statistically significant benefit in overall survival (OS) (MONALEESA [ML]-2 and -7) in 1L use: palbociclib did not demonstrate a significant OS benefit (PALOMA-2 [PAL-2]) and the final OS results for abemaciclib (MONARCH-3) are pending. This study evaluated cost-effectiveness of ribociclib vs palbociclib, using final ML-2 and PAL-2 OS data, in 1L treatment of postmenopausal women with HR+/HER2-ABC from the UK National Health Service perspective.

Methods: A partitioned survival model was developed considering 3 states (progression-free survival, progressive disease, and death) with a 1-month cycle length consistent with the treatment schedule. Hazard ratios (HRs) for PFS and OS for ribociclib plus letrozole vs palbociclib plus letrozole were derived using an anchored matching-adjusted indirect comparison (MAIC) to adjust for differences in baseline patient and disease characteristics between ML-2 and PAL-2 knowing that the two studies had comparable inclusion criteria. Drug acquisition, disease monitoring, subsequent therapies, and adverse event costs were included as cost inputs. Trial data and published literature were used to derive utility values. Costs and effects were discounted at 3.5% per year over a lifetime horizon of 40 years. One-way and probabilistic sensitivity analyses were also performed.

Results: At list price, the total discounted costs of treatment were £132 813 with ribociclib and £136 089 with palbociclib. For treatment with ribociclib vs palbociclib, total discounted quality-adjusted life years (QALYs) were 5.765 vs 4.514, respectively. Ribociclib was the dominant treatment as it was both cost-saving (−£3276) and more effective (+1.251 QALYs) than palbociclib. Of note, the total drug cost with ribociclib was found to be £17 156 lower than that with palbociclib. The probability of ribociclib vs palbociclib being cost-effective at £30 000 per QALY was 100%. Compared with palbociclib, ribociclib remained cost-effective when HRs, utilities, ribociclib drug cost, and health state costs were varied.

Conclusions: Adjusting for differences in baseline characteristics between ML-2 and PAL-2 using an MAIC, a significantly longer OS benefit was observed with ribociclib vs palbociclib. Based on these MAIC-derived estimates, ribociclib remained the dominant 1L treatment option over palbociclib for postmenopausal women with HR+/HER2− ABC. Linear pack pricing (cost per mg) for ribociclib compared to flat pack pricing for palbociclib was the key driver of cost savings.

Conflict of interest:
David Cameron reports payment to institution for advisory board work on CDK 4/6 inhibitors from Pfizer Payment to institution for presentations and advisory work on CDK 4/6 inhibitors from Lilly IDMC - Compensation to institution from Novartis Research funding for Everolimus in the UNIRAD trial from Novartis.
Vikash Kumar Sharma reports employment from Novartis.
Chandroday Biswas reports employment from Novartis.
Cathy Clarke reports employment from Novartis.
David Chandiwana reports employment and stock ownership from Novartis.
Purnima Pathak reports employment and stock ownership from Novartis.

207 (PB-031) Poster

Efficacy and safety of the biosimilar QL1206 compared with denosumab in breast cancer with bone metastases: subgroup analyses of a phase III study

H. Li[1], Y. Liu[2], X. Wang[3], Z. Chen[4], J. Wang[5], T. Sun[6], Q. Li[7], J. Cheng[8], Q. Zhang[9], X. Wang[10], J. Wang[11], K. Gu[12], S. Wei[13], S. Zhang[14], X. Wang[15], P. Sun[16], C. Hao[17], C. Han[18], Y. Li[18], X. Kang[18]. *[1]Key laboratory of Carcinogenesis and Translational Research Ministry of Education/Beijing, Department of Breast Oncology, Beijing, China; [2]Peking University Cancer Hospital and Institute, Department of Breast Oncology, Beijing, China; [3]Cancer Hospital of the University of Chinese Academy of Sciences Zhejiang Cancer Hospital, Department of Breast Medical Oncology, Hangzhou, China; [4]The Second Affiliated Hospital of Anhui Medical University, Department of Oncology, Hefei, China; [5]Linyi Cancer Hospital, Department of Breast Medical Oncology, Linyi, China; [6]Liaoning Cancer Hospital, Department of Breast Medical Oncology, Shenyang, China; [7]Affilitated Hospital Of Chengde Medical University, Department of Oncology, Chengde, China; [8]Wuhan Union Hospital Of China, Department of Oncology, Wuhan, China; [9]Harbin Medical University Cancer Hospital, Department of Breast Medical Oncology, Harbin, China; [10]Qilu Hospital Of Shandong University, Department of Oncology, Jinan, China; [11]Affiliated Hospital of Jining Medical College, Department of Oncology, Jining, China; [12]The First Affiliated Hospital of Anhui Medical University, Department of Oncology, Hefei, China; [13]Gansu Provincial Cancer Hospital, Department of Thoracic Oncology, Lanzhou, China; [14]The Second Affiliated Hospital of Xi`an Jiaotong University Xibei Hospital, Department of Oncology, Xi`an, China; [15]First Affiliated Hospital Of Gannan Medical University, Department of Oncology, Ganzhou, China; [16]Yantai YuHuangDing Hospital, Department of Medical Oncology, Yantai, China; [17]Tianjin Medical University Cancer Institute&Hospital, Department of Breast Medical Oncology, Tianjin, China; [18]Qilu Pharmaceutical Co.- Ltd., Clinical Research Center, Jinan, China*

Background: The prevalence of bone metastases in advanced breast cancer is high (>70%). QL1206 is a biosimilar for denosumab (Xgeva®, Amgen Inc.) and has demonstrated equivalence to the reference product in previous Ph I bioequivalence trial and Ph III trial. Here we present the results of these analyses in breast cancer subgroup.

Material and methods: Patients (pts) with histologically or cytologically confirmed solid tumors and ≥1 metastatic bone lesions were randomly assigned 1:1 to receive QL1206 or denosumab 120 mg subcutaneously Q4W for 3 cycles, stratified by tumor types (breast cancer, lung cancer, or the others), previous skeletal-related event (SRE), and current systemic antitumor therapy (yes or no). Thereafter pts in denosumab group switched to QL1206 treatment and up to 10 additional doses of QL1206 could be given to both groups. The primary endpoint was percentage changes in urinary N-terminal telopeptide of type I collagen (uNTX)/urine creatinine (uCr) from baseline to week 13.

Results: For the breast cancer subgroup (n = 311), 155 pts were assigned to QL1206 and 156 pts were assigned to denosumab. Overall, the median age was 52 years (range, 27–78). 59.6% pts had an ECOG PS of 1 or 2. 99.0% pts received concurrent systemic therapy. At week 13, median percentage change in uNTX/uCr from baseline in QL1206 group was similar to denosumab group (−69.9% vs −74.3%). The least-squares means difference between the two groups was 0.085 (90% CI, −0.062, 0.232). The median time to first onset of SRE was not estimable for both groups. 70.0% pts in QL1206 group and 73.1% pts in denosumab group experienced TRAEs (Gr≥3 TRAEs: 7.3% vs 9.6%). Overall, the most common TRAEs (>10%) were hypocalcemia (24.2%); blood parathyroid hormone elevated (23.5%); hypophosphatemia (17.0%); hyperparathyroidism (10.8%); and ALT increased (10.1%). Immunogenicity was similar between the two groups.

	QL1206 group (n = 151)	Denosumab group (n = 156)
Percentage change in uNTX/uCr from baseline to*		
Week 13		
Median (range)	−69.9% (−98.1%, 568.0%)	−74.3% (−97.7%, 386.3%)
LSM (SE)	−1.416 (0.163)	−1.501 (0.164)
LSM difference (SE; 90% CI)	0.085 (0.089; −0.062, 0.232)	
P value	0.3428	
Week 25		
Median (range)	−75.5% (−98.9%, 316.2%)	−74.6% (−99.6%, 133.5%)
LSM (SE)	−1.518 (0.167)	−1.465 (0.169)
LSM difference (SE; 90% CI)	−0.052 (0.097; −0.212, 0.107)	
P value	0.5886	
Week 53		
Median (range)	−85.1% (−99.7%, 57.5%)	−81.9% (−98.6%, 385.7%)
LSM (SE)	−1.517 (0.212)	−1.448 (0.219)
LSM difference (SE; 90% CI)	−0.069 (0.114; −0.256, 0.118)	
P value	0.5428	

LSM, least-squares means.

Conclusions: QL1206 demonstrated numerically similar efficacy results and similar safety profile to denosumab in breast cancer patients with bone metastases, supporting it as a potential option for this population.

Conflict of interest:
Corporate-sponsored Research: This research was sponsored by Qilu Pharmaceutical Co., Ltd.
Other Substantive Relationships: Cuicui Han, Yujie Li, and Xiaoyan Kang are employees of Qilu Pharmaceutical Co., Ltd.

208 (PB-032) Poster

Intrinsic tumor subtype in hormone receptor (HR) positive, human epidermal growth factor receptor 2 (HER2)-negative advanced breast cancer (ABC) treated with cyclin-dependent kinase 4/6 inhibitors (CDK 4/6i) and endocrine therapy (ET) – a retrospective analysis of real world data

T. Martins[1], M. Vitorino[1], A. Mendes[1], R. Vicente[1], A. Del Rio[1], C. Santos[1]. *[1]Hospital Professor Doutor Fernando Fonseca- EPE, Medical Oncology, Amadora, Portugal*

Background: CDK 4/6 inhibitors significantly improve outcomes for patients (pts) with HR positive, HER2-negative ABC. In this group of patients, the HER2-Low (HER2-L) subtype represents 50–60% and is characterized by poor prognosis. In this retrospective analysis we explore the role of intrinsic tumor subtype (luminal A, luminal B and HER2-L) as a predictor of clinical outcomes in patients treated with ET plus CDK 4/6 inhibitors.

Methods: This is a retrospective study of 49 consecutive pts with HR positive, HER2-negative ABC treated with CDK 4/6i+ET from 2018 to 2020 in Hospital Prof. Dr. Fernando da Fonseca (Amadora). Tumor subtype was determined by immunohistochemistry (IHC) before CDK 4/6i (primary tumors biopsies). In our statistical analyses we used Fisher's exact and chi square tests and Kaplan Meier analysis (SPSS software for Windows -version 28.0.0.0).

Results: 49 pts (96% women, of which 67.4% post menopause, median age of 57 years and 40.9% with metastatic disease at diagnosis). 79.6% received ribociclib and 20.4% received palbociclib, plus ET (34.7% fulvestrant, 65.3% aromatase inhibitor). 71.4% of pts had no previous treatment for metastatic disease. Subtype distribution: Non Her2-L (luminal A and luminal B- 53.1%) and Her2-L (46.9%). Median progression-free survival (PFS) for HER2-L disease was 5.0 months (mo) (95% confidence interval [CI] 0.0–10.8) and 13.0 mo (95% CI 10.2–15.8) for non Her2-L disease (adjusted hazard ratio [HR] = 1.44, $p = 0.459$). Median overall survival (OS) for Her2-L disease was 16.2 mo (95% CI 20.3–83.7) and 22.3 mo (95% CI 20.4–107.6) for non Her2-L disease (HR = 3.5, $p = 0.172$). The overall response rate of CDK 4/6i+ET in Her2-L disease was 60% and 65% in non-Her2-L disease.

Conclusions: Despite the limitations of a small sample and the statistically non-significant PFS and OS HR, our results may indicate a poor prognosis for Her2-L disease and the potential clinical utility of intrinsic tumor subtype as a biomarker in patients with HR-positive/HER2-negative ABC.

No conflict of interest.

209 (PB-033) Poster

Our early experience with Magseed and Savi-scout localization against wire localization Breast conserving surgery in impalpable breast cancer

S.M.M. Tin[1], E. Rezkallah[1], I. Cheema[1], W. Elsaify[1], M. Shaaban[1]. [1]*South Tees University Hospitals NHS Foundation Trust, Surgery, Middlesbrough, United Kingdom*

Background: Image-guided preoperative localization is mandatory for guiding surgery of non-palpable lesions to improve both oncological and cosmetic outcomes. Our purpose of this study is to determine the outcomes of Magseed and SAVI scout localization guided excision of non-palpable breast cancer and compare it to wire guided wide local excision. These outcomes include successful localization, retrieval, margin involvement and re-excision rate.

Material and methods: This was a retrospective cross-sectional cohort study of patients undergoing breast conserving surgery for impalpable breast cancer between November 2019 to September 2021. Patients were divided into three groups based on localization techniques: wire localization (WL), Magseed localization (ML) and savi-scout localization (SCL). Age, tumour size and specimen weight were compared with One-way Anova test and involved margin rate, re-excision rate and misplacement rate were compared with Chi-square test. Localization and retrieval rate were showed with percentage.

Results: There were 75 patients in this study. Each group included 25 patients. There was no statistical difference of age between groups ($p = 0.76$). Tumour size was 20.76 mm (WL), 15.06 mm (ML), 20.18 mm (SCL) and p value is 0.02. Specimen weight was 40.46 gm, 60.74 gm, 81.84 gm for WL, ML and SCL respectively ($p = 0.16$). Positive margin was 16% for WL, 4% for ML and 8% for SCL ($p = 0.33$). Re-excision rate was 16% (4), 0, 8% (2) respectively ($p = 0.31$) and there was no statistically significant. Misplacement of wire (>2 cm from tumour) was 2 cases (WL),1 case (ML) and 1 case (SCL).

Table: Comparison of outcomes of image guided localization techniques

Type of localization	Wire	Magseed	Savi-scout	P value
Age; Mean (SD)	62.71 (8.96)	60.08 (8.18)	60.36 (13.21)	0.76
Min-max	46–71	47–80	33–78	
Tumour size(mm); mean(SD) Min-max	20.76 (12.42) 7–47	15.06 (6.89) 0–30	20.18 (10.51) 0–45	0.02
Specimen weight (gm) Min-max	40.46 (16.09) 10.2–82.7	60.74 (29.50) 16–138.9	81.84 (64.21) 24–354	0.16
Localization rate	100%	96% (24/25)	100%	
Retrieval rate	100%	100%	100%	
Signal loss during procedure % (No)	NA	4% (1/25)	8% (2/25)	
Misplacement (No)	8% (2/25)	4% (1/25)	4% (1/25)	0.77
Margin involved by DCIS % (No)	16% (4)	4% (1-posterior)	8% (2)	0.33
Re-excision – % (No)	16% (4)	0	8% (2)	0.31

Conclusion: Pre-operative non-wire non-radioactivity localization are promising techniques for impalpable breast cancer to obtain clear margin and reduce re-excision rate. Our study showed there was no statistical significance outcomes. Magseed and savi-scout localization had less cases with positive margin and re-excision rate.

No conflict of interest.

210 (PB-034) Poster

Unusual ocular manifestations of breast carcinoma: A single institute case series in the Indian population

S. Murali-Nanavati[1], R. Pathak[1], G. Chitkara[1], A. Reddy[1], N. Nair[1], S. Joshi[1], P. Thakkar[1], V. Parmar[1], S. Gupta[1], R. Sarin[1], R. Badwe[1]. [1]*Tata Memorial Hospital, Breast Oncology, Mumbai, India*

Background: Orbit remains an infrequent site for metastasis and this occurs in 3% of breast cancer patients. On the contrary, orbital metastasis by itself are uncommon with an incidence of 1–13% but, breast cancer accounts for 28.5–58.8% of all metastases to the orbit, making it the most common tumour that metastasizes to the orbit. We aim to retrospectively evaluate the all patients who had breast cancer with orbital mets and analyse the clinico-pathological features, symptoms and survival.

Methods: We retrospectively evaluated all patients who were diagnosed with orbital metastasis from breast cancer, at the Tata Memorial Centre between 2009 and 2019. The clinico-pathological characteristics and follow-up details were obtained from Electronic Medical Records.

Results: All the patients had a clinical history of breast cancer of which 40% (10/25) of the patients Denovo metastatic disease at presentation. Invasive Ductal Carcinoma (IDC) was the most common primary histology, 84% (21/25) out of which 32% (8/25) patients were triple negative breast cancer (TNBC), 56% (14/25) patients were hormone positive alone (ER+/PR+) and 12% (3/25) patients were her 2 neu enriched. Majority of the patients being of premenopausal status, 48% (12/25). All patients were treated with a multidisciplinary approach including surgery, chemotherapy and radiation therapy whenever indicated as per institutional protocol. The time to metastatic progression varied widely, 20% (5/25) patients were diagnosed with Denovo primary breast cancer with orbital metastasis on the first visit i.e. synchronously. Around 48% (12/25) patients developed orbital mets after treatment completion and a Disease-Free Interval of 6 months to 1 year, 4% (1/25) patients progressed while on adjuvant therapy and 4% (1/25) progressed while on neoadjuvant chemotherapy.

Among these 25 patients with orbital metastasis, the mode of diagnosis was MRI scan, CT scan of brain. None of the patients in our study underwent a biopsy as the intent was palliative due to extensive metastatic sites. There was 56% (14/25) concordance between the side of the primary tumour and the side of the orbital metastasis. Patients were asymptomatic for orbital metastasis in 20% (5/25) of the cases. While among the patients that did present with symptoms, diminution of vision 20% (5/25) and proptosis, ptosis (6/25) was the most common. Palliative radiation of 20 GY with 5 fractions was given to 23/25 patients and 8/25 patients received palliative systemic therapy based on the other sites of systemic metastasis.

Conclusion: Based on the data, we conclude that Orbit is a rare site of metastasis for breast cancer and is almost always associated with other systemic sites and requires multimodality treatment. Recognition of metastatic disease and early treatment are important to maximise palliative treatment in breast cancer patients.

No conflict of interest.

211 (PB-035) Poster

Breast cancer management with CDK4/6 inhibitors as first line treatment: a single institution retrospective review

F. Villa[1], C. Corbetta[1], A. Crippa[1], D. Pelizzoni[1], I. Vittimberga[1], C. Sansi[1], J. Arnoffi[1], F.M. Guida[1], O. Cuomo[1], M. Tafuni[1], M.C. Sassone[1], C.V. Viganò[1], M. Anghilieri[1], A. Ardizzoia[1]. [1]*ASST Lecco, Medical Oncology, Lecco, Italy*

Background: The excellent results of phase 3 randomized trials have rendered cyclin-dependent kinase 4/6 inhibitors (CDK4/6i) combined with endocrine treatment (ET) as the new standard of care for both endocrine-sensitive and -resistant patients (pts). We performed a single institution retrospective review of pts with metastatic hormone receptor positive (HR+) HER2 negative (HER2-) breast cancer (MBC) receiving CDK4/6i in I line setting.

Methods: From 06/2017 to 4/2022 we identified 97 HR+HER2-MBC pts treated with CDK4/6i combined with aromatase inhibitors (AI) or fulvestrant in I line setting. We assessed progression-free survival (PFS), time to progression (TTP) on II-line therapy and overall survival (OS) using the Kaplan–Meier method.

Results: Ribociclib was the most CDK4/6i prescribed (48,5%) followed by palbociclib (40,2%) and abemaciclib (11,3%). Abemaciclib was commonly prescribed with fulvestrant (90,9%), ribociclib and palbociclib with letrozole (95.7% and 82% respectively). Patient median age was 65 years (range 34–85) and 12.6% of them were premenopausal. 41.2% of pts have a visceral disease and 60.8% have existing disease. 50.5% received previous adjuvant/neoadjuvant hormonal therapy: almost two third of them had recurrence after 2 years from the end of adjuvant ET, one third during or < 12months (mo). Dose reduction was observed in 2 (2%) upfront and in 58 pts (59.8%) after starting CDK4/6i: abemaciclib dose was reduced once in 18% and twice in 45% of pts treated; ribociclib was reduced once in 59.6% of pts; palbociclib was reduced once in 38.5% and twice in 20.5% of pts. Median time to I reduction was 3.6 mo (1.4 mo for abemaciclib, 5.4 mo for ribociclib and 3 mo for palbocicib). Treatment was discontinued in 48.5% of pts due to progression (78.7%), intolerability (12.8%) and other (8.5%). With a median

follow up (fup) time of 20 mo (range 3–53) PFS was 27.9 mo. In ET resistant pts PFS was 15.2 mo, while in ET sensitive pts was 30 mo. The median overall survival (OS) was not reached. The 12 and 36 mo OS rate were respectively 94% and 70%. Subsequent treatment data were available for 34 pts. The most commonly prescribed regimens were metronomic chemotherapy with vinorelbine and capecitabine (29.4%) and everolimus/exemestane (29.4%). The TTP on II line therapy was 6.2 mo.

Conclusions: In our review abemaciclib was predominantly prescribed in ET resistant while ribociclib in ET sensitive pts. With a median fup of 20 mo we found a median PFS in ET sensitive and ET resistant population similar to pooled median PFS of randomized controlled trials (RCTs) and Real world data already published. Dose reduction (59.8%) and CDK4/6i discontinuation rate due to toxicity (12,8%) were slightly higher than those in the RCTs (31–55% and 4–10% respectively). These may be associated with poor patient related prognostic factors. Further real world data are warranted.

No conflict of interest.

212 (PB-036) Poster

Assessing the application of multidisciplinary management of locally advanced breast cancer in Egyptian female patients at Alexandria surgical oncology unit

G. AbouElnagah[1]. [1]*Alexandria Faculty of Medicine, Surgical Oncology Unit, General Surgery department, Alexandria, Egypt*

Background: Breast cancer is a major public health problem. Locally advanced breast cancer (LABC) has a clinical challenge due to distant metastasis occurs in most patients, and they may relapse and eventual death. Multidisciplinary Team (MDT) like tumor board is an integral part of cancer care. It reduces surgical interference in the presence of hormonal and chemotherapeutic treatment.

Aim of the work: Identify the role of multidisciplinary team in the management of locally advanced breast cancer as regards; Rate of application of multidisciplinary team, the use of neoadjuvant chemotherapy, breast conserving surgery, modified radical mastectomy (MRM) and breast reconstruction, effect of radiotherapy on breast with different types of breast reconstruction and progression free survival and overall survival.

Patients and methods: A retrospective study applied on Egyptian female patients with LABC presented to Alexandria clinical oncology and surgical oncology departments and divided into two groups; group1: patients not managed by MDT (not presented in tumor board) and group 2: patients managed by MDT (presented in tumor board).

Results: 352 patients were included in the study; 187 were included in the tumor board and managed by MDT and 165 were not included in the tumor board. Rate of use of Neoadjuvant chemotherapy in the group included in MDT is higher (27.8%) than the other group (21.2%). Rate of BCS is higher (30.5%) in group 2 than the other group (13.3%) and higher than rate of MRM (61.5%) in group 2 in relation to group 1 which is 13.5% for BCS and 71.5% for MRM (p = 0.01). Metastasis is less (17.6%) in group 2 than the second group (26.7%) (p = 0.04) and local recurrence is also less in group 2 (7%) than the second group (14.5%) (P = 0.02).

Conclusion: MDT management for LABC is proved to decrease major surgery rate, metastasis of the disease and local recurrence of the disease.

No conflict of interest.

213 (PB-037) Poster

Advanced breast cancer journey: a consensus guidance from a multidisciplinary panel for improving clinical practice in Portugal

L. Pinto[1], A. Joaquim[2], R. Dinis[3], A. Amarelo[2], A.P. Amorim[4], Â. Dias[5], D. Brandão[6], J. Godinho[7], L. Ribeiro[8], L. Travado[9], M. Brito[10], M. Luis[11], M. Brice[12], S.S. Almeida[13], T. Hussong Milagre[14], M.R. Dionísio[15], M. Domingues[15], P. Rosa[15], R. Santos[16], C. Vieira[17]. [1]*Centro Hospitalar e Universitário de Coimbra, Oncology Department, Coimbra, Portugal;* [2]*CHVNG/E - Centro Hospitalar de Vila Nova de Gaia/Espinho - Unidade 1 - EPE-SNS, Oncology Department, Vila Nova de Gaia, Portugal;* [3]*Hospital Espírito Santo- EPE-SNS, Oncology Department, Évora, Portugal;* [4]*Unidade Local de Saúde do Alto Minho ULSAM- EPE-Hospital de Santa Luzia, Consulta externa - oncologia, Viana do Castelo, Portugal;* [5]*Hospital Garcia de Orta, Oncology Department, Almada, Portugal;* [6]*Instituto Português de Oncologia do Porto Francisco Gentil- EPE IPO-Porto, Pharmacy Service, Porto, Portugal;* [7]*Hospital Beatriz Ângelo - SNS, Oncology Department, Loures, Portugal;* [8]*Centro Hospitalar Universitário de Lisboa Norte EPE, Oncology Department, Lisboa, Portugal;* [9]*Champalimaud Clinical and Research Center- Champalimaud Foundation, Breast Unit, Lisboa, Portugal;* [10]*Instituto Português de Oncologia de Lisboa Francisco Gentil- EPE IPO Lisboa, Oncology Department, Lisboa, Portugal;* [11]*Instituto Português de Oncologia do Porto Francisco Gentil- EPE IPO-Porto, Palliative Care, Porto, Portugal;* [12]*Careca Power Association, Patient Association, Amadora, Portugal;* [13]*Instituto Português de Oncologia do Porto Francisco Gentil- EPE IPO-Porto, Psychiatry Service, Porto, Portugal;* [14]*EVITA, Patient Association, Lisboa, Portugal;* [15]*Novartis Farma - Produtos Farmacêuticos S.A., Medical Department, Porto Salvo, Portugal;* [16]*LatM - Life Science Consultants, Consultant, Lisboa, Portugal;* [17]*Instituto Português de Oncologia do Porto Francisco Gentil- EPE IPO-Porto, Oncology Department, Porto, Portugal*

Background: Breast cancer (BC) is a leading cause of cancer-related mortality in women. Prevention, early detection, and treatments have lowered mortality. Nevertheless, patients' lives have been impacted by the diagnosis and treatment on physical, emotional, and social levels. When the disease progresses and enters the metastatic phase the patient faces many challenges, with more treatments and side effects that affect their quality of life, change their life plans, and bring uncertainty to the future. This phase of the disease creates more distress and vulnerability for the patients and their carers which demand better equipped health systems to attend to the diversity of their biopsychosocial needs. This consensus guidance aims to establish new procedures and improve existing activities on advanced BC (ABC) patient's treatment journey, based on expert opinions, that ultimately will have a positive impact on patients' lives.

Methods: A multidisciplinary team (MDT) composed of patient association representatives and experts from nine different specialties, involved in the diagnosis and treatment of BC, used their knowledge and experience to address gaps within patient's journey of ABC defined as (1) referral/diagnosis, (2) 1st line of treatment, (3) patients' follow-up and (4) advanced lines of treatment.

Results: Although the experts produced many suggestions across patient's journey, several main points were raised. The patient should have access to a MDT, composed of a core team, that must integrate other specialties according to the patient's needs. The time spent with the patient should be increased to improve healthcare, and clinicians' communication skills should be fostered to better understand the patients' needs and provision of patient-centered care. New software tools need to be put into practice to increase the communication between the healthcare professionals. Patient navigation within healthcare system should be supported by a nurse navigator, that also helps to translate and facilitate health information. Integration of Palliative Care should occur early in the patient's journey, to maximize benefits in symptom control and quality of life. Also important is the integration of primary/community healthcare into the patient´s journey.

Conclusions: The current consensus guidance aimed for the Portuguese setting will provide useful information regarding how to better organize care to improve patients' lives with ABC, it will help healthcare professionals identifying current unmet needs and to decide resources' allocation, and to develop future applications to their daily clinical practice, according to the experts' point of view.

Conflict of interest:
Ownership:
Novartis Pharmaceuticals Corporation.
Corporate-sponsored Research: Novartis Pharmaceuticals Corporation.

214 (PB-038) Poster

Advanced breast cancer treatment after CDK4/6– inhibitors - the experience of a Hospital Center

M. Costa[1], A.C. Valente[1], M. Freitas[1], C. Almeida[1], N. Tavares[1], D. Almeida[1], C. Caeiro[1], I. Augusto[1], I. Sousa[1], M. Barbosa[1]. [1]*Centro Hospitalar e Universitario São João - Porto, Medical Oncology, Porto, Portugal*

Background: Optimal treatment after progression under CDK4/6 inhibitors (iCDK4/6) is not yet defined, although studies are underway. The objective of this work was to evaluate the effectiveness outcomes of subsequent line to iCDK4/6 treatment in our population.

Material and methods: Clinical data of patients diagnosed with advanced breast cancer treated with iCDK4/6 for ≥1 month, were retrospectively analyzed between February 2017 and July 2020 (n = 78), and divided in 2 groups (A: patients treated with iCDK4/6 in 1st line and B: treated in 2nd or more lines). Time to treatment failure of iCDK4/6 (TTF1) was defined as the time period between initiation of treatment with iCDK4/6 and its discontinuation. The time to subsequent line treatment failure (TTF2) was defined as the time period between initiation of treatment with the subsequent iCDK4/6 line and subsequent discontinuation. Clinical benefit of the subsequent line to iCDK4/6 was assessed and defined as stable disease for ≥ 6 months. The statistical analysis was performed using the SPSS® software (V27).

Results: All patients were female. In group A (n = 55), the median age at onset of iCDK4/6 was 54 years [29–85]. The median FU was 22 months [2–48]. In 32.7% of patients (n = 18) Palbociclib (P) was associated with an inhibitor of aromatase (IA) and 32.7% to fulvestrant (F). Treatment was suspended in 58.2% (n = 32) of patients. The median TFT1 was 28 months [95CI 18.20–37.80]. After iCDK4/6 suspension 36.4% of patients (n = 20) were proposed for chemotherapy alone (CTm), 9.1% (n = 5) for hormone therapy alone (HTm), 9.1% for everolimus+exemestane (EE) and 3.7% (n = 2) died before initiate subsequent therapy. The median TTF2 for CTm was 6 months [95CI 4.41–7.59], 5 months for HTm [95CI 0.00–11.53] and 8 months for EE [95CI 3.20–12.80]. The clinical benefit rate (CBR) of CTm was 50% (n = 10), of HTm of 40% (n = 2), as well as EE (40%). Regarding deaths, half (n = 10) of patients on mCT, 1/5 of those on EE and 2/5 of those treated with HTm died. In group B (n = 23), the median age at onset of iCDK4/6 was 61 years [28–76]. The median FU was 20 months [4–43]. The P+F association was prescribed in most patients (87%). Treatment was suspended in 73.9% (n = 17) of patients. The median TTF1 was 15 months[95CI 3.31–26.69]. After discontinuation of iCDK4/6 52.2% of patients (n = 12) were proposed for CTm, 8.7% (n = 2) for HTm, 8.7% for EE and 4.3% (n = 1) died before starting subsequent therapy. The median TTF2 for CTm was 8 months [95% CI 2.16–13.84] and the CBR was 50%.

Conclusion: Studies are underway to help clarify the best post-treatment therapeutic sequencing with iCDK4/6. In our population, the majority of patients proposed for treatment subsequent to iCDK4/6 underwent CTm in both groups. However, the retrospective study design, the small sample size and the heterogeneous population, do not allow definitive conclusions to be drawn.

No conflict of interest.

215 (PB-039) Poster

Characteristics of patients with metastatic luminal breast cancer (MLBC) and ESR1 polymorphism

T. Tarasenko[1], L. Syvak[1], O. Martyniuk[1], S. Lyalkin[1], N. Verovkina[1], A. Kovalenko[1]. [1]*National cancer institute, Chemotherapy of solid tumors, Kyiv, Ukraine*

Background: ESR1 genetic polymorphisms increase the likelihood of the early progress MLBC during the hormonal therapy (HT) with aromatase inhibitors (AI) on average in a third of MLBC patients. Identifying these patients is an expedient factor that facilitates predicting the effectiveness of HT with AI. However, there are no data on the correlation of patients' clinical features and ESR1 polymorphisms..

Material and methods: A prospective cohort study of 82 MLBC patients. First line HT was started with nonsteroidal AI (lertozole/anastrozole). The treatment response was assessed according to RECIST 1.1. In case of progression in 35 (42,7%) cases were identified A-351G (rs9340799) and in 38 (46,3%) cases - T-397C (rs2234693) polymorphisms of ESR1 by analysis of DNA restriction fragment length polymorphism. The study also assesses such clinical data as the patients' menopausal status (MS), body mass index (BMI), smoking experience, gynecological and family cancer history in their relation to ESR1 (A-351G, T-397C) polymorphisms.

Results: The patients' average age is 52.9 ± 12.6. 67.07% (55 patients) had natural menopause without an established statistic difference in the patients with and without ESR1 mutations (χ^2 = 1,790; p = 0.181). 43 patients (52,44%) had the normal BMI. There were no patients with a considerable weight deficit or obesity of the 2nd and 3rd degree. The groups did not display any statistically significant difference in terms of the participants' BMI (χ^2 = 0.674; p = 0.412). Most patients were non-smokers (64 people or 78.05%), without a considerable difference in the group with ESR1 polymorphisms (11 (32.35%) and without (7 (14.58%) (χ^2 = 2,704; p = 0.101). An accompanying gynecological pathology (endometrial hyperplasia, uterine myoma, endometriosis, ovarian cysts, abortions) was found in 33 patients (40.24%), 20 of them (60.6%) having ESR1 polymorphisms (χ^2 = 8,338; p < 0.05). Overall, 27 patients (32.93%) mentioned cancer cases in their family. The study did not reveal a significant relationship between a burdened cancer history and ESR1 variants (χ^2 = 0,459; p > 0.05).

Conclusions: There was no statistically significant association of ESR1 (A-351G, T-397C) polymorphisms with the patients' clinical characteristics (MP, BMI, smoking experience, family cancer history) apart from an accompanying gynecological pathology, which may point out the indirect relation of gynecological disorders in the anamnesis and acquired insensitivity to IA HT, in particular, due to ESR1 gene polymorphisms.

No conflict of interest.

216 (PB-040) Poster

AI-based smartphone App using a single-lead ECG for automated QTc diagnostics in oncology

C.H. Tonk[1,2], T. Schinköthe[2,3], N. Harbeck[3], V. Carmelo[4], J. Gomes Feliciano[5], R. Wuerstlein[3], S. Kümmel[6], A. Schmidt[1,7]. [1]*University of the Bundeswehr Munich, Institute for Sports Science, Neubiberg, Germany;* [2]*CANKADO GmbH, Digital Health, Ottobrunn, Germany;* [3]*Comprehensive Cancer Center of the Ludwig-Maximilians-University, Department of Gynecology and Obstetrics, Munich, Germany;* [4]*Hospital da Luz, Cardiology Department, Lisboa, Portugal;* [5]*Hospital Cruz Vermelha, Heart Center, Lisboa, Portugal;* [6]*Kliniken Essen Mitte, Breast Unit, Essen, Germany;* [7]*University of the Bundeswehr Munich, Research Center for Digitization of Health Care, Neubiberg, Germany*

Introduction: Long QT syndrome is a common cardiotoxic side effect of various anti-tumor drugs. Previous cardiological monitoring of oncological patients is primarily complex and requires for non-internal oncologists a consultation. Therefore, the QTc-Tracker smartphone APP was developed, which enabled a tele-cardiological diagnosis of the QTc time with standard single-lead ECG devices. As a result, diagnosis times could already be reduced by 99%. The further development examined an automatic determination of the QT time using the smartphone APP. However, since single-lead ECG devices are significantly more susceptible to interference, the determination of the QT time is more complex than with 12-lead ECGs.

Methods: The QTc-Tracker smartphone APP was developed to determine the QT time. Self-tracker single-lead ECG devices were used to record the lead I signal. The ECG recordings were analyzed in the APP and passed on to an external cardiologist as reference. The APP used artificial intelligence and was trained in the first phase and validated in the second phase. The first phase aimed to improve QT time detection. The results of the APP were compared with the findings of the external cardiologist. In both phases, ECGs from breast cancer patients receiving ribociclib were used.

Results: A total of 1889 single-lead ECGs were carried out. 248 of these could not be evaluated (13%). QTc prolongation, according to CTCAE, was diagnosed in 41 cases (2.5%). 878 of the evaluable ECGs were used for the training phase and 763 for the evaluation phase. In the first group (before the improvement), the sensitivity to automatically detect a prolongation of the QT time was 36%, and the specificity was 96%. In the evaluation collective (after the training), the sensitivity went up to 85%, and the specificity was unchanged at 96%.

Conclusions: The trained method of the QTc tracker is able to reliably detect a QT time lengthening even without a cardiological diagnosis only by using single-lead self-tracker ECG's. In the rare cases in which an elongation was not detected, the cardiac diagnosis was only a few milliseconds above the threshold value. This artificial intelligence-based smartphone APP is not intended to replace the cardiological diagnosis, but it can simplify routine processes and help to decide which patients need a cardiological examination more urgently.

Conflict of interest:
Ownership:
Timo Schinköthe: Owner and Managing Director of CANKADO GmbH.
Other Substantive Relationships: Christian Horst Tonk: Employee of CANKADO GmbH.

217 (PB-041) Poster

Prospective, Multi-Center, Artificial Intelligence Study for Early Prediction of Serious Events under Treatment Is Now Open for Recruitment in Breast Cancer - OMCAT Trial in Progress

C.H. Tonk[1,2], R.E. Kates[2], S. Kümmel[3], F. Cardoso[4], T. Schinköthe[2,5], N. Harbeck[5], P. Staib[6], A. Schmidt[1,7]. [1]*University of the Bundeswehr Munich, Institute for Sports Science, Neubiberg, Germany;* [2]*CANKADO GmbH, Digital Health, Ottobrunn, Germany;* [3]*Kliniken Essen Mitte, Breast Unit, Essen, Germany;* [4]*Champalimaud Clinical Centre/Champalimaud Foundation, Breast Unit, Lisboa, Portugal;* [5]*Comprehensive Cancer Center of the Ludwig-Maximilians-University, Department of Gynecology and Obstetrics, Munich, Germany;* [6]*St. Antonius Hospital Eschweiler, Department of Hematology and Oncology, Eschweiler, Germany;* [7]*University of the Bundeswehr Munich, Research Center for Digitization of Health Care, Neubiberg, Germany*

Background: Aim of the OMCAT trial ('One Million CAncer Treatment months', NCT04531995) is improvement of cancer patient care and safety by developing artificial intelligence (AI)-based, incident prediction algorithms. Incident detection allows early notification of treatment teams, enabling timely management changes or interventions. Ultimately the algorithms can

also support improved health resource allocation. This trial in progress aims to provide learning databases in breast cancer comprising both electronic patient reported outcome (ePRO) data using the mobile medical device 'CANKADO PRO-React' and ground truth outcome data, which provide disease-specific events of interest ("incidents") verified by the physician (e.g., during patient examinations).

Methods: Incident prediction is posed as an application of stochastic time series analysis using AI and knowledge engineering technology. The learning process begins by fitting individualized and disease-specific stochastic process models to "incident-free" intervals extracted from the ePRO data series. Incidents produce detectable deviations from "ordinary" ePRO fluctuations. The algorithms are trained on CANKADO PRO-React data to produce real-time risk functions for predicting incidents on a clinically specified time horizon.

Results: Considering the heterogeneity and combinatorics of diseases, stages, therapies, and types of events considered in this study, ultimately the AI algorithms aim to discover about 360 distinct predictive relationships. The estimate of one million treatment months is derived from statistical power analysis of this target, considering estimated median documentation time of six months per patient and estimated 400–500 patients per predictive relationship. To date, 45 centers in Germany have expressed interest in participating. This participation level will enable proof of principle. Ethics votes are already available in most regions. Other centers are invited to participate in this trial.

Conclusions: OMCAT opens a whole new path towards evidence-trained AI and a novel combination of patient observation and predictive care. The goals of OMCAT are ambitious and will therefore require many more supporters.

Conflict of interest:
Ownership:
Timo Schinköthe: Owner and Managing Director of CANKADO GmbH.
Other Substantive Relationships: Christian Horst Tonk: Employee of CANKADO GmbH.

218 (PB-042) Poster

Impact of subcutaneous versus intravenous administration of pertuzumab and trastuzumab (PH) for the treatment of HER2-positive breast cancer in Montenegro

N. Cicmil Saric[1], S. Lekic[1], J. Lakicevic[1], V. Todorovic[1]. [1]*Clinical Center of Montenegro, Institute of Oncology, Podgorica, Montenegro*

Background: Both PH are approved for use in patients with HER2-positive breast cancer and are available as intravenous formulations (PH IV) and subcutaneous fixed-dose combination of both drugs (PH FDC SC). SC formulations showed similar efficacy as IV counterparts, providing additional economic value to patients, physicians and health systems due to shorter administration and observation time.

Material and methods: Based on the average number of PH doses, both IV and SC, given per year per patient, we calculated potential time savings for patients, medical staff, and capacity utilization of the institution. We calculated potential savings if PH FDC SC were to be given in regional hospitals (secondary care) instead the Clinical Center of Montenegro (CCM) which is the only institution where breast cancer patients can receive oncology treatment. The analysis was based on 61 patients treated with PH. Two methods were used for analyses: questionnaires filled out by patients and interviews with medical staff, by comparing the application protocols of PH IV and PH FDC SC simulating a time and motion study. The basis for the calculation of savings in patient transport is the GIS model (Geographic Information System) based on the residence of each patient and the address of the gravity tertiary center.

Results: The results showed that switching from IV to SC administration of PH would shorten the administration time per patient by 211 minutes. Annually, patients would spend over 160 days less in a chemotherapy unit. The cost of a hospital chair utilization is 1,04 EUR per minute, which leads to the conclusion that switching to the SC could save up to 240.000 EUR yearly. On the patients side, the time lost in transport would be significantly reduced (85 days/year), as well as the time spent in the hospital to receive therapy (each patient would save 63 hours annually).

Conclusion: SC formulation of PH is associated with favorable pharmaco-economic outcomes generating significant non-drug cost savings for healthcare providers through time savings and other benefits. For patients PH FDC SC could save a significant amount of time by enabling treatment closer to their homes through decentralization of oncology treatment.

Conflict of interest:

N. Cicmil Saric: Advisory Board: Roche, Novartis, MSD; Other Substantive Relationships: Speakers: Roche, MSD, Astra Zeneca, PharmaSwiss, Pfizer.
S. Lekic: Advisory Board: Roche, Novartis, MSD; Other Substantive Relationships: Speakers: Roche, Astra Zeneca, Astellas, MSD, PharmaSwiss, Pfizer.
J. Lakicevic: Advisory Board: Roche, Novartis, MSD; Other Substantive Relationships: Speakers: Roche, MSD, Novartis, Astellas, PharmaSwiss, Pfizer.
V. Todorovic: Advisory Board: Roche, Novartis, MSD; Other Substantive Relationships: Speakers: Roche, MSD, Astra Zeneca, Astellas, PharmaSwiss, Sanofi, BMS.

219 (PB-043) Poster

Trained Artificial Intelligence (AI) for Predicting Therapy Discontinuation Based on Patient Observations in Advanced Breast Cancer

R.E. Kates[1], B. Sprecher[2], S. Meyer[2], C.H. Tonk[1,3], T. Schinköthe[1,4], N. Harbeck[4], A. Schmidt[3,5]. [1]*CANKADO GmbH, Digital Health, Ottobrunn, Germany;* [2]*University of the Bundeswehr Munich, Institute for Technical Informatics, Neubiberg, Germany;* [3]*University of the Bundeswehr Munich, Institute for Sports Science, Neubiberg, Germany;* [4]*Comprehensive Cancer Center of the Ludwig-Maximilians-University, Department of Gynecology and Obstetrics, Munich, Germany;* [5]*University of the Bundeswehr Munich, Research Center for Digitization of Health Care, Neubiberg, Germany*

Background: In various fields outside of medicine, AI-supported systems have been established that can predict an undesirable event. The purpose of such systems is to detect events earlier and, if necessary, to be able to prevent them. In medicine, it would be particularly interesting to be able to make such predictions based solely on patient observations.

Methods: The usage from 323 patients with advanced breast cancer with a total of 78542 documentation days was used. In addition, the premature termination of use was defined as an undesirable event. The data was then processed and annotated. A deep-learning neural network (NN) classifier was trained on this dataset independently on all documented days to predict this target endpoint. The patient classifier score was computed by averaging over daily scores. Overall classifier accuracy and binary cross entropy loss were computed as performance indicators on training and test data sets (2:1 split).

Results: After tuning the hyperparameters, the best-performing NN comprised three hidden layers, each with 88 neurons, using ReLU (linear ramp) activation, and an output layer using sigmoid activation. This model achieved 98% accuracy on training data with binary cross entropy loss of 0.5 and 89% accuracy with a similar loss of 0.49 on the test set.

Discussion: An extension of these results will be to model individual longitudinal data by time series analysis, taking cumulative effects into account, and to quantify the predictive horizon as an additional key performance indicator for applications.

Conclusions: These first results demonstrate that longitudinal medical data, particularly patient self-reported data, have predictive value for a target endpoint and can be modeled using machine learning algorithms. Performance will generally depend on medical context, available input data, specification of clinical target endpoints, and statistical and AI modeling details.

Conflict of interest:
Ownership:
Timo Schinköthe: Owner and Managing Director of CANKADO GmbH.
Other Substantive Relationships: Christian Horst Tonk: Employee of CANKADO GmbH.

220 (PB-044) Poster

Non-Inflammatory skin involvement in Breast Cancer (T4b): Real-world Data from a Tertiary care centre in Eastern India

S. Deepika[1], P. Jain[2], P. Saha[2], M. Sultania[3], M. Kar[2], S. Majumdar[2], S. Barik[2], M. Sable[3], P. Mishra[3], D. Muduly[3]. [1]*AIIMS Bhubaneswar, Surgical Oncology, Bhubaneswar, India;* [2]*AIIMS Bhubaneswar, Radiotherapy, Bhubaneswar, India;* [3]*AIIMS- Bhubaneswar, Pathology with Laboratory medicine, Bhubaneswar, India*

Background: Breast cancer patients with skin ulcerations, satellite nodules or peau d'orange at presentation are classified with stage IIIB breast cancer (T4b) as per AJCC 8th edition. Neoadjuvant chemotherapy (NACT), followed by Modified radical mastectomy (MRM), is the commonly accepted treatment in such patients for fear of adverse outcomes with breast conservation surgery (BCS) and uncertainty over sparing initially involved skin irrespective of the response to chemotherapy. Identifying patients with skin resolution post-NACT can help surgeons in decision-making.

Materials and methods: Data was analysed from a prospectively maintained departmental database. Patients with inflammatory breast cancer and those who underwent upfront surgery were excluded. A total of 97 patients with non-inflammatory skin involvement were analysed.

Results: The mean age of the whole cohort was 47.7 (± 10.6) years. The majority of the patients (68.8%) received anthracycline-based regimen. Majority of the patients showed resolution of dermal skin involvement post-NACT (n = 85, 87.6%), with 14 patients achieving complete pathological response (PCR).

Variable	
Age	47.7 (± 10.6)
Nodal stage	86.6% (Node-positive)
PCR	10 (10.3%)
BCS	4 (4.1%)
MRM	93 (95.8)
LVI	47 (50%)
PNI	23 (24.7)
Grade	
1	6 (6.7%)
2	25 (28)
3	58 (65.2)
HR positive	46 (47.4)
Her2/neu positive	37 (38.1)
Triple negative	30 (30.9)
Adjuvant CT	82 (84.5)
Adjuvant RT	82 (84.4)

After a median follow-up of 28 months, the 3-year OS of the whole cohort was 77.6% (95% CI 65.6–85.7) and 3-year DFS of 63.6% (50–74). Patients who achieved a complete pathological response had improved survival with 3-year OS of 90% (95% CI 47.3–98.5). Patients with persistent skin involvement on histopathology had significantly worse survival (3-year OS and DFS 37.5% and 31.4%, respectively, p = 0.04). Hormone receptor-negative status was a significant predictor for PCR (p = 0.03).

Conclusion: Clinical T4b is a poor biology disease. However, survival rates are improved in patients who show regression of dermal involvement.

No conflict of interest.

221 (PB-045) Poster

Lobular carcinoma of the breast and response to targeted therapy with CDK4/6 inhibitors – a single Portuguese center experience

P. Freitas[1], A.T. Pina[1], S. Carola[1], C. Cardoso[1], E. Gouveia[1], F. Vaz[1], M. Santos[1], M.B. Mira[1], M.T. Alexandre[1], I. Miguel[1], M. Brito[1], A. Moreira[1], H. Nunes[1]. *[1]IPOLFG, Medical Oncology, Lisboa, Portugal*

Background: Invasive lobular carcinoma (ILC) represents 5–15% of all BC, and has a different biological behaviour from invasive ductal carcinoma (IDC). Clinical trials (CT) in luminal metastatic BC (mBC) have demonstrated the benefits of hormonal therapy (HT) + iCDK 4/6 combinations in survival. Data on the magnitude of clinical benefit in ILC mBC is scarce. The aim of this study is to evaluate the response of ILC mBC to HT+iCDK4/6 combinations.

Material and methods: A single-center retrospective study was performed on mBC patients (pts) with a lobular histology initiating iCDK4/6 therapy in our center, between Jan-2019 and Jan-2022. Data was collected from the medical records. Mixed histologies with lobular features were included. The data cut-off date was 18 Aug-2022.

Results: Of the 270 patients (pts) who initiated therapy with iCDK4/6 33 (12.2%) had a lobular or mixed lobular histology. All 33 were female. Median age at diagnosis of mBC was 61. PS ECOG was 0/1 in 27 pts (81.8%). Clinical stage II in 9 pts (27.3%), III in 14pts (42.4%) and IV in 10pts (30.3%). Median disease free interval was 80 months. Most pts (n = 25, 75.8%) had prior adjuvant HT. 18 pts (54.5%) had non visceral disease 10pts (30.3%) bone only metastasis, 15pts (45.4%) visceral disease. The most used iCDK4/6 was Palbociclib (19), ribociclib (11) and abemaciclib (3). 18 pts were treated in 1st line with an aromatase inhibitor (AI)+iCDK combination, and 15 pts with fulvestrant+iCDK combinations on 2nd and further lines. In the AI +iCDK group, after a median follow up (FU) of 12.5 months, mean PFS was 13.2 months (0.4–26.3) (median not reached). In terms of best observed response (BOR), 9 pts had stable disease (SD), 3 partial responses (PR), 1 complete response (CR) and 5pts had progressive disease (PD). At the cut-off date, 11 pts are still under treatment, 6pts progressed and 1 pt discontinued due to unacceptable toxicity; and 4 pts died due to BC. As for the Fulv+iCDK group, after a median FU of 12.1 months, mean PFS was 10 months (1.6–34) (median not reached). In terms of BOR to treatment 6 had SD, 3 PR, 1 CR and 1pt had PD. At the cut-off, 7 pts are still under treatment, 7pts progressed and 1 pt discontinued due to unacceptable toxicity; and 2 pts died due to BC.

Conclusions: IDC usually associates with better prognosis. However, data about the efficacy of HT + iCDK4/6 combinations in this subtype is scarce. Our cohort is therefore very informative, despite the retrospective design and short follow up. In the 2nd and further line setting with a median FU of 12 months, the Fulv+iCDK combinations show a PFS of 10 months that has not yet reached the median. This is in line with the data from seminal CT. In the 1st-line setting where longer survivals are expected, a longer FU is warranted to draw conclusions. It is clear the high clinical benefit drawn from these combinations in ILC.

No conflict of interest.

POSTER SESSION **18 November 2022**

Advocacy

222 (PB-046) Poster

Shared decision-making in breast cancer care: Evidence from a scoping literature review and a survey across breast units in Europe

N. Oprea[1], V. Ardito[1], O. Ciani[1], F. Cardoso[2], M. Bonotto[3], A. Minisini[3], R. D'Antona[4], L. Matos[2]. *[1]SDA Bocconi School of Management, Centre for Research on Health and Social Care Management, Milano, Italy; [2]Champalimaud Clinical Center, Breast Unit, Lisbon, Portugal; [3]Academic Hospital of Udine, Oncology, Udine, Italy; [4]Europa Donna Italia, President, Milano, Italy*

Background: Shared decision-making (SDM) is defined as a process of collaboration between patients and clinicians to reach a joint decision about care which accounts for patient preferences and values. This study aims at investigating SDM implementation barriers and enablers, and mapping the adoption and diffusion of SDM tools across Breast Centres in Europe.

Materials and methods: We performed a scoping review of scientific and grey literature to analyze the strategies that support SDM and decision aids (DAs) adoption in breast cancer (BC) clinical practice. Findings were interpreted based on the Practical, Robust Implementation and Sustainability Model (PRISM), an implementation science framework. The scoping review informed the development of a survey administered to specialists in Europe through BC networks and focused on patient-clinician communication approaches, availability and use of DAs, their barriers and enablers.

Results: The results from the analysis of 82 papers show a rise in interest toward SDM in BC care over time, with more than 50% of studies published since 2018, mostly (59%) in non-European countries. DAs are usually digital tools, although paper-based solutions remain relevant. The table below summarizes the key barriers and enablers to SDM implementation.

PRISM constructs	Barriers	Enablers
Intervention	• Embedding DAs in care pathways	• Patient and clinician DA co-development
Recipients	• Patients' characteristics (age, sex, socioeconomic status) • Clinician individual and team attitude toward SDM	
External environment	• Lack of harmonization in policy provisions	• Clinical guidelines • Scientific associations • Quality standards and checklists
Implementation and sustainability infrastructure	• Integration with IT systems • Procedural obstacles (eg, lack of time) • Educational material overload	• Users' training on DA • Frontend roles delivering the DA

The survey is running as late as August 2022. Preliminary results show that among the 260 respondents, roughly 50% report that DAs are available in their organization and/or country. The most commonly used tools are still paper-based.

Conclusions: The availability of SDM tools does not automatically translate into actual use in a clinical context. Factors related to user-centred development, team attitude and experience, organisational support and reorganisation of clinical pathways influence the adoption of SDM strategies. These findings will support the design of a feasibility evaluation of a digital DA in the metastatic setting.

Our work will contribute to raise awareness on the importance of SDM and to educate BC specialists on the benefits of using DAs, hopefully informing future updates of clinical guidelines at the national and international level.

Acknowledgment: This study is part of the ShareView project, funded by Pfizer Global Medical Grants with Sharing Progress in Cancer Care

No conflict of interest.

223 (PB-047) Poster

Utility Of Telephone-Based Psychological Support Among Breast Cancer Patients During Covid-19 Pandemic: An Observational Study

A. Datta[1]. [1]*Medica Superspeciality Hospital, Oncology, Kolkata, India*

Purpose: Telephone-based support could provide an effective and more flexible option for delivering psychological support. The present study aimed to investigate the feasibility and utility of a telephone-based psychological intervention for advanced breast cancer patients referred to palliative medicine department.

Methods: A single-centre randomized observational design was conducted on 610 adult advanced breast cancer patients referred to palliative medicine department between April and December 2020. Intervention group received additional 4 telephone-based psychotherapy sessions as compared to standard routine palliative care in the control group. Patients were followed up weekly for 1 month. Primary outcomes measured were: anxiety, depression, and psychological well-being.

Results: Most patients reported higher levels of anxiety, depression and lower psychological well-being at baseline. Patients assigned to the intervention group had statistically significant improvement in their psychological symptoms at all study time points as compared to their control group counterparts ($p < 0.005$).

Conclusion: Results from our study provide preliminary support concerning the feasibility and utility of telephone-based therapy for advanced breast cancer patients. Further research examining factors influencing the outcomes of telephone-based psychological support is needed.

No conflict of interest.

224 (PB-048) Poster

Exploring the impact of metastatic breast cancer support group in Nigeria

T. Nwosu-Zitta[1–6]. [1]*Project Pink Blue, Network Of People Impacted By Cancer In Nigeria, Abuja, Nigeria;* [2]*Project PINK BLUE – Health & Psychological Trust Centre, Nigeria;* [3]*Network of People Impacted by Cancer in Nigeria (NEPiCIN);* [4]*Abuja Breast Cancer Support Group (ABC-SG);* [5]*Nigeria Cancer Society;* [6]*ABC Global Alliance – Member*

Introduction: Over 70% of breast cancer patients in Nigeria present metastatic/advanced breast cancer (MBC). An estimated 90% of breast cancer deaths are as a result of metastatic disease, either at diagnosis or recurrence[i]. MBC is associated with severe burden to the patient, family, healthcare delivery system and the society at large[ii]. Women living with MBC face many challenges ranging from poor access to MBC information, untreated pain, frequent break-down of radiotherapy machines and absence of peer support.

Method: In this research, we set up the first metastatic breast cancer support group in Abuja. The group meet once every month on a face-to-face basis and also uses WhatsApp group for regular meaningful engagement. We explored the impact of the group on the patient's quality of life (QoL) using a focused group discussion (FGD). Eighteen (18) patients participated in the two sessions of FGD.

Result: Many of the patients report that the support group provides a culture of love and strength over their death anxiety, especially meeting other patients who have lived with MBC longer. They also report to have found peer support on the online WhatsApp group.

No conflict of interest.

Reference

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225 (PB-049) Poster

Home based care for terminal cancer patients: study from rural part of India

S. Jana[1], A. Manna[1]. [1]*MAS Clinic & Hospital, Oncology, Tamluk, India*

Introduction & Aim: Cancer is one of the common causes of death worldwide after heart disease. Home care of the terminal cancer patients is very difficult and various challenges during their terminal stage. Our goal is to give a pain free good quality of life in these advanced stage cancer patients. Objective of this study is to identify the main difficulties in achieving the above goal in a rural village setting in India.

Method: This study was conducted for a period of one year in MAS Clinic & Hospital, India with the informed consent of the study population. This was a qualitative exploratory study design via randomized way of selected 100 terminal cancer patients. Half of the patients received treatments with the help of family members only. And another half received treatment by trained volunteers and nurses by regular home visit. Data were collected through focus group discussions and in-depth interviews. And data were analyzed by content analysis in two separate groups.

Results: Basically we focused on few major problems i.e. pain, nausea, vomiting, constipation, mobility problem, and bed sore problem. These all three problems are lessen to that group who received care by trained volunteers rather than family members.

Conclusion: This study can provide quality of life of these terminal cancer patients at their own home. And if we give basic training to family members that will be more benefited of these patients and ultimately enhances quality of life and reduce caregiver's burden.

No conflict of interest.

226 (PB-050) Poster

Racial disparity and time to treatment initiation effects on survival differences in breast cancer: a DAGs-based review protocol for a systematic review of cohort studies

P. Mokhtari Hesari[1], D.J. Lizotte[1], G.R. Bauer[1]. [1]*Western University, Epidemiology and Biostatistics, London, Canada*

Background: Racial disparity is a fundamental predictor of many poor health outcomes, including in breast cancer. There is a need to synthesize knowledge on the impact of variations in race/ethnicity and initiation of treatments on health-related outcomes to support mitigating interventions; however, in the literature, there are various ways the causation between racial disparities and outcomes is conceptualized, and the implications of different studies depend strongly on these different conceptualizations. The aim of this protocol is to systematically review the existing evidence on racial/ethnic disparities in initiation of treatments and their impact on breast cancer patients' survival in the U.S, and to develop causal models that describe the ways in which the research community conceptualizes the causal associations between racial disparities and these outcomes.

Methods: A comprehensive systematic search of databases including PubMed, Ovid, Web of science, and the Cochran library will be performed, along with a title search on Google Scholar, to identify relevant literature. The process will follow PRISMA guidelines. The review will include studies of cohorts of female breast cancer patients who were diagnosed with stage I-III in the US. The ROBINS-I risk of bias tool will be applied and studies with either low or moderate risk of bias will be included in the review. A Directed Acyclic Graph (DAG)-based appraisal will be used to describe the causal effects of race/ethnicity on delays to treatment and survival assumed by each study, and to create a consensus causal model that aggregates these associations across the identified studies. The evidence synthesis for constructing directed acyclic graphs (ESC-DAGs) method was used to create a DAGs based checklist.

Results: As part of the protocol, a workflow was created to build causal DAGs that summarize causal associations in the literature. Based on the final checklist, five main steps are required to generate the DAGs in retrospective cohort studies: create a specific DAGs for every study, create a combined DAG which describes the existing literature, modify and/or simplify the DAGs using established causal criteria, and visualize the resulting DAGs.

Conclusion: This systematic review will summarize knowledge about the impact of racial disparity on breast cancer survival considering delays in receiving treatments as a mediator, and will explicitly describe the causation underpinning this knowledge. Future directions will be identified to address

existing gaps potentially relevant to creating equity for racial and ethnic minority groups. The results can help health authorities to take action to alleviate inequity in marginalized groups at population level.

No conflict of interest.

227 (PB-051) Poster

Living with the unknown: The experience of Cypriot individuals living with BRCA 1/2 mutations

S. Christodoulidou[1]. [1]*Europa Donna Cyprus, Psychology, Nicosia, Cyprus*

Background & context: Breast cancer is the most common type of malignancy in Cypriot women, with approximately 600 new cases diagnosed each year. Approximately 5 to 10% of these diagnoses are a result of a mutation in the BRCA 1/2 genes. Genetic testing for breast cancer predisposition has been available in the clinical practice for more than 20 years now. Since genetic information disclosure, following this type of tests, involves a language of possibilities and not certainties, complex distress issues may occur. However, limited attention has been given to the experience of BRCA mutation disclosure. The project recognises the research gap regarding documenting and understanding the needs of individuals living with BRCA mutations, and therefore aims to provide an insight into these experiences. The way an individual experiences a clinical diagnosis may be closely linked to their cultural background, therefore it is important to gather and analyse data separately for the Cypriot population. Currently, no other studies have investigated the experience of Cypriot individuals living with BRCA 1/2 mutation.

Methods: The data obtained, through individual interviews, will be analysed qualitatively. It is expected that they will provide useful insights into what it is like to be a Cypriot citizen living with a BRCA mutation. The project is organised and implemented by establishing a co-operation between researchers from Europa Donna Cyprus, the Cyprus Institute of Neurology & Genetics and major oncology hospitals.

Expected Outcomes: Through the dissemination of the data obtained, we are hoping to provide a fuller picture of the experience of BRCA 1/2 affected individuals living in Cyprus and depict the ways it might be affecting their lives. The acquired knowledge might help genetic counsellors, researchers, and healthcare professionals obtain a better understanding of the implications of germline mutations. This in turn may contribute to the development and integration of ongoing multi- disciplinary psychosocial support services and effective interventions for BRCA affected families. Moreover, the data obtained can be translated into educational materials/lectures on cancer genetic testing so that individuals can feel empowered to make educated, informed health choices. In addition, this new information might serve as strong leverage in advocating and lobbying to influence social policy makers to take necessary actions and adjust national strategies in relation to genetic testing and breast cancer. Finally, this project highlights the importance of setting up a national reference centre for BRCA mutations and other cancer genetic diagnoses, offering services tailored to the needs of the Cypriot population.

No conflict of interest.

228 (PB-052) Poster

Breast cancer and pregnancy: about a series of cases and review of the literature

B. Bannour[1], I. Bannour[2], M. Bannour[2]. [1]*Chu Farhat Hached, Obstetrics and gynecology, Sousse, Tunisia;* [2]*University hospital Farhat Hached of Sousse, obstetrics and gynecology, Sousse, Tunisia*

Background: Pregnancy-associated breast cancer is a rare entity. Its prognosis is overall poor because of the young age of onset and the diagnostic delay related to gravidic breast changes.

Materials and methods: We studied 9 cases of pregnancy-associated breast cancer collected at the Maternity Hospital of Sousse. We compared our results with those of the literature and tried to identify the particular points of this management, and specify the prognosis of this association.

Results: The mean age of our patients was 33 years with extremes of 24 and 44 years. The mean parity was 1.7. The tumor was classified T1 in 4 cases, T2 in 3 cases and T3 in 2 cases. The axillary lymph nodes were palpable in 4 cases. Mammography was performed in 100% of cases. In our series there were 6 therapeutic terminations of pregnancy and only 3 pregnancies were carried to term.

Conclusion: Pregnancy-associated breast cancer is often discovered late compared to the general population with a larger tumor size and lymph node metastasis in 89% during pregnancy compared to 55% in the general population.

The goal of management is to propose an optimal treatment for the mother while limiting the risks for the fetus. Surgical treatment has the same indications as outside of pregnancy, conservative treatment can be proposed only if radiotherapy can be postponed to the post-partum period. Chemotherapy should be avoided during the first trimester, but there are no major fetal risks in the second and third trimesters for combinations such as FEC (5 fluorouracil, epirubicin, cyclophosphamide) and FAC (5 fluorouracil, anthracycline, cyclophosphamide).

No hormone therapy or targeted therapy is currently possible during pregnancy or breastfeeding.

No conflict of interest.

229 (PB-053) Poster

COVID-19, breast cancer care, and social determinants of health: a cross-sectional study to investigate the impact of a pandemic on health and health care

C. Myers[1], C. Cahir[1], K. Bennett[1]. [1]*Royal College of Surgeons in Ireland, School of Population Health, Dublin, Ireland*

Purpose: The aim of this study is to understand the immediate impact on overall health and health care utilisation for women living with and beyond breast cancer (LWBC) specific to breast cancer during COVID-19, and whether the impact varied by social determinants of health (SDH).

Methods: This cross-sectional study included women living in Ireland and diagnosed with breast cancer (BC) in the past five years and was conducted from September 2020 to April 2021 (during the period of COVID-19 restrictions). Chi-Square tests and multivariate regression analyses were used to measure associations between predictors (COVID-19 impact, SDH, clinical characteristics) and outcomes (disrupted health services and quality of life).

Results: There were n = 387 responses and 30.5% of women reported a high COVID-19 impact, which was significantly associated with age, region, and employment status. 54.5% of women reported disrupted breast cancer (BC) care. In multivariable analyses, younger women, women in post-active treatment, and women further removed from their initial BC diagnosis reported significantly more disruption to BC care. Also, women who reported a high COVID-19 impact reported significantly lower quality of life (QoL) scores; women of younger age and non-employed also reported significantly lower QoL scores.

Conclusion: The COVID-19 pandemic has significantly impacted women LWBC in Ireland which varied by SDH including age, region, and employment status. Further research is needed to understand the long-term impact of the pandemic on women LWBC and how the health system in Ireland specific to BC has responded to COVID-19.

No conflict of interest.

POSTER SESSION **18 November 2022**

Basic Science and Translational Research

230 (PB-054) Poster

GC-MS based untargeted approach reveals metabolic perturbation in Tamoxifen resistant breast cancer cells

A. Mishra[1], A. Mishra[2], A. Shrivastava[1]. [1]*King George's Medical University, Center for Advance Research, Lucknow, India;* [2]*King George's Medical University, Endocrine surgery, Lucknow, India*

Background: Breast cancer is the most common cancer among females. The estrogen receptor (ER) is expressed in approximately 70% of breast tumors. Tamoxifen is an ER antagonist that is used as adjuvant therapy in the treatment of ER-positive cancers. Approximately 40% of patients develop tamoxifen resistance during treatment. The metabolic state of cancer cells dictates how responsive they are to chemotherapy, and cancer cells can rewire their metabolism to produce resistant phenotypes. We aim to identify altered metabolites and associated pathways in tamoxifen-resistant (TAMR) breast cancer by using gas chromatography-mass spectrometry (GC/MS).

Materials and Methods: Metabolites were extracted from human MCF7 and MCF7-TAMR cells in methanol-methanol-water by repeatedly freezing and thawing. Methoximine hydrochloride in pyridine reagent was used to treat the dried supernatant before MSTFA + 1% TMCS reagent was used for derivatization. An untargeted GC/MS method was developed and optimized.

MSdial was used for all data preprocessing steps, and the Kovats retention index and GC/MS library search were used to identify metabolites. The Metaboanalyst online tool was used for statistical analysis.

Results: A total of 101 metabolites were identified using library search, of which 70 were found to be significantly different between two cell lines using t-test analysis. The fold change analysis revealed that in TAMR cells, 29 metabolites were upregulated and 36 metabolites were downregulated. The metabolites that are upregulated in TAMR cells include N-acetyl-D-glucosamine, N-acetyl-D-hexosamine, lysine, uracil, citrulline, tyrosine, alanine, glyceric acid, and o-phosphoserine, whereas those that are downregulated are hydroxyproline, threonic acid, lactose, oxoproline, glutamine, o-phosphoethanolamine, oxoglutaric acid, and N-acetyl-L-aspartic acid. We also identified metabolic pathways that significantly differ between the two cells, including amino sugar and nucleotide sugar metabolism; histidine metabolism; Vitamin B6 metabolism; nicotinate and nicotinamide metabolism; pantothenate and CoA biosynthesis; and citrate cycle.

Conclusions: This study revealed dysregulation of various metabolic processes in TAMR cells, which may be crucial in elucidating the molecular basis of the mechanisms underlying acquired tamoxifen resistance.

No conflict of interest.

231 (PB-055) Poster

A study of the anti-proliferative and anti-migration effects of polyphenol compounds in Maltese extra virgin olive oil on different breast cancer cell lines

J.D. Tovar Parra[1], G. Grech[2], M. Zammit Mangion[3]. *[1]Univeristy of Malta, Physiology & Biochemistry, Pembroke, Malta, [2]University of Malta, Pathology, Msida, Malta; [3]University of Malta, Physiology & Biochemistry, Msida, Malta*

Background: According to statistical data the incidence of breast cancer worldwide has been increasing annually. Despite therapeutic advances in conventional and targeted therapies, the 5-year survival rate of stage IV is less than 29%. In addition, adverse events caused by the combination of current therapies often have an impact on a patient's quality of life. Phenolic compounds have been studied as alternative therapies showing anti-proliferative and pro-apoptotic effects in colorectal, ovarian, and breast cancer, and have also shown cell differentiation-inducing effects in leukaemia cell lines according to previous studies conducted by our research team. Therefore, in this study we evaluated the effect of Maltese-derived phenolic compounds (EVOOs) on a variety of Oestrogen and Progesterone receptor-positive and triple-negative breast cancer epithelial cell lines.

Material and methods: MDA-MDA-231, MCF-7, BT549, HCC1806, HCC1937, and HCC70 cell lines were used for the different assays. The effects of phenolic compounds such as hydroxytyrosol, pinoresinol, oleacein, and a fourth compound identified as Peak 4 were evaluated by performing proliferation assays, cell viability, wound healing assays, and cytotoxicity assay. The data was analysed using Prism 8.0 software. Anova test and t-test were performed for statistical analysis where $p < 0.05$ was considered statistically significant.

Results: Peak 4 and hydroxytyrosol decrease cell viability significantly by up to 90% in MDA-MD-231 and MCF-7 cell lines. These compounds show promising anti-proliferative behaviour in MDA-MD-231, MCF-7 and BT549 cancer lines, providing IC50 values of 39 parts per million (ppm) and 36 ppm, respectively. Moreover, they show potential anti-migratory activity compared to control for the MCF7 cell line ($p = 0.006$ and 0.019) and for the BT549 cell line ($p = 0.003$ and 0.034) respectively.

Conclusions: The results of this study suggest that Peak 4 and Hydroxytyrosol exhibit antiproliferative and anti-migratory activity in certain triple-negative breast cancer cells or in cells expressing Oestrogen and Progesterone receptors.

No conflict of interest.

232 (PB-056) Poster

Co-expressing genes with TACSTD2 and interacting microRNAs in patients with recurrent luminal breast cancers

V.C. Kok[1], D. Agustriawan[2], K. Ramanto[2]. *[1]Kuang Tien General Hospital Cancer Center, Medical Oncology, Taichung, Taiwan; [2]Indonesia International Institute for Life Sciences, Bioinformatics Department, Jakarta, Indonesia*

Background: Previous studies showed that high expression of the Trop-2 gene, *TACSTD2*, is associated with higher cyclin D1 levels, lymph node and distant organ metastases in breast cancer. It would be interesting to investigate the interacting microRNAs and co-expressing genes with TACSTD2 in recurrent luminal A breast tumors.

Material and methods: We downloaded the miRNA and gene dataset for breast cancer from the TCGA with 361 and 76 recurrent cancer and normal tissue samples, respectively, and sorted the dataset pinpointing recurrent luminal A breast cancer (N = 111). We calculated differentially expressed miRNAs and genes (DEGs) between recurrent vs. normal tissue and recurrent vs. non-recurrent tumors. We investigated all the mRNAs or genes that correlate moderately to strongly with *TACSTD2* in recurrent breast tumors, taking 0.4 as the cut-off. Genes of interest were queried in the CRISPR-Cas9 viability screening database DepMap for the gene effect scores in luminal breast cancer cell lines. Pathway analysis was adopted with NDEx Integrated Query, ver 1.3.1 (UC San Diego) for functional characterization.

Results: Using the edgeR analysis of the differentially expressed miRNAs and DEGs, we discovered that miR-125b-1 was significantly down-regulated in the recurrent breast tumors than in the normal tissue (LogFC =–1.267, P-value = 1.45e-24). Furthermore, we computed the correlation of miR-125b-1 and *TACSTD2* in the recurrent tumor samples, which disclosed a positive but weak correlation (Spearman correlation = 0.157, P-value = 0.0028). Differential expression analysis of the recurrent tumors versus normal for other miRNAs from miRTarBase revealed overexpression of miR-942 (false discovery rate (FDR) = 1.12e-12) and depletion of miR-495 in recurrent tumors (FDR = 1.98e-05). We found two genes, *AQP5* and *LINC00052*, differentially co-expressed strongly with *TACSTD2* in recurrent tumors compared to the non-recurrent luminal A breast cancers. *AQP5* was positively correlated (correlation = 0.446; p = 6.66e-7), whereas LINC00052 was negative correlated with *TACSTD2* expression (correlation =–0.432; p = 1.53e-6). The long non-coding RNA, *LINC00052*, has been reported as a tumor suppressor. We queried the CRISPR-Cas9 viability screening database DepMap, which showed that *AQP5* acts as a tumor suppressor, evidenced by the gene effect scores by DEMETER2 in six luminal cancer cell lines. STRING and NDEx database analysis showed that *AQP5* would interact with *SRC* and *STX4*.

Conclusions: *TACSTD2* co-expressing *AQP5* and *LINC00052* and their interactions with *STX4* and *SRC* could be interesting in further understanding Trop-2 positive luminal breast cancers in the relapsing state. Overexpression of miR-942 and depletion of miR-495 in recurrent tumors also require further experiments for validation.

No conflict of interest.

233 (PB-057) Poster

Serum methylmalonic acid concentrations at breast cancer diagnosis are not associated with distant metastases

Q. Wu[1], S. Hatse[1], J. García[2], P. Altea-Manzano[2], J. Billen[3], M. Planque[4], A. Vandekeere[5], Y. Lambrechts[1], F. Richard[1], A. Laenen[1], K. Punie[6], P. Neven[7], I. Nevelsteen[7], G. Floris[8], C. Desmedt[1], A. Gomes[9], S.M. Fendt[2], H. Wildiers[1]. *[1]KU Leuven, Oncology, Leuven, Belgium; [2]VIB-KU Leuven Center for Cancer Biology, Cellular Metabolism and Metabolic Regulation, Leuven, Belgium; [3]KU Leuven, Chronic Disease and Metabolism, Leuven, Belgium; [4]VIB-KU Leuven Center for Cancer Biology, Laboratory of Cellular Metabolism and Metabolic Regulation, Leuven, Belgium; [5]KU Leuven, Cellular Metabolism and Metabolic Regulation, Leuven, Belgium; [6]University Hospitals Leuven, General Medical Oncology, Leuven, Belgium; [7]University Hospitals Leuven, Multidisciplinary Breast Center, Leuven, Belgium; [8]University Hospitals Leuven, Imaging and Radiology, Leuven, Belgium; [9]H. Lee Moffitt Cancer Center & Research Institute, Molecular Oncology, Tampa, USA*

Background: Methylmalonic acid (MMA), a metabolite and by-product of propionate metabolism, promotes breast cancer (BC) progression in mice via the transforming growth factor beta (TGFβ) signaling pathway (Gomes et al, Nature 2020). It is currently unknown if this effect also exists in patients with BC. This study is to investigate the association between baseline serum MMA concentrations in patients at BC diagnosis and the development of distant metastases via a matched case-control study.

Material and methods: We included 32 patients with early Luminal B-like BC (Lumb, median age 62.4y) and 52 patients with early triple-negative BC (TNBC, median age 50.5y) who developed distant metastases within 5 years. They were matched to an equal number of early BC patients with at least 5 years of follow-up (median age 62.2y for Lumb and 50.5y for TNBC) who did not develop distant metastases. Matching was performed based on age at diagnosis date (± 5y), tumor stage, and treatment received ((neo) adjuvant chemotherapy and radiotherapy, yes/no). Serum MMA concentrations were determined by liquid chromatography with tandem mass spectrometry (LC-MS-MS). Summary statistics, paired analyses, and multiple conditional logistic regression analyses were performed with and without adjusting for potential covariates (age, kidney function, and tumor

stage). Further, transcriptome data from TCGA (n = 174 for Lumb; n = 140 for TNBC), METABRIC (n = 461 for Lumb; n = 199 for TNBC), and GSE25066 (n = 78 for Lumb; n = 182 for TNBC) were analyzed to identify the role of TGFβ in promoting disease progression.

Results: Baseline serum MMA at BC diagnosis significantly correlated with age (rs = 0.35, p = .005 in Lumb; rs = 0.35, p = .0003 in TNBC), and negatively correlated with kidney function assessed by estimated glomerular filtration rate (eGFR, rs = – 0.42, p = .0005 in Lumb; rs = – 0.32, p = .0009 in TNBC). MMA concentrations at diagnosis were not associated with distant metastases in either subtype, after adjusting for kidney function, age, and tumor stage (all p > 0.05). Next, online data mining reveals a gene expression signature of TGFβ signaling was not associated with distant metastases in patients with BC, like MMA concentrations.

Conclusions: Baseline serum MMA concentrations and a gene signature for TGFβ signaling at BC diagnosis are not associated with distant metastases among patients with Lumb and TNBC subtypes.

No conflict of interest.

234 (PB-058) Poster

Neratinib could be effective as monotherapy or in combination with Trastuzumab in HER2 low expressing breast cancer cells and organoid model

M. Arshad[1]. [1] *King`s College London, Comprehensive Cancer Center, Birmingham, United Kingdom*

The selection of breast cancer patients for anti-HER2 treatment is based on HER2 positivity defined by IHC (Immunohistochemistry) and/or in situ hybridization (ISH). However, there have been some discrepancies and ambiguity on HER2 classification, leading to several cut-off changes over the years and resulting in some of the patients with lower HER2 expressing tumours not offered anti-HER2 treatments. Several studies also suggested that a subset of the HER2 low breast tumours may respond to anti-HER2 treatments. The aim of this study is to understand the mechanisms of action and resistance of HER2 targeting treatments in HER2-low expressing breast cancer cells (BC cells). The HER2 expression of a panel of 8 breast cell lines was assessed by IHC, FISH, western blot and qRT-PCR and their responses to trasztuzumab was assessed based on HER2 expression. We also established a panel of patient-derived organoids (PDOs) from the cancer tissues obtained from breast cancer patients to assess the effects of anti-HER2 agents.

Using cell viability studies, we found that compared to high (IHC3+), moderately low HER2 expressing (IHC 2+) MDA-MB-361 and MDA-MB-453 cells show an intermediate response to trastuzumab. We also showed that trastuzuamb induces upregulation of HER ligands in these cells, resulting in activation of HER receptors. However, trastuzumab in combination with dual ADAM10/17 inhibitor to inhibit the shedding of HER ligands only showed a modest decrease in the cell viability in HER2-low BCs and PDOs. However, a panHER inhibitor neratinib or in combination of trastuzumab was effective in HER2-low BCs and PDOs although greater effect was seen in the combination. Thus, neratinib in combination with trastuzumab maybe effective in a small subset of moderate to low HER2 expressing BC and will require further validation.

No conflict of interest.

235 (PB-059) Poster

PAM50 genomic test in the management of early breast cancer – the importance of clinical-pathological data

A. Valente[1], M.J. Costa[1], R. Pinto[2], L. Cirnes[2], I. Augusto[1], F. Schmitt[2]. [1]*Centro Hospitalar Universitário São João, Medical Oncology, Porto, Portugal;* [2]*Instituto de Patologia e Imunologia Molecular da Universidade do Porto, Molecular Pathology, Porto, Portugal*

Background: The PAM50 test provides important prognostic information for therapeutic decision in hormone-receptor positive (HR+) and HER2-negative (HER2-) early breast cancer. This genomic signature estimates the risk of recurrence (ROR) at 10 years, for patients treated with adjuvant hormone therapy (HT) alone. It also allows the determination of breast cancer intrinsic subtype. However, its validation results only from retrospective studies. We aimed to analyze the correlation between histopathological variables and risk of breast cancer recurrence, as well as the agreement between subtype-like, obtained by immunohistochemistry (IHC) and breast cancer intrinsic subtype, obtained through this molecular analysis.

Methods: Retrospective analysis of patients with early breast cancer, ER +/HER2- who underwent PAM50 genomic test, between 09/2019 and 07/2021, at our institution. Demographic, diagnosis and treatment data were collected.

Results: The study included 123 patients, with a median age of 58.5 years. About 1/3 of patients classified as luminal A subtype like by IHC assessment were reclassified as Luminal B (30%) and HER2-enriched subtype (2%). Among patients classified as luminal B-like subtype, 62% were reclassified as luminal A, 2% as HER2-enriched subtype, and 2% as basal subtype. A positive and statistically significant correlation between tumor grade and ROR (p = 0.002) and between Ki67 value and ROR (p < 0.001) was also demonstrated. Most patients (92%) who underwent adjuvant chemotherapy had high risk ROR, with Docetaxel plus cyclophosphamide (TC) chemotherapy regimen being the most frequently used.

Conclusions: A substantial proportion showed discrepancy between IHC subtype-like and PAM50 intrinsic subtype. Larger studies and longer follow-up are necessary to understand whether this discrepancy translates into treatment modifications and poorer survival outcomes. Tumor grade and Ki67 are independent prognostic factors used for therapeutic decision in clinical practice. Demonstration of an increased ROR associated with increasing values of tumor grade and Ki67, may allow a redefinition of patients' groups that may benefit the most from this genomic signature utilization.

No conflict of interest.

236 (PB-060) Poster

Circulating microRNAs for early detection of therapy-related cardiac events in HER2-positive breast cancer patients: an explorative analysis from NeoALTTO

S. Pizzamiglio[1], C.M. Ciniselli[1], E. De Azambuja[2], D. Agbor-Tarh[3], A. Moreno-Aspitia[4], T. Suter[5], A. Trama[6], M.G. Daidone[7], P. Verderio[1], S. Di Cosimo[8]. [1]*Fondazione IRCCS Istituto Nazionale dei Tumori, Unit of Bioinformatics and Biostatistics, Milan, Italy;* [2]*Institut Jules Bordet and L`Université Libre de Bruxelles, Breast Cancer Research Laboratory-Department of Medicine, Brussels, Belgium;* [3]*Frontier Science, Scotland Ltd, Kingussie, United Kingdom;* [4]*Mayo Clinic, Jacksonville, Florida, USA;* [5]*Bern University Hospital- University of Bern, Department of Cardiology-Inselspital, Bern, Swaziland;* [6]*Fondazione IRCCS Istituto Nazionale dei Tumori, Evaluative Epidemiology Unit- Department of Research, Milan, Italy;* [7]*Fondazione IRCCS Istituto Nazionale dei Tumori, Scientific Directorate, Milan, Italy;* [8]*Fondazione IRCCS Istituto Nazionale dei Tumori, Platform of Integrated Biology Unit, Milan, Italy*

Background: Cardio-toxicity remains the main adverse event associated with anti-human epidermal growth factor receptor 2 (HER2) therapy. Currently, drug-induced cardio-toxicity is clinically assessed by regular evaluation of left ventricular ejection fraction (LVEF) by imaging techniques. However, the cardiac damage is usually detected late when a functional impairment has already occurred, not allowing for early preventive strategies. The aim of the present study is to identify circulating microRNAs (miRNAs) to early assess cardio-toxicity in HER2-positive breast cancer (BC) patients.

Material and methods: We based our work on plasma samples obtained at baseline (T0), after 2 weeks of anti-HER2 treatment alone (T1) and at week 18 immediately before surgery (T2) from patients of the NeoALTTO trial (NCT00553358). For each sample a total of 752 miRNAs were profiled using "microRNA Ready-to-Use PCR, Human panel I+II" (Exiqon). The levels of miRNAs were normalized according to the overall mean approach. MiRNAs differentially expressed according to the cardiac event status were identified by resorting to non parametric Kruskal-Wallis test and penalized logistic regression analysis.

Results: During the follow-up of the NeoALTTO trial (median of 6.7 years; interquartile range, 5.7–6.8 years), a total of 13 cardiac events (primary and/or secondary) were observed related to 11 patients. For the aim of the present study we compared circulating miRNA profiles of plasma samples obtained from the 11 patients suffering a cardiac event with an equal number of patients without any cardiac events matched by age, treatment arm and estrogen receptor status. The association of miRNA expression value according to the occurrence of a cardiac event was assessed within each specific time point: 138 miRNAs were detected at T0, 172 at T1 and 104 at T2. Out of these, none was significantly dysregulated at T0 or at T2. However, 8 circulating miRNAs were differentially expressed between patients with and without a cardiac event at T1. Specifically, miR-125b-5p, miR-409-3p, miR-15a-5p, miR-423-5p, miR-148a-3p, miR-99a-5p and miR-320b were significantly up-regulated in patients with a cardiac event with a fold change ranging from 8 to 2; miR-642a-5p resulted down-regulated with a fold change of 0.19.

Conclusions: By analysing circulating miRNAs profiles in HER2-positive BC patients in the context of NeoALTTO trial, we identified 8 miRNAs differentially expressed between patients with or whithout cardiac event in

plasma collected after two weeks of anti-HER2 neoadjuvant treatment. The obtained results highlighted potentially non invasive cardio-toxicity markers that could be used to monitoring progression of cardiac damage and planning of therapeutic strategies.

Conflict of interest:
Advisory Board: Serena Di Cosimo: Pierre-Fabre (outside the scope of this work).

237 (PB-061) Poster

Gene expression profile at week 2 of neoadjuvant therapy course predicts outcome in HER2-positive breast cancer patients: an explorative analysis from NeoALTTO

S. Di Cosimo[1], S. Pizzamiglio[1], C. Sotiriou[2], C.M. Ciniselli[1], T. Triulzi[3], L. de Cecco[3], S. El-Abed[4], M. Izquierdo[5], E. de Azambuja[6], C. Saura[7], J. Huober[8], M. Untch[9], I. Lang[10], S. Loi[11], E. Tagliabue[3], I.T. Rubio[12], A. Vingiani[13], M.P. Colombo[3], P. Verderio[1], G. Pruneri[13]. *[1]Fondazione IRCCS Istituto Nazionale dei Tumori, Department of Applied Research and Technological Development, Milan, Italy; [2]Institut Jules Bordet - Université Libre de Bruxelles, Breast Cancer Translational Research Laboratory, Brussels, Belgium; [3]Fondazione IRCCS Istituto Nazionale dei Tumori, Department of Experimental Oncology and Molecular Medicine, Milan, Italy; [4]Breast International Group, Breast International Group, Brussels, Belgium; [5]Novartis Pharma, Novartis Pharma, Basel, Switzerland; [6]Institut Jules Bordet - Université Libre de Bruxelles, Department of Medical Oncology, Brussels, Belgium; [7]Vall d`Hebron University Hospital - Vall d`Hebron Institute of Oncology, Department of Oncology, Barcelona, Spain; [8]University of Ulm, Department of Oncology, Ulm, Germany; [9]Helios Klinikum Berlin-Buch, Breast Cancer Center, Berlin, Germany; [10]National Institute of Oncology, Department of Oncology, Budapest, Hungary; [11]University of Melbourne, Sir Peter MacCallum Department of Oncology, Melbourne, Australia; [12]Clinica Universidad de Navarra, Breast Surgical Oncology Unit, Madrid, Spain; [13]Fondazione IRCCS Istituto Nazionale dei Tumori, Department of Pathology, Milan, Italy*

Background: NeoALTTO showed increased pathological complete response (pCR) with paclitaxel combined with dual over single anti-HER2 blockade. The trial included six initial weeks of treatment with lapatinib (L), trastuzumab (T) or their combination (L+T) followed by chemotherapy (CHT). A tumor biopsy was planned during the CHT-free window at day14 ± 2. Herein, we tested the hypothesis that prognostication of clinical outcome is feasible through assessment of gene expression profile (GEP) following two weeks of anti-HER2 therapy.

Patients and methods: RNA from matched baseline and day14 ± 2 biopsies were profiled using Clariom S microarray (ThermoFisher). The levels of the molecular classifier TRAR, which proved to identify HER2-addicted (HER2 high/ESR1 low, TRAR-low) and non HER2-addicted (TRAR high, Estrogen Receptor [ER]-dependent) primary tumors, and five immune-related metagenes, namely, the T-cell surrogate lymphocyte-specific kinase (LCK), the monocyte/myeloid lineage hemopoietic cell kinase (HCK), interferon (IFN), major histocompatibility complex II (MHCII), and signal transducer and activator of transcription 1 (STAT1) were computed. Logistic and Cox regression models were applied to evaluate the association between TRAR and immune-related metagenes with pCR and event free survival (EFS), at baseline and after two weeks of treatment with anti-HER 2 therapy.

Results: Overall, 180 matched baseline and day14 ± 2 GEP samples were analyzed from patients treated with L (n = 65), T (n = 66), and L+T (n = 49). No significant differences in patient characteristics or outcomes were observed between the cohort included in our study and the whole NeoALTTO patient population. At baseline, none of the immune-related metagenes tested were informative of patient outcomes. After 2 weeks of treatment with anti-HER2, the expression levels of LCK (OR: 3.92, 95%CI: 1.96; 7.85), HCK (OR: 3.22, 95%CI: 1.55; 6.68), and MHCII (OR: 2.68, 95%CI: 1.37; 5.26) were significantly positively associated with pCR, independently from ER status and treatment arm. When considering changes from baseline, increased levels of LCK were also predictive (2.90, 95% CI:1.48;5.71), and those of HCK were associated with EFS regardless of pCR and nodal status (HR: 0.57, 95%CI: 0.34; 0.96). TRAR assessment at day 14 ± 2 was not predictive of response. However, both pre-treatment TRAR (Odds Ratio [OR]: 0.19, 95% CI: 0.08;0.47), and its increase during treatment (OR:3.99 95%CI1.90; 8.39) were independently associated with pCR.

Conclusions: Biomarkers of early T-cell and monocyte-macrophage activation, as well as HER2 downregulation hold the potential to reliably identify patients likely to achieve a pCR and a favorable prognosis. New effective treatments need to be explored for cases lacking an early GEP response.

Conflict of interest:
Advisory Board: Serena Di Cosimo: Pierre-Fabre (outside the scope of this work).
Cristina Saura: AstraZeneca, Byondis B.V., Daiichi Sankyo, Eisai, Exact Sciences, Exeter Pharma, F. Hoffmann - La Roche Ltd, MediTech, Merck Sharp & Dohme, Novartis, Pfizer, Philips, Piere Fabre, PintPharma, Puma, Roche Farma, Sanofi.-Aventis, SeaGen, and Zymeworks (outside the scope of this work).
Other Substantive Relationships: Miguel Izquierdo: Employee of Novartis Pharma

238 (PB-062) Poster

Investigating The Role of Several Inner Nuclear Membrane Proteins In Triple Negative Breast Cancer

M. Rose[1], J. Burgess[1], C.M. Cheong[1], K. O'Byrne[2], D. Richard[1]. *[1]Queensland University of Technology, Centre for Genomics and Personalised Health, Brisbane, Australia; [2]Queensland Health, Princess Alexandra Hospital, Woolloongabba, Australia*

Background: Triple Negative Breast Cancer (TNBC) is an aggressive, highly metastatic subtype of breast cancer, which has significantly poorer survival times in comparison to other breast cancers. To date, chemotherapy remains the standard of care for TNBC patients. The nuclear envelope has been implicated in several cellular processes known to be dysregulated in tumourigenesis. However, a nuclear envelope targeting cancer therapy is yet to emerge. Our study investigates how several key inner nuclear membrane (INM) proteins contribute to TNBC tumourigenesis, and if downregulating these proteins inhibit TNBC inhibits tumour cell growth.

Materials & Methods: Bioinformatic analysis and cellular assays were utilised to assess the role of the INM proteins in tumour growth. The GENT2 database was used to analyse mRNA expression of several INM proteins in tumour and non-malignant patient samples. A panel of TNBC cell lines and non-cancerous MCF10A breast cells were used to establish the role of the INM proteins in tumour progression. Immunofluorescence and immunoblotting were utilised to determine the expression and localisation of each INM protein in TNBC and MCF10A cells. To investigate the role of the INM proteins in tumourigenesis, proteins were depleted by siRNA and cellular viability was measured by several assays, including an Annexin V/PI apoptosis assay, cell cycle analysis, and Incucyte proliferation assays.

Results: The transcript levels of INM proteins were shown to be significantly overexpressed in breast cancer patient samples compared to non-malignant tissue. Similarly, the INM proteins were overexpressed in the TNBC cell lines at the protein level, and siRNA-mediated depletion of these proteins specifically inhibited TNBC cell growth and induced aberrant nuclear morphology.

Conclusions: The INM proteins have an evident role in tumourigenesis and targeting these proteins may improve treatments for TNBC by providing a novel mechanism to specifically inhibit tumour cell growth. Elucidating the role of the INM in tumourigenesis may further enhance our capacity to develop cancer therapeutics.

No conflict of interest.

239 (PB-063) Poster

An expanded 29-gene HER2 signature robustly identifies genomic HER2-Type early-stage breast tumors

A. Ellappalayam[1], A. Barcaru[1], M.M. Kuilman[1], R. Bhaskaran[1], W.M. Audeh[2], L. Mittempergher[1], A.M. Glas[1]. *[1]Agendia N.V., Research and Development, Amsterdam, Netherlands; [2]Agendia Inc., Medical Affairs, Irvine, USA*

Background: BluePrint® (BP) is a highly robust and reliable breast cancer (BC) 80-gene molecular subtyping assay which identifies the underlying biology of a tumor by classifying early-stage BC into three molecular subtypes, Basal-Type, Luminal-Type, and HER2-Type. BP measures the expression of 58 Luminal- 28 Basal- and 4 HER2-Type signature genes from Formalin Fixed Paraffin Embedded (FFPE) tumor tissues.

In recent years, the definition of HER2 'positive' (HER2+) has evolved as the heterogeneity of HER2+ BC has become more elucidated. The purpose of this study is to potentially expand the BP HER2 signature by evaluating additional genes that may capture the modern definition of HER2+.

Material and Methods: For this study, we selected full genome microarray data of 1252 early-stage BC patient samples including all three BP molecular subtypes. Samples were split into training (n = 626) and test (n = 626) data sets. An additional set of 448 control samples with known BP results processed over 9 months were used to evaluate the BP HER2 expanded signature. Differential expression analysis was performed on the training set

between the HER2- *versus* the Basal- and Luminal-Type tumors. Statistically significant differentially expressed genes were identified and further selected based on coefficient of variation (CV) for the most stable genes. Functional annotation and pathway analysis was performed using Gene Ontology and Reactome Pathway Analysis followed by comparison of the new signature with previously reported molecular subtyping signatures using Principal Component Analysis (PCA).

Results: Our approach resulted in an expanded 29-gene HER2-Type signature. The 29 genes had an exceptionally low CV of ~5% indicating that they have a high stability. Among the 29 genes, 7 are from the HER2 amplicon and known to be upregulated in pathologically confirmed HER2+ tumors. Pathways associated with these genes include PI3 K and AKT signaling, which have a key role in cancer development.

Similarly to the BP 80-gene assay, the expanded BP HER2 signature could also better identify the molecularly HER2-Type versus non-HER2-Type tumors, based on the higher percentage of variance captured by PCA, than previously reported molecular subtyping signatures, while having an excellent concordance (97%) with the original 80-gene BP.

Conclusions: The expanded 29-gene BluePrint HER2-Type signature represents even more biological diversity within the HER2-Type tumors, thereby capturing the modern definition of HER2+ tumors. Indeed, the 29 genes include known HER2 amplicon genes and other genes involved in several oncogenic signaling pathways. Importantly, it is yet to be determined whether improved recognition of the HER2-Type increases treatment response prediction with HER2-targeted therapies, which is part of future research.

Conflict of interest:
Other Substantive Relationships: All authors are non-commercial employees of Agendia, the company that markets the 80-gene molecular subtyping assay, known as BluePrint.

240 (PB-064) Poster

A novel biomarker to predict DNA-Repair-inhibitor response in stage I-III high risk breast cancer patients

A. Barcaru[1], M.M. Kuilman[1], D. Wolf[2], C. Yau[3], E.B.M. Choy[1], W.M. Audeh[4], L. Brown-Swigart[2], G.L. Hirst[3], F.W. Symmans[5], M.C. Liu[6], R. Nanda[7], L.J. Esserman[3], L.J. van 't Veer[1], A.M. Glas[1], L. Mittempergher[8]. *[1]I-SPY 2 Investigators, Agendia N. V., Research and Development, Amsterdam, Netherlands; [2]University of California San Francisco, Department of Laboratory Medicine, San Francisco, USA; [3]University of California San Francisco, Department of Surgery, San Francisco, USA; [4]Agendia Inc., Medical Affairs, Irvine, USA; [5]University of Texas MD Anderson Cancer Center, Department of Pathology, Houston, USA; [6]Mayo Clinic, Department of Surgery, Rochester, USA; [7]University of Chicago, Department of Medicine, Chicago, USA; [8]Agendia N.V., Research and Development, Amsterdam, Netherlands*

Background: The combinations of PARP inhibitor (PARPi) and platinum-based drugs are gaining more interest as first line therapy for early-stage breast cancer. The I-SPY2 trial (NCT01042379) qualified different DNA-Damage-Repair (DDR) deficiency biomarkers that predict response to DNA damage agents. Here we aimed to translate the I-SPY2 research findings to a robust clinical grade platform signature to predict sensitivity to PARPi and platinum-based chemotherapy.

Material and methods: For this study, 72 fresh frozen pre-treatment biopsies from patients enrolled in the ISPY2 Veliparib+Carboplatin (VC) arm, were analyzed with whole transcriptome microarray following standard diagnostics at Agendia. All 72 patients had a High Risk MammaPrint® 70-gene profile. Pathological complete response (pCR) was defined as no residual invasive cancer in breast or nodes at the time of surgery. From the total set, 27 patients had pCR (5 HR(hormonal receptor)+HER2- 22 Triple Negative (TN)) and 45 had residual disease (RD) (28 HR+HER2- 17 TN). Biomarker development was based on the identification of significantly differentially expressed genes between pCR and RD groups, while balancing the HR status as well as prior knowledge on the biological relevance of the genes (i.e. genes relevant to DDR were prioritized). A leave-one-out cross-validation was employed due to a limited sample size. The significance criteria were based on the absolute value of the effect size (|ES|>0.5). Signature performance was evaluated on the RNAseq data from the carboplatin arm (n = 122) of the BrighTNess trial (NCT01525966), using 8-fold cross validation with support vector classifier.

Results: A set of 60 genes was selected after passing the significance criteria. Large majority of the signature genes (>70%) are related to DDR pathways among which homologous recombination repair, non-homologous end joining repair, Fanconi anemia and other conserved DDR genes. The performance of the biomarker on the development set was 94% accuracy, 96% sensitivity and 93% specificity across all patients. Sensitivity and specificity in the TN group were 95% and 94%, and in HR+HER2- 100% and 93%, respectively. Independent performance assessment using the BrighTNess data set yielded an average of 67% accuracy (with standard deviation σ = 11%), 67% sensitivity (σ = 10%) and 65% specificity (σ = 11%). Relatively large standard deviation pointed to heterogeneity within this cohort.

Conclusion: In the ISPY2 VC arm, RePrint predicts pCR with high accuracy, sensitivity and specificity. The performance on the BrighTNess dataset indicates the potential DRD predictive value of RePrint on RNAseq data. The signature includes genes from various DDR pathways indicating that it may detect patients with DDR deficiency that could be candidate for DNA damage response therapy.

Conflict of interest:
Other Substantive Relationships: Barcaru A, Kuilman M.M., Choy E.B.M., Audeh M.W., van 't Veer L.J., Glas A.M. and Mittempergher L. are non-commercial employees of Agendia.

241 (PB-065) Poster

Single nucleotide polymorphisms of ABCB1 (rs1128503) and ABCC2 (rs145008610) genes and its clinical impact in ER & PR positive breast cancer patients in a tertiary care hospital of India

T. Mistry[1], S. Ghosh[1], P. Sahoo[1], S. Mahata[1], R. Pal[1], S. Sarkar[1], T. Choudhury[1], N. Alam[2], S. Mandal[3], V.D. Nasare[1]. *[1]Chittaranjan National Cancer Institute, Pathology and Cancer Screening, Kolkata, India; [2]Chittaranjan National Cancer Institute, Surgical Oncology, Kolkata, India; [3]Chittaranjan National Cancer Institute, Epidemiology and biostatistics, Kolkata, India*

Background: Inter-individual differences in drug response are frequent clinical challenge due to genetic variation. ATP-binding cassette (ABC) transporters are crucial determinants of drug disposition and have been studied extensively in response to chemotherapeutic regimen and tamoxifen treatment. But no major findings were established till date in Indian scenario that correlates the effect of drug in ABC polymorphism.

In our study we aim to investigate the impact of ABCB1 (rs1128503) and ABCC2 (rs145008610) gene polymorphisms with reference to the clinical characteristics and adverse drug reactions in hormone receptor positive Breast Cancer (BC) patients who received tamoxifen adjuvant therapy.

Materials and Methods: In this monocentric, observational study, 121 patients were recruited with histologically proven hormone receptor positive BC from surgical OPD of Chittaranjan National Cancer Institute, Kolkata. Tamoxifen therapy (20 mg orally daily till 3 years) was given to the recruited patients after first-line treatment with surgery followed by adjuvant/ neo adjuvant chemotherapy with different regimens administered according to NCCN guidelines. The dose was determined as per patient's BSA value. 5 ml peripheral blood was withdrawn during the treatment to isolate genomic DNA and polymorphism analysis of ABCB1 (167964T>C) and ABCC2 (58626T>C) gene was performed using PCR-RFLP method. PET-CT/ CECT/MRI reports were clinically correlated with genomic data to assess the drug response and adverse drug effect among the attendees.

Results: Majority of the BC patients (n = 121) are diagnosed in stage II (52.9%), 41–60 (57.9%) age group are more prone to develop breast cancer. Infiltrating Ductal Carcinoma (83.5%) found to be the most common pathological subtype, maximally with grade II tumor (58%); tumor size range between >2cm-≤5 cm were most prevalent. In this study, significantly different in response categories among treatment group and significantly unequal survival outcome were seen between responder, non-responder and partial responder (long rank p = 0.225). Median overall survival was achieved within 48 months. Overall response rate was 94.2%. ABCB1 and ABCC2 gene polymorphism is non-significant with clinical parameters. Furthermore, no statistical significance (p > 0.05) was found with adverse events of Chemotherapeutic regimens and tamoxifen adjuvant therapy in contrast to ABCB1 and ABCC2 gene polymorphism.

Conclusion: Our study interprets that, ABCB1 (rs1128503) & ABCC2 (145008610) gene polymorphism may not be a predictor of treatment outcome of patients with respect to hormone positive breast cancer patients. Moreover, transporter genes may not significantly associate with adverse drug reaction thus no effect in overall survival. However, small sample size of our study restricts the statistical power.

No conflict of interest.

242 (PB-066) Poster

Development of a multiplex dPCR assay for ERBB2 amplification in breast cancer

P. Meng[1], H. Dalal[1], Y. Chen[2], A. Ehinger[3], M. Alcaide[2], L. Saal[1]. [1]*Lund University, Division of Oncology, Lund, Sweden;* [2]*SAGA Diagnostics AB, Lund, Sweden;* [3]*Skåne University Hospital, Department of Genetics and Pathology, Lund, Sweden*

Background: *ERBB2* amplification on chromosome 17 serves as a marker for monoclonal antibodies targeting HER2 in cancers, most notably in breast cancer. Although immunohistochemistry (IHC) and in situ hybridization (FISH/SISH/CISH) remain the gold standard for clinical diagnosis of *ERBB2* amplification, their semiquantitative and subjective nature are limitations that warrant the exploration of alternative quantitative, reliable, rapid, and cost-effective complementary approaches such as digital PCR (dPCR). Here we describe initial results with a dPCR-based SAGAplex™ assay for *ERBB2* amplification.

Material and Methods: We developed a single-reaction SAGAplex multiplex dPCR assay that enables simultaneous quantification of two common alleles of *ERBB2*, a control region CEP17 (a locus within the chromosome 17 centrome) and a copy number stable control region located near cytoband 2p13.1 (CNS-2p13.1). For 351 primary breast cancer patients selected from the SCAN-B cohort (ClinicalTrials.gov NCT02306096), *ERBB2* copy number was determined using the SAGAplex assay on DNA isolated from surgical tumor samples obtained at surgery. *ERBB2*, *CEP17*, and CNS-2p13.1 copy numbers were utilized combinatorially to evaluate gain of *ERBB2* and correspondence to the clinical HER2 status (FISH/SISH). Thresholds were determined by ROC analysis.

Results: Within the cohort of 351 cases, 121 breast tumors were clinically HER2-positive. SAGAplex *ERBB2* multiplex analysis was successfully performed in all cases. dPCR-*ERBB2* status was evaluated using several combinatorial metrics utilizing the measured copy numbers for *ERBB2*, CEP17, and CNS-2p13.1. When benchmarked to the clinical HER2 status, the sensitivity of the SAGAplex assay ranged from 86.8% to 92.6%, and the specificity ranged from 89.6% to 98.3%. Discordances may be due to tumor heterogeneity, tumor cellularity, false positive or negative assay performance, or an incorrect clinical result. For example, one patient had cancer evaluated IHC 3+ but not amplified by FISH and she received endocrine treatment but did not receive anti-HER2 therapy and survived 6.7 months; dPCR-*ERBB2* measured 10.5 copies of *ERBB2* with normal CEP17 and CNS-2p13.1 copy number. The assay is being optimized, final thresholds will be determined, and the performance will be evaluated in an independent test set.

Conclusions: The results thus far illustrate good concordance between clinical HER2 status and *ERBB2* status as determined by a SAGAplex multiplex dPCR assay. Further development, evaluation, and validation is ongoing. Rapid, quantitative, robust, and cost-effective multiplex dPCR could be an alternative or supplementary approach for determining *ERBB2* amplification in cancer.

Conflict of interest:
Ownership:
YC, MA, LHS have ownership and employment interest in SAGA Diagnostics AB.

243 (PB-067) Poster

A higher number of HSP70 positive immune cells in a deep layer of TNBC is associated with a higher FOXP3 expression and a higher risk of axillary lymph node involvement

A. Car Peterko[1], K. Rajković Molek[2], T. Gulić[3], D. Veljković Vujaklija[4], P. Valković Zujić[4], I. Belac Lovasić[5], F. Lovasić[6], E. Mustać[7], M. Avirović[7]. [1]*Clinical Hospital Centre Rijeka, Clinical department for general surgery and surgical oncology, Rijeka, Croatia;* [2]*Clinical Hospital Centre Rijeka, Clinical department of pathology and cytology, Rijeka, Croatia;* [3]*University of Rijeka-Faculty of Medicine, Department of physiology, immunology and pathophysiology, Rijeka, Croatia;* [4]*Clinical Hospital Centre Rijeka, Clinical department of radiology, Rijeka, Croatia;* [5]*Clinical Hospital Centre Rijeka, Clinical department of radiotherapy and oncology, Rijeka, Croatia;* [6]*Clinical Hospital Centre Rijeka, Clinical department of general surgery and surgical oncology, Rijeka, Croatia;* [7]*University of Rijeka- Faculty of Medicine, Department of general pathology and pathologic anatomy, Rijeka, Croatia*

Background: The high mutation burden of triple-negative breast cancer (TNBC) is related to its immunogenic potential. The presence of tumour infiltrating lymphocytes (TILs) in the preclinical stage of disease reflects a proinflammatory immune response against cancer cells. However, cancer cells may modulate it to support tumour growth and progression. A chaperone HSP70 molecule expression, upregulated by oncogenic signalling, supports the formation of early-stage breast cancer (BC) as well. Moreover, in the later course of the disease, HSP70 is actively released by the cancer cells and can induce the termination of the specific immune response. The aim of this study was to explore the role and possible predictive value of the HSP70(+) immune cells in a deep layer (HSP70-IC-DL) of TNBC.

Material and methods: Clinical data and surgical tissue specimens from 68 consecutive, stage I-III, TNBC patients, submitted to the upfront surgery in Clinical Hospital Centre Rijeka in the period from 2008 till 2016, as well as the 36 control specimens from benign breast tissue biopsies, were included in the present retrospective study. TILs, CD8, CD4, FOXP3, CD68, CD11c, PDL-1, CTLA-4 and HSP70 staining were evaluated in both groups by two independent dedicated breast cytopathologists.

Results: In contrast to benign breast tissue, a significantly higher infiltration of all immune cells, including HSP70-IC-DL, was observed in the study group ($p < 0.001$). The following positive correlations were detected with the respect to the number of HSP70-IC-DL: TILs expression in a both layers (superficial, rho = 0.30, $p = 0.025$; deep, rho = 0.38, $p = 0.002$), FOXP3 expression in the superficial layer and in the metastasis (rho = 0.42, $p < 0.001$; rho = 0.61, $p = 0.026$) and CTLA-4 expression in a deep layer (rho = 0.34, $p = 0.006$). Consistent with our previous findings, HSP70-IC-DL is associated with the adverse clinical and pathological markers as well; higher stage of disease ($p = 0.013$), higher grade ($p = 0.013$) and a higher pN status ($p < 0.001$). The latest association may represent a valuable tool for the prediction of the lymph node involvement (AUC = 0.78, $p < 0.001$) as well as the lymph node capsular penetration (AUC = 0.78, $p < 0.001$).

Conclusion: Upon the results of our previous analysis and the available literature data, we hypothesized the correlation of HSP70-IC-DL with the cancer-induced immunotolerance in the BC. Herein presented correlations of HSP-IC-DL with the FOXP3 and CTLA-4 expression in TNBC further support our initial findings. Targeting the HSP70 molecule, or the HSP70-related pathways in TNBC could have a role in further immunotherapy development in this BC subtype. In addition, routine evaluation of HSP70- IC-DL may improve clinical decision-making with respect to axillary surgery in TNBC patients. Further translational and clinical research is required to confirm our observations.

No conflict of interest.

244 (PB-068) Poster

Usability test of BREAST-Q questionnaires during pre-implementation of Patient-Reported Outcomes Measures in a Plastic- and Breast Surgical Outpatient Clinic

J. Prüsse[1], S.T. Hansen[1]. [1]*Zealand University Hospital, Department of Plastic- and Breast Surgery, Roskilde, Denmark*

Background: Significant evidence support the benefits of implementing patient-reported outcome measures (PROMs) in routine clinical practice. Collecting PROMs electronically requires adequate assessment of the user interfaces to ensure that the electronic patient-reported outcomes measures (ePROMs) are fit for the purpose and user-friendly. The aim of this study was to investigate the usability and technical feasibility of BREAST-Q as ePROMs.

Material and Methods: This study is part of an ongoing multi-method feasibility study exploring the implementation of BREAST-Q in a Plastic- and Breast Surgical outpatient clinic at a Danish university hospital. Throughout the ongoing study, women, diagnosed with breast cancer, are invited to complete two to three electronic BREAST-Q questionnaires. The questionnaires were prepared in the electronic data capture system REDCap.

The exploration of usability and technical feasibility in BREAST-Q were conducted as on-site moderater-controlled concurrent think aloud tests. Participants included for the test were eight women comparable to the target audience of the BREAST-Q implementation. Participants were aged 50–79, and were diagnosed with breast cancer. Before each test session, the moderator clarified to the women that the purpose of the test was to evaluate the interface and feasibility of the ePROMS to ensure that they were fit for purpose, user-friendly and acceptable to patients.

Results: The participants completed the questionnaire within 8–12 minutes. The overall assessment of technical feasibility and usability in

BREAST-Q as ePROMs was a good layout with comprehensible and effective navigation.

Three major aspects of potential improvement to take into consideration before placing the BREAST-Q to use was identified: Difficulty consenting with a signature, confusion regarding automatic calculation of BMI and voluntariness in relation to answering questions concerning sexual well-being.

Conclusion: The findings from the usability and feasibility tests facilitated improvement of the layout in the ePROMs. It led to removal of the signature function, being assured that consenting via a checkbox was adequate and legal. In addition, a field, which calculated BMI was hidden from participants and questions regarding sexual well-being was made voluntary. The latter, because it became evident, that in particular, one question could not be answered by patients who are not sexually active.

In conclusion, the usability and feasibility test of BREAST-Q as ePROMs led to essential alterations in the layout of the ePROMs making them more user-friendly and fit for the target audience.

No conflict of interest.

245 (PB-069) Poster

Exploring the lymph node's microenvironment for personalized management of luminal A breast cancer

I. Gante[1,2,3], J. Martins Ribeiro[4], A. Gomes[5], J. Mendes[2,4], V. Almeida[5,6], F. S. Regateiro[2,7,8], F. Caramelo[2,9,10], H. Coimbra Silva[2,4], M. Figueiredo Dias[1,2,3]. *[1]Faculty of Medicine - University of Coimbra, Gynecologic University Clinic, Coimbra, Portugal; [2]Coimbra Institute for Clinical and Biomedical Research iCBR - Faculty of Medicine - University of Coimbra, Area of Environment- Genetics and Oncobiology CIMAGO, Coimbra, Portugal; [3]Coimbra Hospital and University Centre CHUC, Gynecology, Coimbra, Portugal; [4]Institute of Medical Genetics - Faculty of Medicine - University of Coimbra, UC Genomics, Coimbra, Portugal; [5]Coimbra Hospital and University Centre CHUC, Pathology, Coimbra, Portugal; [6]Institute of Anatomical and Molecular Pathology - Faculty of Medicine - University of Coimbra, Anatomical and Molecular Pathology, Coimbra, Portugal; [7]Institute of Immunology - Faculty of Medicine - University of Coimbra, Immunology, Coimbra, Portugal; [8]Coimbra Hospital and University Centre CHUC, Allergy and Clinical Immunology Unit, Coimbra, Portugal; [9]Faculty of Medicine - University of Coimbra, Center for Innovative Biomedicine and Biotechnology CIBB, Coimbra, Portugal; [10]Faculty of Medicine - University of Coimbra, Laboratory of Biostatistics and Medical Informatics LBIM, Coimbra, Portugal*

Background: Lymph nodes (LNs) are the main doorway for tumor cell metastasis from the primary site and its evaluation is a major prognostic factor. The One Step Nucleic Acid Amplification (OSNA) is being adopted worldwide for sentinel-LNs (SLNs) staging in breast cancer (BC). SLNs' OSNA lysate may be used for gene expression studies, being the potentially ideal samples to search for new markers related to immune response. Using a targeted gene expression approach, we aim to identify transcriptomic patterns of SLNs immune response and biomarkers that may improve risk stratification and personalized therapy for patients with Luminal A early stage BC.

Material and methods: This was an observational, prospective, pilot study that included 32 patients with Luminal A early stage BC (cT1-T2 N0): 16 patients with OSNA negative SLNs and 16 patients with OSNA positive SLNs. After the OSNA assay, rather than being discarded, the remaining OSNA lysates were prepared for target RNA sequencing analysis, using the Oncomine™ Immune Response Research Assay. Identification of differentially expressed genes (DEGs) for group comparisons was performed by DESeq2 R package (version 1.36.0) in R (version 4.2.0). Data analysis was performed using STATA software, version 13.1, and statistical significance was set at $p < 0.05$.

Results: In Luminal A BC patients, several genes were upregulated in metastatic (OSNA positive) SLNs, including *KRT7, VTCN1, CD44, GATA3, ALOX15B, RORC* and *NECTIN2*. In macrometastatic SLNs, *LRG1, CD276, FOXM1* and *IGF1R* were also upregulated. In metastatic SLNs, higher values of total tumor load (TTL) correlated with a higher expression of most DEGs. Three different clusters were established: cluster 1 have the highest gene expression levels of all the 11 DEGs and the highest total number of LNs with metastasis whereas cluster 3 have the lowest gene expression levels of all the 11 DEGs and the lowest total number of LNs with metastasis.

Conclusions: A better understanding of the complex interplay between cancer cells and host immunity is essential for the choice of personalized treatment in Luminal A BC. The DEGs here identified in metastatic SLNs of Luminal A BC may improve prognosis accuracy and increase the efficacy and safety of targeted therapies. Particularly, *VTCN1*, *CD44*, *NECTIN2*, *LRG1*, *CD276* and *FOXM1* seems extremely promising biomarkers and potentially useful for target immunotherapy. As OSNA assay is being implemented for SLNs staging in other cancers, RNA sequencing on the OSNA lysate could also have a translational utility.

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No conflict of interest.

246 (PB-070) Poster

One-step nucleic acid amplification assay in palpable and non-palpable breast tumours

M. Robalo Cordeiro[1,2], D. David[2], A. Gomes[3], I. Gante[1,2], M. Figueiredo-Dias[1,2]. *[1]Faculty of Medicine - University of Coimbra, University Clinic of Gynecology, Coimbra, Portugal; [2]Coimbra University Hospital Center, Gynecology Department, Coimbra, Portugal; [3]Coimbra University Hospital Center, Pathology Department, Coimbra, Portugal*

Background: The one-step nucleic acid amplification (OSNA) assay quantifies the cytokeratin 19 (CK19) messenger RNA copy number, which is currently being used for assessment of axillary sentinel lymph node (SLN) *status* in breast cancer. The total tumour load (TTL), defined as the total amount of CK19 mRNA copies in all positive SLNs, may help predicting additional metastatic axillary involvement besides SLN. There is evidence suggesting that palpable and non-palpable breast tumours manifest distinct pathological features, making tumour palpability a putative predictive factor of axillary lymph node involvement. This is the first study aiming to evaluate the potential relationship between breast tumour palpability and SLN biopsy with OSNA assay.

Material and methods: Patients with breast cancer diagnosis and SLN study with OSNA assay were included in this cross-sectional study. Statistical analysis was performed using SPSS® version 27.

Results: A total of 155 patients with breast tumours were included: 63.2% with non-palpable tumours (mean histologic size = 14.7 ± 9.7 mm) and 36.8% with palpable tumours (mean histologic size = 19.5 ± 13.2 mm), ($p = 0.01$). According to the pTNM staging, 83.3% of the non-palpable tumours had a T stage ≤ pT1 *vs* 73.2% of the palpable tumours ($p = 0.02$).

The mean age in the non-palpable group patients was 59 years old [37–77] and it was 61 years old [42–79] in the palpable group ($p = 0.15$). In both groups, more than 80% of the patients were postmenopausal ($p = 0.92$), the majority had invasive carcinoma ($p = 0.29$) and intrinsic molecular subtype classified as Luminal A ($p = 0.55$).

SLN *status* was positive in 20.8% of the non-palpable tumours and in 32.2% of the palpable tumours ($p = 0.20$). The mean TTL of the positive SLN in the non-palpable tumours was 60 725 CK19 mRNA copies/μL [280–430 000] and it was 105 795 CK19 mRNA copies/μL [300–730 000] in the palpable tumours ($p = 0.58$).

In pT1 tumours, SLN *status* was positive in 22.5% of the non-palpable tumours and in 26.8% of the palpable tumours ($p = 0.61$). Mean TTL in pT1 tumours was 44 906 CK19 mRNA copies/μL [280–420 000]: 22 701 CK19 mRNA copies/μL [280–280 000] in pT1 non-palpable tumours *versus* 77 204 CK19 mRNA copies/μL [300–420 000] in palpable tumours ($p = 0.18$).

Conclusions: Even though palpable tumours have a higher mean TTL, we were unable to evidence TTL differences or even axillary LNs involvement differences between palpable and non-palpable tumours, mainly due to the study small sample size.

No conflict of interest.

247 (PB-071) Poster

Development of antibody-drug conjugates targeting the CDCP1 receptor for the treatment of Triple negative and metastatic breast cancer

M. Gough[1], K. Kwah[1], T. Khan[1], Y. He[1], C. Pyke[2], G. Ratnayake[3], C. Snell[4], J. Hooper[1], T. Kryza[1]. *[1]Mater Research Institute - The University of Queensland, Cancer cell biology, Brisbane, Australia; [2]Mater Hospital, Breast cancer unit, Brisbane, Australia; [3]Princess Alexandra Hospital, Radiation Oncology, Brisbane, Australia; [4]Mater Hospital, Pathology, Brisbane, Australia*

Background: CUB-domain containing- protein 1 (CDCP1) is a transmembrane receptor involved in the progression of several cancers. Recent studies demonstrate that CDCP1 is a rational target for the development of innovative targeted therapies for cancer including theranostics agents and antibody-drug conjugates.

Material and methods: To determine the therapeutic potential of CDCP1 in breast cancer, we investigated its expression in multiple cohorts of breast cancer tissues by immunohistochemistry, as well as in various preclinical models including cell lines, primary cells and patient-derived xenografts using flow cytometry, western blot and immunofluorescence staining. Then, we evaluated the capacity of the CDCP1-targeting chimeric antibody ch10D7 to specifically accumulate in breast cancer lesions in in vivo preclinical models including patient-derived xenografts and breast cancer metastasis models. Finally, we determined the efficacy of the ch10D7-MMAE antibody-drug conjugate to kill breast cancer cells in vitro and breast tumours ex-vivo and in vivo.

Results: The CDCP1 receptor is expressed at targetable level in a significant proportion of breast cancer cases with high/intermediate expression detected in ∼30% of localized ER-positive cases, ∼50% of metastatic ER-positive cases and >70% of Triple negative or HER2-positive cases. Similar proportion of expression was detected in cellular models. We demonstrated that ch10D7 antibody labelled with the radionucleotide Zircodium-89 specifically accumulates in breast cancer lesions in vivo allowing the detection of mammary-fat pad implanted patient-derived xenografts and of breast cancer metastasis by PET/CT imaging. Finally, we confirmed that the ch10D7-MMAE antibody-drug conjugate is very efficient at inducing cell death in vitro as well as controlling primary tumour and metastatic tumour burden in pre-clinical models, conferring a significant survival advantage compared to classical therapy.

Conclusion: Our work demonstrates that CDCP1 is a potential target to detect and limit the progression of breast tumours and that biomolecules specifically recognising this receptor are promising agents which could improve survival of patients.

Conflict of interest:
Ownership:
Prof Hooper, Dr He and Dr Kryza are inventor on a patent covering the utilization of CDCP1-binding molecules for diagnosis and treatment of cancers.
Advisory Board: N/A
Board of Directors: N/A
Corporate-sponsored Research: N/A
Other Substantive Relationships: N/A

248 (PB-072) Poster

A machine learning (ML) approach for identifying genetic biomarkers and new targets associated with impaired survival of breast cancer patients

G. Sanz Martin[1], V. Doldan Martelli[1], J. Del Castillo Izquierdo[1], P. Gomez del Campo[1], C.M. Galmarini[1], J.M. Domínguez Correa[1].
[1]*Topazium Artificial Intelligence, Research & Development, Madrid, Spain*

Background: Machine learning tools are appropriate to dive vast amounts of clinical and genetic information to identify genetic biomarkers of worse survival and potential new molecular targets.

Material and Methods: Whole-exome sequencing and clinical information from 945 breast tumours were obtained from http://gdac.broadinstitute.org. Sequencing data from each tumour was encoded using an encryption system that generated individual vectors of 10240 positions and 2% sparsity containing all the mutations present in each sample. This vector collection was then input into a ML framework (MLF) to identify subgroup of patients based on their genetic similarities. The resultant subpopulations were correlated with overall survival at 7 years. Genetic markers significantly contributing to their differences were identified and the biological pathways that were affected were assigned using the KEGG pathway database.

Results: The MLF identified two different subpopulations: SP0 (n = 358) and SP1 (n = 587). Stratification analysis demonstrated no association between any of the subpopulations with clinical (age, race, ethnic and staging), pathological (hystotypes and pTNM), nor molecular subtypes. Patients in SP1 had a higher risk of death at 7 years compared to those in SP0 (hazard ratio (HR): 1.5; 95% confidence interval (CI): 1.01–2.25; p = 0.04). Patients from SP1 presented a higher tumour mutation burden (SP1: 5520 vs. SP0: 1491 mutations; p < 0.001) and a selective contribution from the following KEGG pathways: PI3K/Akt, calcium, oxytocin and Rap1 signalling, focal adhesion, regulation of actin cytoskeleton, axon guidance and protein digestion. Of those, only PI3K/Akt (hsa04151; HR: 1.63; CI95%: 1.07–2.48; p = 0.02), axon guidance (hsa04360; HR: 1.89; CI95%: 1.16–3.08; p = 0.01) and regulation of actin cytoskeleton pathways (hsa04810; HR: 2.17; CI95%: 1.38–3.41; p = 0.0008) were related to a higher risk of death at 7 years. When patients harbouring gene mutations associated to these 3 pathways were discarded from the analysis, the unfavourable survival of SP1 patients was lost corroborating the role of these 3 pathways in their worse prognosis. Genes mutated in the PI3K/Akt pathway were COL4A2, ERBB3, IGF1R, COL6A2, PPP2R5B, PDGFRA, NTRK2, FGFR2, IL7R, PDGFB and CSF1R. Genes mutated in the regulation of actin cytoskeleton pathway were APC, DOCK1, SSH3, PDGFRA, HRAS, INSRR, ITGB5, MYLK2 and ACTN1. Genes mutated in the regulation of axon guidance pathway were BMPR2, SMO, PLXNA4, L1CAM, SSH3, PLXNB2 and EFNA3.

Conclusions: Our MLF has identified various genes involved in the process of PI3K/Akt and cell adhesion and migration as being critically related to an impaired survival. This methodology should be validated in other genetics datasets. Various of these genes should be investigated as potential new drug discovery targets.

Conflict of interest:
Ownership:
Carlos M. Galmarini
Other Substantive Relationships: Guillermo Sanz Martin, Victoria Doldan Martelli, José del Castillo Izquierdo, Pablo Gómez del Campo and Juan Manuel Domínguez Correa are employees of Topazium Artificial Intelligence.

249 (PB-073) Poster

Prognostic impact of HER low expression in early breast cancer in a Tunisian center

H. Rachdi[1], S. Driss[1], A. Latrous[1], Y. Berrazega[1], N. Daoud[1], N. Mejri[1], H. Boussen[1]. [1]*Abderrahmen Mami Hospital, Medical oncology department, Ariana, Tunisia*

Background: Identification of HER2 status in early breast cancer (EBC) is experiencing a paradigm change, leading to the identification of a new entity (HER2-low), defined as immunohistochemically 1+ or 2+ and lack of HER2 gene. This entity is depending on the HR status. Until now, HER2-low status has not been validated as an independent prognostic factor but it could be a promising new target for antibody–drug conjugates (ADCs) which are under investigation.

We aimed to determine the differences in clinicopathological characteristics and survival outcomes between HER2-low and HER2-IHC 0 in EBC.

Materiel and methods: We retrospectively reviewed clinical and anatomopathological data from patients treated for EBC from 2014 to 2017 and who had either negative or low HER 2 status.

We assessed the impact of HER2-low on survival outcomes (OS and PFS) using cox models.

Univariable analysis adjusted for T and N of TNM classification, SBR score, molecular type (luminal or triple negative) and KI 67status, were realized

Results: Our study included 201 patients of which 112 (55,7%) had HER2-low BC Median age was 50 years (29–80). Seventy five percent were HR+ and 25% HR-.

With a median follow-up of 55.4 months, 5-years OS was better in the in the HER2-0 group (77.19% in the HER2-low group, and 80.44% in the HER2-0 group, with a significant difference between the two groups [95% CI: 76.96; 85.11] (p = 0.047)

DFS was lower in the HER2-low group with 5-years DFS at 60.7% in the HER2-low vs 62.5% in HER2-0 groups but insignificant (p = 0.123)

In univariate analysis, we observe a significant prognostic impact of molecular subtype, triple negative and KI 67 status (> 20%) HR [95% CI: 77.63; 85.85] (p = 0.003) and HR [95% CI:76.60; 85.05] (p:0.000) respectively. However multivariate analysis did not show any significant factor impacting overall survival.

Conclusions: We showed that 5-years DFS and OS, seems to be lower in the HER2-low group with statistical significance for the OS. Findings suggest that HER2-low breast cancer is significantly different from HER2-0 breast cancer with regard to HR status. Larger studies are warranted to clarify whether HER2-low is an independent prognostic marker in EBC or whether it represents a biomarker that may impact treatment decisions.

No conflict of interest.

250 (PB-074) Poster

Cell-free DNA concentration in patients with different molecular subtypes of breast cancer

P. Karathanasis[1], G. Bletsa[2], D. Tsakogiannis[2], C. Zografos[3], F. Zagouri[4], G. Zografos[1], N. Michalopoulos[1]. *[1]Hippocratio General Hospital of Athens, 1st Department of Propaedeutic Surgery, Athens, Greece; [2]Hellenic Anticancer Institute, Hellenic Anticancer Institute, Athens, Greece; [3]Laiko General Hospital of Athens, 1st Department of Surgery, Athens, Greece; [4]Alexandra Hospital, Medical Oncology Department of Clinical Therapeutics, Athens, Greece*

Background: Breast cancer is the most common form of cancer diagnosed in women worldwide, and is one of the leading causes of death among women in Greece. Elevated levels of ccfDNA in the blood of breast cancer patients has been demonstrated in a few studies in the past. As the scope of breast cancer intratumour genetic heterogeneity unravels, the development of robust and standardized methods for the assessment of circulating biomarkers like ccfDNA will be essential for the realization of the potentials of personalized medicine. The aim of this study is to correlate the patient's ccfDNA levels with the different molecular subtypes of the disease.

Materials and Methods: The present study was conducted at the Hippocratio General Hospital of Athens in collaboration with the Hellenic Anticancer Institute. It has been approved by the scientific board of the hospital and every included woman has signed a consent form. Blood samples were collected from women who were diagnosed with different molecular subtypes and also from healthy women. After the blood sample collection, the samples were sent to the Hellenic Anticancer Institute where ccfDNA was quantified directly in unpurified plasma using a Qubit fluorometer 4.0 (Invitrogen Ltd., Life Technologies, UK) and a Qubit dsDNA HS Assay kit (Invitrogen Ltd., Thermo Fisher Scientific, UK) according to manufacturer's instructions. All statistical analyses of the results were performed using SPSS 22.0. Student's t – test was used to examine differences in circulating levels of cell-free DNA among the comparison groups.

Results: In total 148 women were included in this study (117 patients and 41 healthy). Patients with breast cancer had significantly higher levels of circulating cell free DNA compared to healthy counterparts (mean values: 661 vs. 573 ng/ml, $p < 0.001$). The levels of cell free DNA were significantly higher in all subtypes of breast cancer compared to healthy subjects (mean values: 617.5 ng/ml, $p = 0.012$ for Luminal B; 660 ng/ml, $p = 0.007$ for Luminal A; 711.4, $p = 0.002$ for Triple Negative; 691, $p = 0.005$ for Her-2 positive).

	All cancers	Healthy	Luminal B	Luminal A	Triple Negative	Her 2
N	117	41	43	29	27	18
Cell free DNA (mean ± SD)	661 ± 155.2 (p < 0.001)	573 ± 55.3	617.5 ± 96.2 (p = 0.012)	660 ± 156.2 (p = 0.007)	711.4 ± 219.6 (p = 0.002)	691 ± 154.1 (p = 0.005)

Conclusion: Measurement of ccfDNA concentration in patients with breast cancer is a promising biomarker, as the levels of ccfDNA are significantly higher in breast cancer patients compared to healthy women. From our study there also seems to be a correlation between the levels of ccfDNA and the different molecular subtypes of the disease as it is found that the higher levels of ccfDNA were found in women with Triple Negative breast cancer, suggesting potential clinical application of a simple blood-based test.

No conflict of interest.

251 (PB-075) Poster

Plasma L-arginine metabolic profiling in breast cancer patients reflects differences in cellular gene expression and metabolic activities according to subtype – A translational study in human breast cancer

J. Hannemann[1], L. Oliveira-Ferrer[2], A.K. Goele[1], I. Witzel[2], V. Müller[2], R. Böger[1]. *[1]University Medical Center Hamburg-Eppendorf, Institute of Clinical Pharmacology and Toxicology, Hamburg, Germany; [2]University Medical Center Hamburg-Eppendorf, Department of Gynecology, Hamburg, Germany*

Background: L-arginine is a semi-essential amino acid; its availability for protein synthesis is limiting for cell proliferation. It is also a substrate for nitric oxide synthases (nNOS, iNOS, eNOS) and arginases (ARG) 1 and 2. The effects of L-arginine on cell proliferation and disease progression in breast cancer have remained controversial. We studied whether breast cancer subtypes show different levels of L-arginine and its metabolites, and if this relates to NOS and ARG isoform expression and tumor cell proliferation.

Materials and Methods: In 220 women with early breast cancer without overt metastatic disease, we analyzed plasma levels of L-arginine, L-citrulline (product of NOS), and L-ornithine (product of ARG) by UPLC-MS/MS in blood samples drawn before therapy. L-citrulline/L-arginine (cit/arg) and L-ornithine/L-arginine (orn/arg) ratios are surrogates of NOS and ARG activity, respectively. We correlated metabolite levels with ER, PR, and HER2 scores, Ki-67 index, and lymph node (LN) status. Further, we studied mRNA expression of NOS and ARG isoforms by qRT-PCR, L-arginine metabolite levels by UPLC-MS/MS, and cell proliferation by image cytometry in MCF-7, SK-BR-3, MDA-MB-231, MDA-MB-468, and BT-474 breast cancer cells.

Results: The highest cit/arg ratio was found in plasma samples of patients with ER+/HER2+ tumors (0.65 ± 0.29), whereas patients with triple negative breast cancer had the lowest cit/arg ratio (0.52 ± 0.22). The latter group also had the highest proliferation scores. Cit/arg ratio was lower in patients with >1 positive LN than in those with 0 or 1 ($p < 0.04$). Orn/arg ratio did not differ between clinical breast cancer subtypes. *In vitro* experiments showed that RNA expression levels of all NOS isoforms (NOS I, NOS II, NOS III) were highest in ER+ breast cancer cells (BT-474 > MCF-7). In agreement with this, cellular cit/arg ratio was highest in BT-474 cells. These results are in line with those obtained in the breast cancer patients. Both triple-negative cell lines showed the lowest expression of NOS isoforms and the highest proliferation rates. ARG2 gene and protein expression was high in BT-474 and MDA-MB-468 cells, as was the orn/arg ratio. ARG1 was not expressed in any of the breast cancer cell lines.

Conclusion: In this translational study we found agreement between plasma metabolic ratios *in vivo* and molecular analysis in corresponding cell lines *in vitro*. Breast cancer cell lines are a representative and suitable model to further investigate molecular mechanisms according to subtype and possible interventions. Analysis of the expression of L-arginine metabolizing enzymes and plasma metabolic ratios may help to utilize metabolic fingerprinting in the different breast cancer subtypes to further individualize therapy approaches.

No conflict of interest.

252 (PB-076) Poster

Levels of vitamin D and expression of the vitamin D receptor in relation to breast cancer risk and survival

L. Huss[1], S.T. Butt[2], S. Borgquist[3], K. Elebro[4], M. Sandsveden[5], J. Manjer[2], A.H. Rosendahl[6]. *[1]Lund University and Helsingborg Hospital, Clinical Sciences and Department of Surgery, Helsingborg, Sweden; [2]Lund University and Skåne University Hospital, Clinical Sciences and Department of Surgery, Malmö, Sweden; [3]Aarhus University Hospital, Department of Oncology, Aarhus, Denmark; [4]Lund University and Skåne University Hospital, Clinical Sciences and Department of Plastic Surgery, Malmö, Sweden; [5]Lund University, Clinical Sciences, Malmö, Sweden; [6]Lund University and Skåne University Hospital, Clinical Sciences and Division of Oncology and Pathology, Lund, Sweden*

Background: Previous research suggests associations between low systemic levels of vitamin D and poor breast cancer prognosis and between expression of the vitamin D receptor (VDR) in breast cancers and survival. This study aimed to study associations between pre-diagnostic systemic levels of vitamin D and expression of VDR in subsequent breast tumors, and interactions between vitamin D and VDR on breast cancer mortality.

Material and methods: Systemic vitamin D levels were measured in women within the Malmö Diet and Cancer Study. The expression of VDR was evaluated immunohistochemically in a tissue microarray of subsequent breast cancers. Statistical analyses followed.

Results: Women with high levels of vitamin D had a smaller proportion of VDR negative breast tumors compared to women with low levels of vitamin D (odds ratio: 0.68; 95% confidence interval: 0.41–1.13). Vitamin D levels were not found to modify the association between low VDR expression and high breast cancer mortality.

Table: Vitamin D levels and VDR expression in relation to breast cancer mortality

Vitamin D tertile/level	VDR expression	Numbers within group	Dead breast cancer	HR (CI 95%)	HR* (CI 95%)
1st Low		300	58	1.58 (1.03–2.43)	1.51 (0.96–2.38)
2nd Medium	All tumors	309	40	1.00 (ref)	1.00 (ref)
3rd High		303	56	1.43 (0.92–2.24)	1.41 (0.88–2.26)
All	VDR neg	193	53	2.15 (1.32–3.49)	1.70 (1.08–2.76)
	VDR pos	719	101	1.00 (ref)	1.00 (ref)
1st Low	VDR neg	71	21	2.26 (1.13–4.52)	1.68 (0.76–3.71)
	VDR pos	229	37	1.00 (ref)	1.00 (ref)
2nd Medium	VDR neg	68	14	2.04 (0.92–4.52)	1.44 (0.57–3.64)
	VDR pos	241	26	1.00 (ref)	1.00 (ref)
3rd High	VDR neg	55	18	2.10 (0.96–4.59)	1.97 (0.88–4.41)
	VDR pos	248	38	1.00 (ref)	1.00 (ref)

*Adjusted for age at and season of diagnosis, size of tumor, lymph node status, and molecular subtypes

Conclusions: There was no statistical evidence for an association between pre-diagnostic levels of vitamin D and the expression of VDRs in breast cancer, nor did vitamin D levels influence the association between VDR expression and breast cancer mortality. Further studies are needed in order to establish the effects of vitamin D on breast cancer.

No conflict of interest.

253 (PB-077) Poster

Surgical choices and complications in elderly women: a single center retrospective analysis in frail vs non frail breast cancer patients

P. Costa[1], M. Debiasi[2], B. da Silva Reus[3], A. Cardoso[2], D. Pinto[2], P. Gouveia[2], R. Andres-Luna[2], C. Mavioso[2], J. Anacleto[2], F. Cardoso[2], M.J. Cardoso[2]. *[1]Centro Hospitalar Universitário de Lisboa Central and Champalimaud Clinical Center, Reconstructive Plastic Surgery CHULC-Breast Unit CCC, Lisbon, Portugal; [2]Champalimaud Clinical Center, Breast Unit, Lisbon, Portugal; [3]University of Lisbon Medical School, Epidemiology Master of Science Program, Lisbon, Portugal*

Background: Early Breast Cancer (EBC) in the elderly is a major public health problem and a risk factor for undertreatment due to concerns of complications. While underrepresented in clinical trials, invaluable clinical insights for this population rely on real-world data.

Objective: To describe surgical patterns and outcomes of an elderly population diagnosed with EBC treated in a European BC-dedicated reference center.

Material and methods: A retrospective cohort of all breast cancer patients ≥ 70 years old submitted to breast surgery for EBC from 2018 to 2021 was evaluated. Patients were included only if submitted to the G8 screening tool. Frail was defined as a G8≤14. Data on standard demographics, G8 screening, comorbidities, oncological and reconstructive surgery performed and surgical outcomes were collected.

Results: Overall, 192 patients were included; 67 of these patients (35%) were considered frail. Median age was 76.8 years. Charlson Comorbidity Index (CCI) ranged from 3 to 7 and 93,8% of patients had at least one comorbidity. Frail patients were significantly older ($p < 0.01$), had worse CCI ($p < 0.01$) and ASA ($p < 0.01$) scores and more comorbidities ($p = 0.09$). In total, 199 breasts were operated, with 7 patients having bilateral tumors. One hundred and seventy three (86,9%) of these were breast conservative surgeries (BCS) and 26 (13,1%) were mastectomies; this proportion was similar in both frail and non-frail groups. In the frail population, oncoplastic surgery after breast reconstruction (BR) was more frequently therapeutic mammoplasty: 20 (33%) patients. No reconstruction was reported after mastectomy. In the fit group, more diversity was seen in oncoplastic procedures after breast conservation: 22 mammoplasties (19,5%), 3 lateral intercostal artery perforator flaps and 1 implant-based reconstruction; 13 (76,5%) breasts were reconstructed with immediate breast implant after mastectomy. Frail patients were less likely to be offered BR ($p < 0.01$). One or more complications occurred in 30,2% of patients, mainly seromas (41,7%) and hematomas (23,3%), but there were no significant differences in both groups. The rate of postoperative complications in reconstructed breasts was 66,7%. There was no statistically significant association between frailty and in hospital length of stay, readmission or reintervention, though numerically higher in frail patients.

Conclusions: Our results suggest that G8 frail patients are less likely to be offered BR. Even if there were no significant differences in surgical adverse outcomes between groups, this could have been masked by a higher proportion of BR among fit patients, a more complex surgery expected to yield to more complications. G8 screening can be a useful instrument to support the surgeon's decision to whether or not to consider BR in elderly breast cancer patients.

No conflict of interest.

254 (PB-078) Poster

Bacterial β-glucuronidase activity in postmenopausal breast cancer patients: a pilot study

L. Hillege[1], J. Waelen[1], J. Ziemons[1], R. Aarnoutse[1], J. De Vos-Geelen[2], M. De Boer[2], Y. Van Riet[3], J. Vincent[4], K. Venema[5], S. Rensen[1], J. Simpson[6], M. Redinbo[6], J. Penders[7], M. Smidt[1]. *[1]Maastricht University, Surgery, Maastricht, Netherlands; [2]Maastricht UMC+, Internal Medicine, Division of Medical Oncology, Maastricht, Netherlands; [3]Catharina Hospital, Surgery, Eindhoven, Netherlands; [4]Elkerliek Hospital, Medical Oncology, Helmond, Netherlands; [5]Maastricht University, Centre for Healthy Eating & Food Innovation, Venlo, Netherlands; [6]University of North Carolina, Chemistry, Biochemistry, and Biophysics, Chapel Hill, USA; [7]Maastricht UMC+, Medical Microbiology, Maastricht, Netherlands*

Background: Long lifetime exposure to elevated estrogen levels is associated with a higher risk for developing estrogen receptor-positive (ER+) breast cancer in postmenopausal women. A factor that can influence estrogen levels is the intestinal bacterial enzyme β-glucuronidase (GUS), which can de-conjugate estrogens, leading to their reabsorption into the circulation. In this pilot study, we aimed to investigate if there was a significant difference in fecal GUS activity between postmenopausal ER+ breast cancer patients and postmenopausal controls.

Material and methods: Postmenopausal ER+/HER2- breast cancer patients were included in an ongoing prospective cohort study in the Netherlands. Patients collected a fecal sample before starting neoadjuvant chemotherapy. Controls, enrolled from the National Dutch Breast Cancer Screening Programme, without signs of breast cancer on the mammogram also collected a fecal sample. The GUS activity was quantified using a fluorescence-based activity assay with 4-MUG as substrate.

Results: GUS activity was analyzed in samples derived from nine breast cancer patients and nine postmenopausal controls. No significant difference in GUS activity was found between these two groups.

Conclusions: In this pilot experiment, no differences were found in fecal GUS activity between postmenopausal breast cancer patients and post-menopausal controls. An increase in the study population is required to confirm these results. Furthermore, proteomics-based identification of specific GUS that affects estrogen metabolism should be considered.

No conflict of interest.

255 (PB-079) Poster

Analysis of fatty acid composition profile of tumoral and non-tumoral tissues from breast cancer patients

B. Gonzalez Yebra[1,2], A.L. Gonzalez[3], J. Molina Torres[4], M.A. Guerrero Ramos[5], E. Ramirez Chavez[4], N. Gutierrez[1], D. Muñoz Lopez[1], E. Lara Lona[1], P. Romero Morelos[6]. *[1]Universidad de Guanajuato, Medicina y Nutrición, Leon, Mexico; [2]Hospital Regional de Alta Especialidad del Bajio, Investigación, Leon, Mexico; [3]Universidad de Guanajuato, Ciencias Aplicadas al Trabajo, Leon, Mexico; [4]CINVESTAV, Biotecnología y Bioquímica, Irapuato, Mexico; [5]Hospital Regional de Alta Especialidad del Bajío, Oncología, León, Mexico; [6]Universidad Estatal del Valle de Ecatepec, Investigacion, Ecatepec, Mexico*

Background: Breast cancer is the most diagnosed cancer, with 2.3 million estimated new cases (11.7% of total cases). In woman, breast cancer has high incidence (24.5%) and mortality (15.5%). Several factors influence the

risk for this disease, including age, genetics, endocrine factors, and lifestyle such as smoking, alcohol consumption, physical activity, and diet.

Evidence focusing on the role of diet has emerged recently. Some studies indicated that saturated and unsaturated fatty acids (FA) are associated with increased cancer risk in rodent and humans. The role of specific polyunsaturated fatty acids (PUFA) for protecting or promoting cancer effects have been studied. In western diets, the most common FA are n-6 PUFA, found in corn and safflower oils and could be precursors of development of mammary tumors. In contrast, n-3 PUFA may have anticancer effects. In the other hand, there are few studies investigating the FA composition in breast tissues, in this sense, our aim was to determine the FA profile differences in the tumoral and non-tumoral breast cancer tissues.

Material and methods: We included 4 patients from a third level hospital in Mexico. After surgery for resect the tumor, 50 mg of breast tumoral and non-tumoral adjacent tissue from patients where collected. Total lipids of the adipose tissue were extracted by saponification using NaOH and converted to methyl esters by transesterification. FA levels were determined by Gas chromatography-mass spectrometry (GC-MS) and were identified using commercial standards of known retention times. Means and standard deviations of individual FA were calculated and the total sum of FA in each family was determined. Two-tail Student´s t-tests were used to compare the mean differences between tumoral and non-tumoral adjacent breast tissue.

Results: We analyzed FA composition by GC-MS from 50 mg of tumoral and non-tumoral breast tissue resected from the same patient (n = 4 non-tumoral adjacent breast tissue and n = 4 tumoral breast tissues). No significant differences were detected in a) total FA between non-tumoral and tumoral tissues (394.9 ± 284 vs 228.9 ± 136.6, p = 0.33); b) saturated (48.23 ± 50.7 vs 22.06 ± 10.01, p = 0.35); c) monounsaturated (69.08 ± 81.82 vs 104.8 ± 69.85, p = 0.88); d) PUFA (3.553 ± 1.978 vs 7.115 ± 3.22, p = 0.1), e) n-6 PUFA (49.36 ± 56.16 vs 5.048 ± 3.148, p = 0.16), f) n-3 PUFA (136.2 ± 106.9 vs 47.73 ± 24.07, p = 0.15) or g) n-6/n-3 PUFA ratio (0.2261 ± 0.2379 vs 0.2025 ± 0.2767, p = 0.68). Interestingly, only n-6 PUFA, arachidonic acid (ARA) showed differences between non-tumoral and tumoral breast tissue (1.41 ± 0.763 vs 3.74 ± 1.19, p = 0.02).

Conclusion: The results suggest no different FA composition, neither in n-6/n-3 PUFA ratio between tumoral and non-tumoral adjacent breast tissue in patients. Increased AA levels in tumoral breast tissue may be related to mechanism of carcinogenesis at molecular level.

No conflict of interest.

256 (PB-080) Poster

Caveolin-1 haplotypes as predictor for locoregional recurrence in breast cancer

C. Godina[1], H. Tryggvadottir[1,2], A. Bosch[1,2], S. Borgquist[1,3], M. Belting[1,2,4], K. Isaksson[5,6], H. Jernström[1]. *[1]Lund University, Department of Clinical Sciences in Lund, Oncology, Lund, Sweden; [2]Skåne University Hospital, Department of Hematology, Oncology and Radiation Physics, Lund, Sweden; [3]Arhus University and Arhus University Hospital, Department of Oncology, Arhus, Denmark; [4]Uppsala University, Department of Immunology, Genetics and Pathology, Science for Life Laboratory, Uppsala, Sweden; [5]Lund University, Department of Clinical Sciences in Lund, Surgery, Lund, Sweden; [6]Kristianstad Hospital, Department of Surgery, Kristianstad, Sweden*

Background: Caveolin-1 (CAV1) is a master regulator of cell signaling and membrane transport. CAV1 has been implicated in breast cancer oncogenesis and metastasis and may be a potential prognosticator, especially for non-distant recurrences. Several *CAV1* SNPs have been linked to other cancers, however, the prognostic impact of *CAV1* SNPs in breast cancer remains unclear. Here, we investigated *CAV1* haplotypes association with clinical outcomes in breast cancer.

Methods: A cohort of 1017 breast cancer patients (inclusion 2002–2012, Lund, Sweden) was genotyped using Oncoarray by Ilumina. The patients were followed for up to 15 years and 215 had a recurrence of which 61 had locoregional recurrence. Five out of six *CAV1* SNPs (rs10256914, rs959173, rs3807989, rs3815412, and rs8713) passed quality control. Haplotypes were constructed from the five SNPs. *CAV1* haplotypes in relation to clinical outcomes were assessed with Cox regression and adjusted for potential confounders (age, tumor characteristics, and adjuvant treatments).

Results: Five common haplotypes were found (>10%). None was associated with tumor characteristics. Only the TTACA haplotype found in 145 patients was associated with outcome. The TTACA haplotype conferred borderline increased risk for any recurrence, adjusted hazard ratio (HR_{adj}) 1.39 (95% CI 0.96–2.01), which was mainly driven by an increased risk for locoregional recurrence HR_{adj} 2.24 (95% CI 1.24–4.04).

Conclusions: The TTACA haplotype of *CAV1* predicted increased risk for locoregional recurrence. If the finding is confirmed, patients with TTACA haplotypes may derive benefit from more tailored treatment to prevent locoregional recurrences.

Conflict of interest:
Ownership:
AB is co-founder and board chair for SACRA therapeutics
Advisory Board: AB has participated in Advisory Boards for Pfizer and Novartis
Board of Directors: AB is co-founder and board chair for SACRA therapeutics
Other Substantive Relationships: AB has received travel support from Roche and lecture fees from Eli-Lilly

257 (PB-081) Poster

Development and Validation of a Digital-Artificial Intelligent (AI) enabled Assay to predict early-stage breast cancer recurrence

G. Fernandez[1], M. Prastawa[2], R. Scott[2], B. Marami[2], N. Shpalensky[3], A. Madduri[4], K. Cascetta[1], M. Sawyer[1], M. Chan[2], G. Koll[4], D. Malinowski[5], R. De Angel[6], A. Shtabsky[2], A. Feliz[2], T. Hansen[1], B. Veremis[2], C. Cordon-Cardo[1], J. Zeineh[2], M. Donovan[7]. *[1]Mt Sinai, Pathology, New York, USA; [2]PreciseDx, Pathology, New York, USA; [3]PreciseDx, Statistics, New York, USA; [4]PreciseDx, Engineering, New York, USA; [5]PreciseDx, Business Development, North Carolina, USA; [6]PreciseDx, Business Development, New York, USA; [7]PreciseDx, Pathology, Miami, USA*

Background: Breast cancer (BC) is the most frequently diagnosed cancer worldwide and the second leading cause of cancer-related deaths. To advance predictive recurrence models we developed an AI-image analysis platform that utilizes whole slide images (WSI) to phenotype invasive BC (IBC) at the tissue-cell architectural level. The objective was to produce an AI-IBC phenotype that includes a novel methodology to grade BC along with additional features that reflect biological pathways. We sought to combine these extracted and complex image feature sets with standard clinical pathology data to develop readily accessible models that predict early-stage BC recurrence.

Methods: 2075 patients from 2004–2016 (Mount Sinai Health System, NYC, NY USA) with early-stage invasive ductal/lobular BC, followed for a median of 6 years, were divided 3:1 into training and validation cohorts. H&E WSI, 40X magnification (Philips, Netherlands) were interrogated with a deep learning morphology feature array (MFA) to extract tumor cell and tissue architectural morphologic features prioritized based on +/– association with breast cancer recurrence (BCR) events with a c-index range of <0.4 (+) or >0.4 (-). Available clinical data for modeling included: age, race, tumor size, grade, anatomic stage, lymph node status, and ER/ PR/Her2. Recurrence events were classified as locoregional, distant metastasis and overall survival. C-index/AUC curves, Kaplan-Meier, hazard ratio (HR), sensitivity, specificity, NPV, and PPV were used to assess risk discrimination.

Results: In the training model (n = 1559) clinical features included: age, tumor size, anatomic stage, lymph node status (grade was not selected) and 7 imaging features which reflected an AI-(grade) IBC phenotype, yielded a C-index of 0.78 (95% CI, 0.76–0.81) vs. clinical 0.71 (95% CI, 0.67–0.74) and image feature models 0.72 (95% CI, 0.70–0.74). A risk score of 58 (scale 0–100) stratified patients as low- or high-risk, HR 5.5 (95%CI, 4.19–7.2, p < 0.001), with a sensitivity 0.71, specificity 0.77, NPV 0.95, and PPV 0.32 for predicting BCR within 6 years. In validation (n = 516), the model produced a C-index of 0.75 (95% CI, 0.72–0.79) vs. clinical 0.71 (95%CI, 0.66–0.75) vs. image feature models 0.67 (95% CI, 0.63–071). When patients were stratified by a risk score of 58, the HR was 4.4 (95%CI, 2.7–7.1, p < 0.001), sensitivity 0.60, specificity 0.77, NPV 0.94, and PPV of 0.24 for predicting BCR.

Conclusion: We developed and validated a novel AI-enabled digital platform which successfully predicted early-stage BCR within 6 years using only the H&E stained image and readily available clinical pathology variables. Additional cohort studies are underway to further expand upon these initial validation results.

Conflict of interest:
Other Substantive Relationships: PreciseDx employees

258 (PB-082) Poster

Clinical and Experimental investigation of AKT1/2/3 isoforms indicated non-redundant isoform specific role in driving stemness and Cisplatin resistance in TNBCs

F. Malik[1], B. Wadhwa[2]. [1]*Indian Institute of Integrative Medicine, Pharmacology and Cancer Research, Srinagar, India;* [2]*Indian Institute of Integrative Medicine, Cancer Pharmacology, Srinagar, India*

Background: Metastatic Triple Negative Breast Cancers TNBCs become non-responsive to current chemotherapeutic treatment options. For decades Cisplatin is used in the treatment of different cancers and have shown clinical benefit against TNBCs. However, acquired resistance towards Cisplatin impedes its long-term benefits against TNBCs. Others and our studies have observed higher expression of AKT in TNBC cells and clinical samples, and dismal role of AKT towards drug response in other cancers is established. The role of individual isoform of AKT1/2/3 is not extensively investigated towards Cisplatin treatment in TNBCs. We tried to investigate the expression of AKT1/2/3 in the primary and metastatic patient tissue and co-relate isoform specific role towards Cisplatin sensitivity using cell lines, mice xenograft models and clinical samples.

Methodology: We used various human and Mice TNBC cell lines, mice xenograft models and clinical samples to uncover role of AKT1/2/3 towards towards cisplatin treatment. AKT1/2/3 expression was observed in clinical samples (primary and Lung/ Liver Met.) of ethnically two different populations from UK and India. Genetic knock-in and knockdown and pharmacological inhibitors were used during detailed understanding of mechanism of Cisplatin sensitivity vis-à-vis AKT isoforms.

Results: Amongst the clinical samples of UK and India, higher expression of AKT1 was observed in primary tumor issues, whereas lung and liver metastatic samples displayed elevated expression of AKT2. Genetic modulation of the expression of AKT isoform in cell lines displayed the role of AKT2 with invasive and migratory, and stemness properties. Cell line and mice xenograft studies revealed that loss of expression of AKT1 isoform is associated with reduced sensitivity towards cisplatin treatment. The decrease in cisplatin treatment response in AKT1 knockdown cells was allied with the upregulation in the expression of transporter protein ABCG2.. Our further detailed experiments suggests that knockdown of AKT1 (shAKT1) cells acquire EMT and cisplatin resistance through AKT/Snail/ ABCG2 axis. Further experiments revealed that knockdown of Snail in combination with cisplatin treatment induced caspase-3 and PARP-1 cleavage thereby overcoming resistance in shAKT1 cells

Conclusion: Studies demonstrated the varied expression of AKT1/2/3 in TN breast cancers primary and metastatic patient samples across ethnicities. It also demonstrated that expression of ABCG2/Snail was found enhanced during silencing AKT1 expression, while overexpression of AKT1 negatively regulates the expression of ABCG2/Snail, thus rendering cells sensitive to cisplatin mediated death. Studies suggest that the analysis of the expression of AKT isoforms can be predictive marker for the treatment choice of cisplatin and can offer useful information for its personalized use in patients.

No conflict of interest.

259 (PB-083) Poster

Cytokine identification in seroma fluid after mastectomy in breast cancer patients – first results of SerMa pilot study subgroup

N. Ditsch[1], N. Pochert[2], M. Schneider[3], M. Köpke[3], A. Mattmer[3], S. Hunstiger[3], J. Sagasser[3], H. Kahl[4], A. Metz[2], M. Reiger[2], A. Neumann[2], M. Banys-Paluchowski[5], M. Untch[6], C. Dannecker[3], U. Jeschke[3], C. Traidl-Hoffmann[2], T. Kühn[7]. [1]*University Hospital Augsburg, Gynaecology and Obstetrics, Breast Center, Augsburg, Germany;* [2]*University Hospital Augsburg, Environmental Medicine, Augsburg, Germany;* [3]*University Hospital Augsburg, Gynaecology and Obstetrics, Augsburg, Germany;* [4]*University Hospital Augsburg, Radiotherapy, Augsburg, Germany;* [5]*University Hospital Schleswig-Holstein, Campus Lübeck, Gynaecology and Obstetrics, Augsburg, Germany;* [6]*Helios Hospital Berlin-Buch, Gynaecology and Obstetrics, Berlin, Germany;* [7]*Hospital Esslingen, Gynaecology and Obstetrics, Esslingen, Germany*

Introduction: Postoperative seroma formation is one of the most common and serious complications after breast cancer surgery. It frequently appears after simple or radical mastectomies. Data from our recently published pilot study on immunological processes in seroma formation, showed a specific immune response of CD3+/CD4+ T helper (Th) cells. A significant increase of Th2 and Th17 was observed in both, seroma fluid and peripheral blood of the same patients while no increase was found in healthy controls. Interleukin (IL)-17 contributes to various lesions that are produced by Th17 cells as well as to autoimmune diseases that are accompanied by chronic inflammation. Regarding the balance between Th1 and Th2 one important cytokine is IL-6. Tumour necrosis factor alpha (TNFα) and interferon gamma (IFNy) were originally found to be produced by inflammatory cells and play important roles in the immune system.

Methods and patients: To specify the results, we used a patient subgroup of the pilot phase of the SerMa study (EUBREAST 5) for further analyses. In this population of breast cancer patients who underwent simple mastectomy we analyzed the cytokine content of collected seroma fluids (Sf) and compared the results with those measured in serum of the same patients (Sp) and in serum of ealthy controls (Sc). Cytokines were evaluated by the Bio-Plex platform (BioRad). A Bio-Plex Pro human Cytokine Screening Panel was used to determine the cytokine concentrations. Statistical analysis was performed using GraphPad Prism. Results were analyzed by either a one-way ANOVA or Kruskal–Wallis-test. Correlation analysis was also performed by the software. A value of $p < 0.05$ was considered statistically significant.

Results: Significant higher levels of IFNy, IL-2, TNFα, IL-4, IL-6 and IL17 were found in the Sf-group compared to Sp and Sc groups. In detail, cytokines responsible for Th1 differentiation were IFNγ, IL-2, and TNFα. For the Th2 differentiation Il-4 and IL-6 showed significant higher levels, and in case of Th17 it was primarily IL-17.

Conclusion: These results demonstrate an interesting concordance between cytokine expression and T-cell differentiation in the Sf group which needs to be further investigated in a larger patient cohort planned within the SerMa study.

No conflict of interest.

260 (PB-084) Poster

The combination of platelet-to-lymphocyte ratios with TIL assessment as prognostic factor for patients with triple negative breast cancer

Y. Horimoto [1], H. Onagi[2], Y. Ishizuka[1], A. Arakawa[2], J. Watanabe[1], M. Saito[1]. [1]*Juntendo University, Breast Oncology, Tokyo, Japan;* [2]*Juntendo University, Human Pathology, Tokyo, Japan*

Background: Tumor infiltrating lymphocytes (TILs) are a prognostic marker in breast cancer and high TIL infiltration correlates with better patient outcomes. Meanwhile, parameters involving immune cells in peripheral blood have also been established as prognostic markers. High platelet-to-lymphocyte ratios (PLRs) and neutrophil-to-lymphocyte ratios (NLRs) are related to poor outcomes in breast cancer, but their mechanisms remain unknown. To date, TILs and these parameters have been examined separately.

Material and methods: We investigated the relationship between TILs and the peripheral blood markers, PLR and NLR, in the same patients, using surgical specimens from 502 patients with invasive breast carcinoma without pre-operative chemotherapy.

Results: A positive correlation between PLR and TIL was observed in triple-negative breast cancer (TNBC) ($P = 0.013$), while no significant relationship was observed in other subtypes. TNBC patients had different patterns of outcomes according to TIL and PLR, with the TIL-high/PLR-low group having the lowest rate of disease relapse and death, and the longest distant metastasis-free and overall survivals, while the TIL-low/PLR-high group had the shortest survivals.

Conclusions: The combination of PLR with TIL assessment may enable more accurate prediction of patient outcomes with TNBC.

No conflict of interest.

261 (PB-085) Poster

HER2-low versus HER2-0 in Invasive Lobular Breast Carcinoma

M. Fontes-Sousa[1], L. de Sousa[2], L. Ribeiro[1], S. Pinto Torres[1], D. Alpuim Costa[1], C. Gama Pinto[3], L. Mestre[3], P. Borralho[4], A. Raimundo[5], I. Negreiros[3]. [1]*CUF Lisbon Breast Unit, Medical Oncology, Lisboa, Portugal;* [2]*NOVA Lisbon University, NOVA Medical School, Lisboa, Portugal;* [3]*CUF Lisbon Breast Unit, Breast Surgery, Lisboa, Portugal;* [4]*Hospital CUF Descobertas, Pathology, Lisboa, Portugal;* [5]*CUF Oncology, Medical Oncology, Lisboa, Portugal*

Background: Invasive Lobular Carcinoma (ILC) accounts for 8 to 15% of all invasive breast cancers and has distinctive biological features. Emergent data and the first positive trial targeting human epidermal growth factor receptor 2 low (HER2-L) tumors underscore its relevance. HER2-L is defined as immunohistochemical HER2 1+ or 2+ with negative *in situ* hybridization.

The objective of the study was to review institutional cases of ILC and analyze clinically relevant variables according to HER2-L or HER2-0 status.

Material and methods: All consecutive ILC patients treated at a Breast Cancer Unit in Lisbon, whose data was retrieved from clinical files, were considered for analysis over a 10-year period (Jan-2011 to Apr-2022). SPSS was used for statistical analysis and $p < 0.05$ was established for significance. The study was approved by the local Ethics Committee.

Table: Data regarding studied variables according to HER2 subgroups.

Variables	HER2-Low (n = 98)	HER2-Negative (n = 53)	p
Median age (years) at diagnosis	61 (35–93)	56 (42–87)	NS
Stage*			NS
I	51 (52%)	25 (47%)	
II	25 (26%)	21 (40%)	
III	16 (16%)	6 (11%)	
IV	6 (6%)	1 (2%)	
Histological grade			0.037
G1	4 (4%)	5 (10%)	
G2	78 (83%)	45 (86%)	
G3	12 (13%)	2 (4%)	
Breast conservative surgery	44 (48%)	27 (52%)	NS
pN+	23 (25%)	18 (34%)	NS
with extracapsular invasion	9/23 (39%)	11/18 (61%)	
Discordance cN0/pN+	16 (70%)	11 (61%)	NS
Chemotherapy (Neo or adjuvant)	37 (38%)	14 (27%)	NS
Postmenopausal status	70 (71%)	31 (59%)	NS
with hormonal replacement therapy	20/41 (49%)	12/22 (54%)	
Positive family cancer history**	32 (39%)	35 (70%)	<0.001
Recurrence	5 (5%)	1 (2%)	NS
before 36 months follow-up	4 (80%)	1 (100%)	
Death	5 (5%)	1 (2%)	NS

NS: not significant
*Respective AJCC stage at diagnosis (7th or 8th edition according to the year)
**considered cancers: breast, ovarian, prostate, pancreas or melanoma.

Results: A total of 164 patients were identified, all female. HER2 positive tumors (n = 8) and cases reported solely as HER2-negative (n = 5) were excluded. Of the included 151 patients, 98 (65%) were HER2-L and 53 (35%) were HER2-0. The median age at diagnosis was 59 years old and the median follow-up was 36 months. Estrogen and Progesterone receptors positivity (median 95%) and Ki67 (median 15%) were similar in both groups. Selected variables are shown below. Of note, a positive family history of cancer appeared to have a correlation with HER2-0 ($p < 0.001$), but no further germline genetic information was available.

Conclusions: ILC has a slightly higher HER2-L percentage (65%) than reported in the literature for invasive breast carcinoma (estimated 50–60%), thus being an attractive HER2-L target for therapy. This is relevant in early recurrences, as most occurred before the 3rd year since diagnosis. Despite being a retrospective study, we found that most clinically relevant variables were similar between the HER2-L and HER2-0 populations, with the exception of family history of cancer and histological grade.

Conflict of interest:
Advisory Board: AstraZeneca, Daiichi-Sankyo, Gilead, Lilly, MSD, Novartis, Pfizer, Roche
Other Substantive Relationships: Roche

262 (PB-086) Poster

Spatial Immunophenotyping Identifies Differential Infiltration of Immunosuppressive Subsets in Tumor Stroma and Invasive Margin and PDL1 expression in Inflammatory and non-Inflammatory Breast Cancer Patients overexpressing X-Linked Inhibitor of Apoptosis Protein

C. Van Berckelaer[1], P. Van Dam[1], S. Van Laere[2], M. Morse[3], G. Joseph[4], G. Devi[5]. *[1]Antwerp University Hospital UZA, Multidisciplinary Breast Clinic, Antwerp, Belgium; [2]University of Antwerp, Center for Oncological Research CORE, Antwerp, Belgium; [3]Duke University, Department of Medicine, Durham, USA; [4]East Carolina University Brody School of Medicine, Department of Pathology, Greenville, USA; [5]Duke University School of Medicine, Duke Inflammatory Breast Cancer Consortium, Duke Cancer Institute, Durham, USA*

Background: Inflammatory Breast Cancer (IBC) is a rare, but highly aggressive variant responsible for 10% of breast cancer related mortality. X-linked inhibitor of apoptosis protein (XIAP) can suppress immune-mediated tumor cell death by its ability to inhibit caspase activity, granzyme release, and activate NFkB and MAPK inflammatory crosstalk signaling. In this study we wanted to assess the pattern of expression of XIAP and to delineate the associated changes in the tumor immune microenvironment (TiME) for prognostic value in invasive breast cancers including inflammatory breast cancer (IBC).

Material and methods: Spatial localization of immune subsets and expression of XIAP and PDL1 were analyzed by immunohistochemistry on pretreatment tumors from 81 IBC and 61 subtype-matched nIBC patients. Results were validated by CIBERSORT analysis of immune cell signatures with XIAP protein and mRNA expression.

Results: XIAP expression was qualitatively graded as 0 (negative) to 3+ (strong) in tumor cells and dichotomized for statistical analysis as low ($\leq$1) and high (>1). High XIAP in 37/81 IBC correlated significantly with high PD-L1, increased infiltration of FOXP3+ Tregs, CD163+ tumor associated macrophages, and a low CD8/CD163 ratio in both tumor stroma (TS) and invasive margins (IM). Differential subsets of higher CD8+ T cells and CD79a + B cells in the IM were observed in high XIAP-nIBC TIME. Additionally, gene set enrichment analysis identified cellular stress response- & inflammation-related genes in high XIAP-IBC. Although high XIAP expression was not associated with a worse outcome in most groups, we surprisingly observed a correlation between high XIAP and better OS (HR: 0.44, 95%CI: 0.20–0.99, P = 0.04) in non-metastatic IBC patients.

Conclusions: This is the first study using immunophenotyping and gene expression data to demonstrate a strong association between high XIAP and an immunosuppressive TiME in IBC. Overcoming the upregulation of XIAP during cellular stress may counter immunosuppressive signaling. Therefore, further investigation of combinatorial strategies of immunotherapeutics with XIAP/IAP antagonists is warranted and has the potential to improved clinical outcomes in IBC and other aggressive breast cancer subtypes.

No conflict of interest.

POSTER SESSION **18 November 2022**

Optimal Diagnosis

263 (PB-087) Poster

Comparison of ER, PR, HER2 and Ki67 expression by MammaTyper® RT-qPCR and immunohistochemistry (IHC) on needle core biopsies of breast cancer

A. Shaaban[1], N. Badr[2], M. Zaakouk[3], D. Kearns[4], A. Kong[5]. *[1]Queen Elizabeth Hospital Birmingham & University of Birmingham, Cellular Pathology & Institute of Cancer and Genomic Sciences, Birmingham, United Kingdom; [2]Faculty of Medicine, Menoufia University and University of Birmingham, Pathology, Shebin El-Kom, Egypt; [3]Cairo National Cancer Institute and University of Birmingham, Cancer Pathology, Cairo, Egypt; [4]Queen Elizabeth Hospital Birmingham, Cellular Pathology, Birmingham, United Kingdom; [5]Kings College London, Comprehensive Cancer Centre, School of Cancer and Pharmaceutical Sciences, London, United Kingdom*

Background: Breast cancer molecular subtyping is traditionally defined by the immunohistochemical expression of ER, PR, HER2 and Ki67. There is limited data on the role of multigene tests and their correlation with IHC particularly on conventional core biopsies. MammaTyper® is a quantitative CE marked in vitro diagnostic RT-qPCR test for assessment of mRNA expression of these four biomarkers (*ESR1, PGR, ERBB2, MKI67*), classifying breast cancer into five subtypes. We evaluated the concordance of MammaTyper® with ER, PR, HER2 and Ki67 by IHC on core needle biopsy samples of breast cancer.

Materials and Methods: 137 formalin-fixed paraffin-embedded samples of breast cancer cores with tumour content of at least 20% were collected from archives of a large UK institution. ER/PR IHC was considered positive using 1% cut off. HER2 was positive if IHC 3+ or 2+ and FISH amplified. Ki67 IHC of $\geq$20% assessed visually and digitally using the Visiopharm image analysis software was considered positive. The MammaTyper® test was performed on the CFX96™ qPCR cycler (Bio-Rad). Agreements between IHC and MammaTyper® test results were expressed as overall percent agreement (OPA), positive percent agreement (PPA), negative percent agreement (NPA) and Cohen's kappa.

Results: RT-qPCR results of *ESR1* were highly concordant with IHC with OPA 95.5% using 1% cut-off. The OPA and NPA between RT-qPCR and IHC for PR was 89.4% and 80.0% respectively. Using the Allred Score for ER and PR (with 3/8 or more defined as positive), the OPAs were 94.7% and 88.6% respectively. For *ERBB2*/HER2, the OPA was 95% and the PPA was 84.6%. Best concordance between *MKI67* by MammaTyper® and Ki67 IHC was achieved using hot spot digital image analysis (OPA:87.2%, PPA:90.6%, NPA:80%), Table 1.

Table 1: Concordance of IHC and MammaTyper®

	ER/*ESR1*	*PR*/*PGR*	*HER2*/ *ERBB2*	*Ki-67*/*MKI67*
IHC cutoffs	Binary, ≥1%	Binary, ≥1%	Binary, 3+ or 2+ and FISH positive	Binary, ≥20%, Digital analysis
RT-PCR cutoffs	Binary, ≥37.1	Binary, ≥35.0	Binary, ≥40.4	Binary, ≥36.3
Number of samples	132	132	126	47
PPA (95% CI)	96.0% (90.1–98.4%)	95.1% (88.1–98.1%)	84.6% (57.7–95.7%)	90.6% (75.8–96.8%)
NPA (95% CI)	94.0% (80.4–98.3%)	80.0% (67.0–88.8%)	96.5% (91.3–98.6%)	80.0% (54.8–95.9%)
OPA (95% CI)	95.5% (90.4–97.9%)	89.4% (83.0–943.6%)	95.0% (90.0–97.8%)	87.2% (74.8–94.0%)
kappa (95% CI)	0.881 (0.776–0.962)	0.769 (0.649–0.872)	0.759 (0.553–0.916)	0.706 (0.470–0.902)

Conclusion: RT-qPCR-based assessment of the mRNA expression of ERBB2, ESR1 and PGR showed high concordance with IHC. MKI67 by MammaTyper® exhibited a higher concordance with the digital Ki67 image analysis. This suggests that MammaTyper® test on needle biopsies represents a reliable, efficient and reproducible alternative for breast cancer 4- marker detection and molecular subtyping.

No conflict of interest.

264 (PB-088) Poster

Interobserver variation in the assessment of HER2 low expression in breast cancer: can we improve by adjusting criteria? An international interobserver study

X. Baez Navarro[1], M.R. van Bockstal[2], D. Nawawi[1], G. Broeckx[3], C.G. Colpaert[4], S.C. Doebar[5], M.C.H. Hogenes[6], E. Koop[7], K. Lambein[8], D.J.E. Peeters[9], R.H.J.A. Sinke[10], J.B. van Brakel[11], J. van der Starre-Gaal[12], B. van der Vegt[13], K. van de Vijver[14], C.P.H. Vreuls[15], W. Vreuls[16], P.J. Westenend[17], C.H.M. van Deurzen[1]. *[1]Erasmus MC, Pathology, Rotterdam, Netherlands [2]Cliniques universitaires Saint-Luc, Pathology, Brussels, Belgium [3]Antwerp University Hospital, Pathology, Antwerp, Belgium [4]General Hospital Turnhout, Pathology, Turnhout, Belgium [5]Spaarne Gasthuis, Pathology, Haarlem, Netherlands [6]Laboratory Pathology East Netherlands, Pathology, Hengelo, Netherlands [7]Gelre Hospital, Pathology, Apeldoorn, Netherlands [8]Leuven University Hospital, Pathology, Leuven, Belgium [9]General Hospital Sint-Maarten, Pathology, Mechelen, Belgium [10]Pathan BV, Pathology, Rotterdam, Netherlands [11]Skåne University Hospital, Pathology, Malmö, Sweden [12]Isala Clinics, Pathology, Zwolle, Netherlands [13]University Medical Center Groningen, Department of Pathology & Medical Biology, Groningen, Netherlands [14]Ghent University Hospital, Pathology, Ghent, Belgium [15]Utrecht University Medical Center, Pathology, Utrecht, Netherlands [16]CWZ Hospital, Pathology, Nijmegen, Netherlands [17]PAL Laboratory of Pathology, Pathology, Dordrecht, Netherlands*

The immunohistochemical classification of Human Epidermal Growth Factor Receptor 2 (*HER2*) expression is optimized to detect *HER2*-amplified breast cancer (BC). However, novel HER2 targeting agents are also effective for BCs with low levels of *HER2* expression. This raises the question whether the current guidelines for *HER2*-testing are sufficiently reproducible to identify *HER2* low BC. The aim of this multicenter international study was to assess the interobserver agreement of *HER2* low scoring according to the current American Society of Clinical Oncology/College of American Pathologists (ASCO/CAP) guidelines. Furthermore, we evaluated whether the agreement improved by redefining the current immunohistochemistry (IHC) scoring criteria, or by adding fluorescent in situ hybridization (FISH).

We performed a two-round study of 105 non-amplified BC. During the first assessment, sixteen pathologists used the latest version of the ASCO/CAP guidelines. After a consensus meeting, the same pathologists scored the same digital slides using modified IHC scoring criteria based on the 2007 ASCO/CAP guideline, and an extra 'ultralow' category (incomplete membrane staining in ≤ 10% of the tumor cells) was added.

Overall, the interobserver agreement was limited (α = 0.63) in the first round, but this was improved by clustering IHC categories. In the second round, the highest reproducibility was seen when comparing IHC 0 versus the grouped cluster of ultralow/1+/2+ (74.3% of cases with 100% agreement). The FISH results were not statistically different between *HER2* 0 and *HER2* low cases, regardless of the IHC criteria used.

In conclusion, our study suggests that the modified 2007 ASCO/CAP criteria were more reproducible to distinguish *HER2* 0 cases from *HER2* low cases as compared to the 2018 ASCO/CAP criteria. However, the reproducibility was still moderate, which was not improved by adding FISH data. This could potentially lead to suboptimal selection of patients eligible for novel *HER2*-low targeting agents. There is a need for clearer, more reproducible IHC definitions and/or development of more accurate methods to detect *HER2* low BC.

IHC combinations	K-alpha	100% (16/16 pathologists) agreement	87.5% (14/16 pathologists) agreement
Round 1			
0 vs 1+ vs 2+ vs 3+	α = 0.63	4.7% (5 of 105)	30.4% (32 of 105)
0 vs 1+ and 2+	α = 0.56	33.3% (35 of 105)	76.2% (80 of 105)
Round 2			
0 vs ultralow vs 1+ vs 2+	α = 0.32	9.5% (11 of 105)	33.9% (39 of 105)
0 vs ultralow and 1+ vs 2+	α = 0.71	26% (30 of 105)	53.9% (62 of 105)
0 vs ultralow, 1+, and 2+	α = 0.68	74.3% (78 of 105)	80% (84 of 105)
0 and ultralow vs 1+ vs 2+	α = 0.73	20.9% (22 of 105)	50.4% (53 of 105)
0 and ultralow vs 1+ and 2+	α = 0.65	52.4% (55 of 105)	74.3% (78 of 105)

No conflict of interest.

266 (PB-090) Poster

Imaging features of malignant lesions in women with PTEN Hamartoma Tumor Syndrome

A. Hoxhaj[1], P. Techanithisawat[2], A. Milants[3], R. Mann[1]. *[1]Radboudumc, Medical Imaging, Nijmegen, Netherlands; [2]Queen Sirikit Centre of Breast Cancer, King Chualalongkorn Memorial Hospital, Radiology, Bangkok, Thailand; [3]Vitaz, Radiology, Sint-Niklaas, Belgium*

Background: Women with *PTEN* Hamartoma Tumor Syndrome (PHTS) have an increased lifetime risk (67–85%) for breast cancer (BC) and are offered breast cancer surveillance. In order to allow for the early diagnosis of BC, knowledge of imaging features of malignant lesions is important. In this study, we thus evaluated the types of malignant lesions encountered and the associated imaging characteristics in women with PHTS who underwent breast cancer surveillance.

Methods: This retrospective single institution study included 39 women with PHTS (aged ≥18 years) who visited the Radboud university medical center, a national PHTS expert center, between January 2001 and January 2021. Data were collected from electronic medical records. Surveillance examinations were independently re-read by two radiologists. Surveillance consisted of annual magnetic resonance (MRI) and mammography from age 25 and 30 onwards, respectively.

Results: A total of 14 distinct BCs were diagnosed. Ten BCs were diagnosed by means of surveillance (biopsy), while 4 were incidental cancers detected at prophylactic mastectomy. Among the 10 BCs diagnosed by means of surveillance, 9 had MRI examinations available and 1 had only mammography examinations available. Among 3/9 BCs with MRI examinations available presented with irregular shape and margin, fast initial enhancement, plateau or washout in the delayed phase, and diffusion restriction and were all pathologically confirmed as invasive carcinoma of no special type (NOS). Other 5/9 BCs with MRI examinations available presented with features of non-mass like enhancement, focal area, heterogeneous/clumped internal enhancement (fast initial enhancement, plateau/washout in the delayed phase) and were pathologically confirmed as DCIS (n = 1), invasive lobular carcinoma (n = 1), and invasive carcinoma NOS (n = 3). One BCs with MRI examinations available presented as a round mass, with circumscribed margins and heterogeneous enhancement and was pathologically confirmed as capsulated papillary carcinoma. The remaining BC detected during surveillance by means of mammography presented as calcifications and was pathologically confirmed as DCIS. Among the 4 incidental BCs, only 1 had MRI examinations available and had been described as an oval mass with circumscribed margins. This cancer was pathologically diagnosed as invasive carcinoma NOS. The remaining 3 incidental BCs had only mammography examinations available and were all histologically classified as DCIS. However, only 2 of them were visible at mammography and presented as round masses, with irregular margins.

Conclusions: Imaging features of most BCs were typical of malignancies at MRI examinations, while mammography examinations were less reliable. We conclude, thus, that the careful evaluation of breast lesions in women with PHTS with multiparametric MRI is essential in order to detect BC early.

No conflict of interest.

267 (PB-091) Poster

Assessment and management of lesions of uncertain malignant potential of the breast at Trieste Breast Unit: a single center experience

S. Scomersi[1], M. Fezzi[1], T. Federica[2], A. Basso[1], M. Tonutti[3], R. Ceccherini[4], F. Zanconati[5], M. Bortul[1]. *[1]Breast Unit Trieste, Clinica Chirurgica, Trieste, Italy; [2]Breast Unit, Clinica Chirurgica, Trieste, Italy; [3]Breast Unit Trieste, SC Radiodiagnistica, Trieste, Italy; [4]Breast Unit Trieste, Oncologia Senologica OSARF, Trieste, Italy; [5]Breast Unit Trieste, SC Anatomia Patologica, Trieste, Italy*

Background: Breast lesions of uncertain malignant potential (B3 lesions) represent a heterogeneous group of abnormalities with an overall risk for malignancy of 9.9%–35.1% after total resection. Given their different risk of upgrade to malignancy the management of B3 lesions with the goal of finding the balance between open surgical excision, vacuum guided percutaneous excision and surveillance is still an issue for breast centers.

Materials and methods: We collected data from patients diagnosed with B3 lesions from January 2016 till December 2021 at Breast Unit of Trieste, Italy. We collected data about clinical presentation (symptoms/screen-detection), imaging findings (mammography, ultrasound, magnetic resonance imaging) and biopsy modality (core biopsy, vacuum assisted biopsy with reference to needle gauge). We registered the management performed for each case (open surgical excision, percutaneous vacuum excision or surveillance), the rate of malignancy upgrade, the positive predictive value (PPV) for each type of B3 lesion. We also compared our B3 management during years 2016–17 and 2018–21 to identify any possible variation referring to respectively First- and Second Consensus conference on management of B3 lesions published those times.

Results: Study population consisted of 316 B3 lesions in patients with median age of 58 years old. 18% patients were symptomatic, the rest were screening detected. Core biopsy was performed in 43.7% of patients, vacuum assisted biopsy was performed in 56.3% of cases. Lesions most frequently diagnosed were Radial Scars (RS) (27.2%), Papillary Lesions (PL) (19.9%), and Atypical Ductal Hyperplasia (ADH) (19.3%). Globally 52.5% of patients underwent surgical excision, mostly because of discordance biopsy/imaging. The positive predictive value was calculated for each type of B3 lesion: ADH showed the highest PPV (25.8%), RS showed the lowest (5.3%). In the present series B3 lesions were predominantly upgraded to ductal carcinoma in situ (DCIS) and low-grade invasive tumors. Among patients who were sent to surveillance instead of surgical or percutaneous excision, at a median follow up of 36 months we registered 3 cases (1.3%) of upgrade to malignancy. None of the patients treated with percutaneous vacuum guided excision evolved to malignancy at follow up. No substantial differences in B3 lesions management was registered among 2016–17 years and 2018–21 years, but a trend towards minimally invasive breast biopsy or percutaneous excision using a vacuum-assisted device was observed.

Conclusions: Lesions of uncertain malignant potential of the breast (B3) are heterogeneous in respect to risk of malignancy, so that their management is still complex and relies on a multidisciplinary approach.

No conflict of interest.

268 (PB-092) Poster

Sonographic assessment of the axilla in breast cancer: changing the threshold

S. James[1], V. Chohan[2], K. Lim[2], M. Rees[1]. *[1]ABUHB, General Surgery, Newport, United Kingdom; [2]ABUHB, Radiology, Newport, United Kingdom*

Background: Ultrasound assessment of the axilla remains an important diagnostic component in the pre-operative investigation of breast cancer, which helps determine the surgical management of the axilla. The threshold to biopsy an axillary node based on its cortical thickness can vary between centres, with no current nationally agreed consensus within the UK. Our centre recently changed its threshold for axillary node biopsy from a cortical thickness of 2.5 mm to 3 mm, based on recent evidence. We retrospectively analysed our own data to assess the potential impact of this change on patient management.

Materials and Methods: Data from all patients who underwent an axillary node clearance within the Aneurin Bevan University Health Board, between October 2018 and September 2021, was analysed. Data analysed included patient demographics, pre-operative axillary ultrasound findings and final post-operative histology. Patients who underwent neo-adjuvant chemotherapy were excluded from analysis.

Results: The data of 98 patients was analysed [Median age = 62 years; 96 (98%) Female]. Median lymph node cortical thickness was 4.2 mm (1.25–50 mm). The sensitivity for pre-operative detection of lymph node metastases with axillary ultrasound was 93% (n = 125) using the existing cortical thickness threshold of 2.5 mm. With a higher cortical thickness threshold of 3 mm, the estimated sensitivity for pre-operative detection of lymph node metastases was 83% (n = 114, $c^2 = 0.23$, p = ns). Axillary lymph node metastases were found in 18 patients (13%) where the lymph node cortical thickness was <2.5 mm. In patients who were heavily node positive (>4 nodes/N2 disease, n = 50) the sensitivity of the technique improved to 94% (n = 47) independent on whether the cortical thickness biopsy threshold was 2.5 or 3 mm.

Conclusions: Increasing the cortical thickness threshold for pre-operative axillary node biopsy appeared to have a small yet non-significant effect of the sensitivity to detect axillary node metastases. There was no difference observed in the sensitivity to detect patients with heavy nodal disease however, which may be of more value in the future should the publication of ongoing trials, such as POSNOC, continue to support the de-escalation of surgical treatment in the axilla. The methodology used to estimate sensitivity using an alternative cortical thickness threshold in retrospective data may exaggerate the number of false-negative results. Ongoing evaluation of prospective data is therefore key to ensure quality control parameters are maintained.

No conflict of interest.

269 (PB-093) Poster

The utility of virtual clinics in the assessment of patients with mastalgia: a model for breast services post-pandemic?

A. Regan[1], M. Rees[1]. *[1]ABUHB, General Surgery, Newport, United Kingdom*

Background: Mastalgia is a common breast symptom amongst patients, which often prompts referral to breast services. Despite the lack of correlation between mastalgia alone and breast cancer, patients referred to breast clinic with this symptom often report significant anxiety around their visit, due to the worry of a cancer diagnosis. This can be the case as these patients are often seen in a one-stop breast clinic alongside other women with symptoms that are more concerning for breast cancer. We developed a virtual telephone clinic (VTV) to assess patients with mastalgia, outside the one-stop rapid access breast clinic, and assessed the clinics safety and validity in managing this group of patients.

Materials and methods: All patients referred to the breast service with symptoms of mastalgia alone between May - September 2020 were initially assessed via a VTV by a single consultant breast surgeon. During the VTC the patients were assessed and appropriate advice on management was given. At the end of the appointment patients were either reassured and discharged or given an appropriately timed face-face follow-up appointment, based on individual circumstances. Outcomes assessed included: patient demographics, clinic outcomes, waiting times and patient re-attendance rates. The primary outcome was the proportion of patients who were reassured and discharged following a VTC attendance alone. Secondary outcomes included the proportion of patients re-referred to the service within 1 year of initial assessment and any missed cancer diagnoses detected within this time-frame.

Results: 167 patients with mastalgia, and no other breast symptoms, were assessed via a VTC over the time-frame of the study. Median patient age was 39 years (11–91 years) and the majority were female (n = 164, 98%). The mean waiting time from referral to VTC was 68.2 days, however the study period coincided with the onset of the COVID-19 pandemic. The majority of patients were reassured and discharged after the VTC appointment alone (n = 107, 64%) and all patients were discharged after a single subsequent face-face follow-up appointment when needed. Reasons for patients requiring a face-face appointment after the VTC included patient anxiety (n = 10, 17%), the fact that the patient had not had a breast examination performed in primary care (n = 40, 66%) and additional symptoms reported by the patient during the virtual consultation (n = 10, 17%). Re-attendance rate within 1 year was low at 6.2% and there were no cases of a missed breast cancer identified within this time frame.

Conclusions: Virtual clinics appear to be a safe and valid method for assessing patients who present to the breast service with mastalgia, and no other breast symptoms. Patient reported outcome measures are currently being sought to ensure the patient satisfaction of this service is also maintained at high levels.

No conflict of interest.

270 (PB-094) Poster

The development of an interactive online referral tool for breast services in Wales: optimising the patient referral pathway

S. Gohobur[1], S. James[2], A. Regan[2], M. Rees[2]. [1]*Liverpool University, Medicine, Liverpool, United Kingdom;* [2]*ABUHB, General Surgery, Newport, United Kingdom*

Background: The appropriate utilisation of referral pathways is an important component in optimising the function of any cancer service. Lack of knowledge and understanding of existing pathways and accepted guidance by users of the system can have a negative effect on the performance of that system, and may also negatively impact patient experience. We audited appropriate utilisation of existing service pathways by assessing referrals from primary care to breast services within our region. The response to this has led to the development of an online breast service prioritisation tool, which aims to maximise compliance with existing national referral guidelines, thus improving the efficiency of the breast service for our patients.

Materials and methods: All referrals to the breast service from primary care were assessed over a 1 month period. Referrals were prioritised as Urgent Suspected Cancer (USC), Urgent or Routine by the referrer and each referral was subsequently reviewed by a consultant breast surgeon who could either accept the referral at it's existing priority level, or regrade the referral based on it's compliance with national guidance. The online "ABUHB Breast Service Prioritisation Tool" was subsequently created using third party software (https://ztree.ai/706811498). The tool functions as an interactive decision aid for users, and uses accepted national and regional guidelines alongside existing referral pathways within the breast service to optimise clinical decision making. Since the tools development, user feedback has been sought using a standardised questionnaire.

Results: A total of 684 referrals to the breast service was received from primary care in a single calendar month (June 2022). The majority of the referrals were prioritised as USC by the referring practitioner (n = 464, 68%), while urgent (n = 131, 19%) and routine (n = 89, 13%) referrals were less frequent. After consultant review, the priority for most referrals was not changed (n = 390, 57%) but there were a significant number or referrals where the priority was either downgraded (n = 171, 25%) or upgraded (n = 123,18%) respectively. User feedback since the development of the prioritisation tool (n = 44) has been positive with 87.5% or respondents stating the tool is useful, 97.5% stating the tool is either easy or very easy to use and 97.5% of respondents stating they would use the tool when making a referral to the breast service at least some of the time.

Conclusions: Optimising referral priority and the use of referral pathways is an important component of a well functioning cancer service and our results demonstrate there is scope for improvement. The online referral prioritisation tool has received positive feedback from users to date and its effect on improving compliance with current guidance will be assessed as the tool goes live over the next 12 months.

No conflict of interest.

271 (PB-095) Poster

Morphometric analysis of ductal carcinoma in situ identifies features associated with low risk of progression to invasive breast cancer

M. Leite[1], X. Melillo[1], N. Lam[1], S. Vonk[1], B. de Bruijn[1], J. Sanders[1], M. Almekinders[1], L. Visser[1], E. Groen[1], C. Van der Borden[1], L. Mulder[1], P. Kristel[1], E. Lips[1], J. Wesseling[1], T. Precision[1]. [1]*Netherlands Cancer Institute, Molecular Pathology, Amsterdam, Netherlands*

Background: Ductal carcinoma *in situ* (DCIS) is a potential precursor of invasive breast cancer (IBC). However, the majority of DCIS will never progress to IBC if left untreated. As almost all DCIS are treated by surgery often supplemented by radiotherapy, overtreatment of indolent DCIS occurs. Consequently, there is an urgent need to identify biomarkers to distinguish harmless from aggressive DCIS. We hypothesised that morphometric features observed in Hematoxylin-Eosin (HE) sections of DCIS, such as number, geometry and density of DCIS ducts and cells could identify harmless DCIS lesions.

Material and methods: We retrieved clinical data from a case-control study of patients diagnosed with primary DCIS treated with breast-conserving surgery alone (n = 689) and average follow-up of 12 years. Patients diagnosed with subsequent ipsilateral IBC (iIBC) were assigned as cases, while those without iIBC as controls. HE stained slides of DCIS lesions were scanned and uploaded to HALO software (IndicaLabs) for tissue and cell classification based on artificial intelligence algorithms. DCIS ducts were manually annotated by an expert pathologist in 57 HE sections. Annotations were used by an advanced deep learning neural network to create a train-by-example tissue classifier. We obtained the area, perimeter and spatial coordinates of DCIS ducts, the nucleus of DCIS cells and stroma areas. Data was exported to R-studio, and extra morphometric variables were calculated, such as: DCIS/stroma area ratio, cell density, duct circularity and minimal distance between DCIS ducts or between nucleus.

Results: Detection of DCIS ducts by the HALO classifier showed a high agreement with pathologist: kappa agreement = 0.80 (0.68–0.92 95%CI). DCIS tissue and cell classifiers were applied on 226 cases and 463 controls. After linear univariate regression analysis, several morphometric values were associated with lower risk of progression to invasive, such as: lower DCIS/stroma ratio, odds ratio (OR) = 0.84 (0.74–0.94 95%CI, p = 0.003); lower number of DCIS cells/duct, OR = 0.80 (0.68–0.94 95%CI, p = 0.007); shorter duct diameter, OR = 0.58 (0.38–0.88 95%CI, p = 0.011); and less circular duct shape, OR = 0.49 (0.24–0.97 95%CI, p = 0.043). The association of the last two variables remained significant after multivariate regression model with pathological and molecular co-variates (i.e., histopathological grade, COX2 and HER2 expression): shorter duct diameter, OR = 0.51 (0.29–0.91 95%CI, p = 0.023) and less circular duct shape, OR = 0.33 (0.13–0.78 95%CI, p = 0.012).

Conclusions: Morphometric features are promising to distinguish harmless from potentially hazardous DCIS and could guide personalized treatment decisions in the near future. We demonstrated that geometry and density of DCIS ducts and cells in HE-sections are associated with outcome. External validation of these associations is ongoing.

No conflict of interest.

272 (PB-096) Poster

PATHways UK survey: Pathology perceptions on current biomarker testing and pathways for breast cancer in England

P. Taniere[1], A.G. Nicholson[2], J. Gosney[3], L. Joseph[4], E. Shaw[5], A.G. Lanctot[6], R. Bains[6], J. Ryan[7]. [1]*University Hospitals Birmingham NHS Foundation Trust, Consultant Histopathologist/ Molecular Pathology, Birmingham, United Kingdom;* [2]*Consultant Histopathologist, Royal Brompton and Harefield Hospitals, Guy's and St Thomas' NHS Foundation Trust, Honorary Professor of Respiratory Pathology, National Heart and Lung Institute, Imperial College, London, United Kingdom;* [3]*Royal Liverpool University Hospital, Department of Cellular Pathology, Liverpool, United Kingdom;* [4]*Consultant Histopathologist, Honorary Lecturer, Manchester Medical School, Deputy Clinical Head of Division of Laboratory Medicine-Manchester Foundation trust, Manchester M23 9LT, United Kingdom;* [5]*Consultant Histopathologist- University Hospital Southampton NHS Foundation Trust, Honorary Senior Clinical Lecturer, University of Southampton- Pathology Lead for the Central and South NHS Genomic Laboratory Hub- Clinical Director- Southern Counties Pathology, Southampton, United Kingdom;* [6]*Novartis Pharmaceuticals UK Ltd, Solid Tumours Medical, London, United Kingdom;* [7]*Novartis Pharmaceuticals UK Ltd., Medical Programmes, London, United Kingdom*

Background: The PATHways survey aimed to capture pathologists' perspectives on current diagnostic pathways, the increasing role of molecular diagnostic tests, and improvement opportunities for optimising pathways to ensure equitable and timely access. Here we report the results for breast cancer (BC) testing.

Materials and Methods: A nationwide survey was conducted (Jan-Mar 2022) with consultant pathologists at regional laboratories in England, using a structured questionnaire. Descriptive analysis (by OPEN Health) was performed with quantitative and qualitative methods.

Results: Fifteen centres, each covering a median (IQR) population of 2.5 (1.9–3.6) million, completed the survey. Technologies available in-house included IHC (15/15), RT-PCR (9/15), FISH (4/15), sanger sequencing (2/15) and NGS (2/15) while biomarker testing was also performed in coordination with external labs and genomic laboratory hubs (GLHs). The most common challenge for implementing new tests was funding/resource allocation (13/15). Median (IQR) estimated BC samples received per month were 130 (40–425; n = 8). Nine centres responded to sections for BC testing at diagnosis and progression (Table 1). Estimated median turnaround time ranged from 2 to 3 days for IHC (excluding NTRKfus) to 24.5 days for NGS (excluding *PIK3CA*). Educational support suggested for pathologists included understanding new pathways and best practice sharing. Patient information, report interpretation and tissue requirements were among the educational support advised for clinicians.

Conclusion: Our survey demonstrated that HR, PgR and HER2 were routinely tested for BC diagnosis but not consistently at progression. Limited other molecular testing was performed routinely at this time, with *PIK3CA* testing nationally commissioned since April 2022. Recommendations from this survey on logistical and technical challenges will help inform existing and

Table 1: (abstract: 272 (PB-096)): Biomarker testing for BC

Method	Target	Diagnosis Sites (n)	Diagnosis Reflex testing (n)	Progression Sites (n)	Progression Reflex testing (n)	Test location Pathology (n)	External Lab (n)	GLH (n)	Estimated Turnaround time (calendar days) Median (IQR)
IHC	HR	9	9	5	4	9	0	0	2 (2–2.2)
	HER2	9	9	5	5	7	2	0	2.8 (2–3.2)
	PgR	9	8	5	5	9	0	0	2 (2–2.6)
	PD-L1	7	3	6	3	6	2	0	3 (2.2–11.2)
	NTRKfus	4	0	4	0	1	1	2	19.2 (12.4–25.9)
FISH	HER2	8	6	4	3	4	1	3	7 (3.5–10.2)
	NTRKfus	3	0	4	1	0	1	3	24.5 (21.9–25.9)
RT-PCR	PIK3CA	3	0	2	0	1	0	3	14 (10.8–22)
	BRCA1/2	1	1	1	1	0	0	2	15 (15–15)
	NTRKfus	3	0	3	0	1	0	3	15 (11.2–22.5)
NGS	PIK3CA	1	0	1	0	0	0	2	40 (40–40)
	BRCA1/2	2	0	3	1	0	0	4	24.5 (24.5–32.2)
	NTRKfus	3	1	4	2	1	0	4	24.5 (22.2–28.4)

HR, hormone receptor; IQR, inter-quartile range; NGS, next-generation sequencing; NTRKfus, NTRK fusion; PgR, progesterone receptor

new pathway optimisation, supporting equitable treatment planning across all regions.

Conflict of interest:
Corporate-sponsored Research:
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Leena Joseph and Emily Shaw have no conflict of interest.
Adrienne G. Lanctot, Rozinder Bains and Jacqueline Ryan are employees of Novartis Pharmaceuticals UK Ltd.

273 (PB-097) Poster

Real-world use of multigene signatures in early breast cancer: the experience by the Lombardy Genomic Assays for Breast Cancer Working Group

L. Licata[1], D. Cosentini[2], R. De Sanctis[3], M. Iorfida[4], E. Rota Cameroli[5], A. Vingiani[6], E.L. Simoncini[7], G. Pruneri[6], E. Munzone[4], G. Bianchini[1], A. Zambelli[3], C. Tondini[5]. *[1]IRCCS Ospedale San Raffaele, Department of Medical Oncology, Milan, Italy; [2]ASST Spedali Civili of Brescia, Department of Medical Oncology, Brescia, Italy; [3]IRCCS - Humanitas Research Hospital, Medical Oncology and Hematology Unit, Rozzano - Milan, Italy; [4]IEO-European Institute of Oncology IRCCS, Division of Medical Senology, Milan, Italy; [5]ASST Papa Giovanni XXIII, Oncology Unit, Bergamo, Italy; [6]Fondazione IRCCS Istituto Nazionale dei Tumori, Deparment of Pathology and Laboratory Medicine, Milan, Italy; [7]ASST Spedali Civili of Brescia, SSVD Breast Unit, Brescia, Italy*

Background: Multigene assays (MGAs) are extremely useful tools for tailoring adjuvant chemotherapy (CT) in ER+/HER2- EBC. In July 2019, Lombardy was the first Region in Italy to reimburse MGAs for patients (pts) with formal indication to receive adjuvant CT after multidisciplinary discussion. Here, we report real-world MGAs experience in 6 referral Cancer Centers in Lombardy.

Methods: Oncotype DX was the preferred test in 97% of cases and only test used in 5 Centers. We selected consecutive pts tested with Oncotype DX from July 2020 to July 2022. The distribution of clinical-pathologic features and RS groups (low RS 0–25 or high RS 26–100) was assessed using Chi-Square. We also compared the distribution of clinical-pathologic features and RS with those in the TAILORx and RxPONDER trials.

Results: We identified 1098 pts. Breakdown of clinical-pathologic features by RS score is summarized in the table.

	All (%)	RS 0–25 (%)	RS 26–100 (%)	p-value
Age				0.27
≤ 50 y	456 (41.5)	341 (74.8)	115 (25.2)	
> 50 y	642 (58.5)	461 (71.8)	181 (28.2)	
Tumor size				0.22
T1	655 (59.7)	489 (74.7)	166 (25.3)	
T2	409 (37.2)	288 (70.4)	121 (29.6)	
T3	34 (3.1)	27 (79.4)	7 (20.6)	
Nodal status				< 0.00001
N0	577 (52.6)	379 (65.7)	198 (34.3)	
N1	521 (47.4)	425 (81.6)	96 (18.4)	
Grade				< 0.00001
G1	33 (3)	31 (93.9)	2 (6.1)	
G2	646 (58.8)	538 (83.3)	108 (16.7)	
G3	419 (38.2)	233 (55.6)	186 (44.4)	
Ki67				< 0.00001
0–20%	436 (39.7)	377 (86.5)	59 (13.5)	
21–30%	418 (38.1)	311 (74.4)	107 (25.6)	
> 30%	244 (22.2)	114 (46.7)	130 (53.3)	
Total	1098 (100)	802 (73)	296 (27)	

Overall, the test identifies 73.0% of pts with low RS, with potential benefits in terms of CT sparing and drug costs. Chi-square test for Grade (G), Ki67 and RS distributions was significant ($p < 0.00001$). About half (69 of 139) of pts with G3 tumors and Ki67 > 30% showed low RS, while 6.1% of G1 and 13.5% of low Ki67 were found with high RS. The proportion of low RS in N1 pts is similar to that reported in RxPONDER (81.6% vs 83.1% of pts screened for the trial), while N0 pts with low RS are less than those in TAILORx (65.7% vs 85.7%), most likely because sample is enriched with pts candidate to CT with poor biological features. The distribution of G in our series is very different from registration trials, with more G3 and less G1 (38.2% and 3%) than those in TAILORx (17.8% and 26.6%) and RxPONDER (10.1% and 24.3%). More pts ≤ 50 years were tested in our series (41.5%) than in TAILORx and RxPONDER (31.4% and 24.4%, respectively) and, among them, 42% were N1.

Conclusions: Oncotype DX resulted the preferred genomic test adopted in our series. Our data highlight the real-world use of Oncotype DX, confirm that individual clinical-pathologic features do not predict RS scores and demonstrate remarkable impact in reducing CT prescription. The significant proportion of N1 pts ≤ 50 years who were tested with Oncotype DX indicate that oncologists considered the test informative also in this population.

Conflict of interest:
Advisory Board: Exact Sciences (LL, EM, ELS, GP, GB)
Agendia (AV, CT, GB, AZ)
Other Substantive Relationships: Consultancy: Exact Sciences (CT, GB, AZ)

274 (PB-098) Poster

False-Negative Rates Between Pathological Lymph Node Status Between Ductal and Lobular Breast Cancer: A Retrospective Cohort Study of 83,152 Patients

A. Oemrawsingh[1], A. Heemskerk-Gerritsen[2], L. Koppert[1], A. Jager[3]. *[1]Erasmus University Medical Center, Surgical Oncology, Rotterdam, Netherlands; [2]Erasmus University Medical Center, Epidemiology, Rotterdam, Netherlands; [3]Erasmus University Medical Center, Medical Oncology, Rotterdam, Netherlands*

Background: Preoperative axillary staging with physical examination and/or an axillary ultrasound to assess clinical lymph node status (cN) may have different false negative rates between common histological subtypes of breast cancer. The aim of this retrospective study was to quantify and compare the false-negative rates of a cN0 stage between patients with Invasive Lobular Carcinoma (ILC) and Invasive Ductal Carcinoma (IDC).

Materials & Methods: Data from the Netherlands Cancer Registration was used, which consisted of women with newly diagnosed invasive breast carcinoma between January 2011 and December 2021. The prevalence of false-negative pathological node-positive status (pN > 0) was compared between clinically node-negative breast cancer patients with either ILC or IDC. In addition, ordinal logistic regression was used to estimate the association between histological subtype and a false-negative pN status.

Results: In total, 83,152 female patients were included of which 16.7% were diagnosed with ILC and 83.3% were diagnosed with IDC. The prevalence of a pN > 0 status was significantly higher in patients with ILC vs. patients with IDC (25.6% vs. 22.4%, $p < 0.001$). Invasive lobular carcinoma ($\beta = 0.245$, $p < 0.001$), upfront surgery ($\beta = 0.99$, $p < 0.001$) and a higher clinical tumor status ($\beta = 2.40$, $p < 0.001$) were associated with a higher false-negative pN status.

Conclusions: Preoperative staging with physical examination and/or axillary ultrasound showed significantly more false negative pathological node-positive rates in patients with ILC compared to those with IDC. ILC and higher clinical tumor status (cT) were associated with a higher pN status as well as upfront surgery. The consequences of these findings are subject of further research.

Table 1: Baseline Patient and Tumor Characteristics

	Total population (N = 83,152)	ILC (N = 13,851)	IDC (N = 69,301)
Age, mean (SD)	61.8 (11.6)	63.5 (11.2)	61.5 (11.7)
cT stage, N (%)			
Tis	1637 (19.7)	117 (0.8)	1,520 (2.2)
T0	148 (0.2)	38 (0.3)	110 (0.2)
T1	57,333 (68.9)	7,528 (54.3)	49,805 (71.9)
T2	19,961 (24)	4,690 (33.9)	15,271 (22.0)
T3	2,150 (2.6)	1,147 (8.3)	1,003 (1.4)
T4	472 (0.6)	116 (0.8)	356 (0.5)
pN stage, N (%)			
N0	61,111 (73.5)	9,914 (71.6)	51,697 (74.6)
N1	17,336 (20.8)	3,115 (22.5)	14,221 (20.5)
N2	791 (1.0)	236 (1.7)	555 (0.8)
N3	281 (0.3)	130 (0.9)	151 (0.2)
Chemotherapy			
No	64,493 (77.6)	10,486 (75.7)	54,007 (77.9)
Preoperative	3,869 (4.7)	823 (5.9)	3,046 (4.4)
Postoperative	14,657 (17.6)	2,514 (18.2)	12,134 (17.5)
Both	133 (0.2)	28 (0.2)	105 (0.2)

cT = clinical tumor stadium; pT = pathological tumor stadium; pN = pathological node stage; ALND = axillary lymph node dissection

No conflict of interest.

275 (PB-099) Poster

Primary location of breast cancer and total tumor load of the sentinel lymph node

D. David[1], M. Robalo Cordeiro[1,2], A. Gomes[3], I. Gante[1,2], M. Figueiredo Dias[1,2]. *[1]Coimbra University and Hospital Centre, Gynecology, Coimbra, Portugal; [2]Faculty of Medicine - University of Coimbra, Gynecology, Coimbra, Portugal; [3]Coimbra University and Hospital Centre, Pathologic Anatomy, Coimbra, Portugal*

Background: Axillary lymph node staging is a determining factor in the treatment and prognosis of patients with breast cancer. One-step nucleic acid amplification (OSNA) is a molecular procedure that allows assessment of the total tumor load (TTL) in axillary sentinel lymph node (ASLN) and can be used to predict extra lymph node metastasis in early breast cancer. The primary location of the breast tumor seems to be closely related to ASLN positivity. The purpose of this study was to determine whether the primary location of the tumor could have an influence on TTL.

Material and Methods: Patients with invasive breast cancer undergoing axillary staging from 2020 and 2022 performed through OSNA assay at Gynecology Department. Exclusion criteria were: bilateral localization and multicentric tumors. TTL was calculated as the sum of the total number of CK19 mRNA copies in all positive ASLNs. To assess the influence of tumor location on ASLN positivity and TTL, 3 groups were formed depending on the location (L) of primary tumor: L1- external quadrants and axillary tail; L2- internal quadrants and L3- nipple location. SPSS® v26 was used for statistical analysis and a p-value < 0.05 were considered statistically significant.

Results: Twenty-three out of 107 patients (21,5%) with invasive breast cancer had a positive ASLN. The main histologic type was invasive NST carcinoma [n = 88, 82,2%], followed by lobular invasive carcinoma [n = 12, 11,2%]. Primary tumors were located with greatest frequency in upper outer quadrant [36,4% (n = 39)], followed by junction of the upper and lower outer quadrants [10,3% (n = 11)] and junction of the upper inner and outer quadrants [10,3% (n = 11)].

L1 contains 68,2% of cases (n = 73), L2 with 26,2% (n = 28) and L3 with 5,6% of cases (n = 6).

In L1 group at least one ASLN was positive (21,9% n = 16), in L2 14,3% (n = 4) and in L3 50,0% (n = 3) (19,8% in L1+L2 *vs* 50,0% in L3 $p = 0,11$).

Nipple location revealed the highest rate of positive ALSN (50,0% *vs* 19,8%, $p = 0,11$) and lymph vascular invasion (33,3% *vs* 10,9% $p = 0,15$).

Concerning L1, 6 patients had micrometastases (37,5%) and 10 had macrometastases (62,5%). Concerning L2, three had micrometastases (75,0%) and one macrometastases (25,0%). In L3 group, two had micrometastases (66,6%) and one ha macrometastases (33,3%).

Regarding mean of TTL, L1 showed a mean of 75127 ± 34872 +, L2 a mean of 420000 ± 139905 and L3 a mean of 2377 ± 1962 ($p = 0,18$).

Conclusions: Nipple location seems to have the highest association with lymph-vascular and ASLN positivity. Larger studies are needed to corroborate these findings.

No conflict of interest.

276 (PB-100) Poster

What are women's perceptions of diagnostic DBT and targeted breast ultrasound for the evaluation of their focal breast complaints?

C. Siebers[1], L. Appelman[1], L. Koco[1], M. Palm[1], L. Rainey[2], M. Broeders[3,4], P. Appelman[5], S. Go[6], M. Van Oirsouw[7], R. Mann[1,8]. *[1]Radboud UMC, Medical Imaging, Nijmegen, Netherlands; [2]Radboud UMC, Radboud Institute for Health Sciences, Nijmegen, Netherlands; [3]Radboud UMC, Health Evidence, Nijmegen, Netherlands; [4]Dutch Expert Centre for Screening, Dutch Expert Centre for Screening, Nijmegen, Netherlands; [5]St. Antonius Hospital, Radiology, Utrecht, Netherlands; [6]Noordwest Ziekenhuisgroep, Radiology, Alkmaar, Netherlands; [7]Dutch Breast Cancer Society, Dutch Breast Cancer Society, Utrecht, Netherlands; [8]The Netherlands Cancer Institute, Radiology, Amsterdam, Netherlands*

Background: In the Breast Ultrasound Study (BUST) the diagnostic accuracy of ultrasound (US) and the additional cancer yield of digital breast tomosynthesis (DBT) in the clinical setting was assessed. Within BUST, the radiological order of imaging was reversed, starting with US. This side-study to the BUST focuses on patients' perceptions of US and DBT.

Material and methods: 1181/1276 (92.5%) women who participated in the BUST completed a questionnaire after US and DBT (M = 47.2 years, SD = 11.74). Their perceptions of the imaging tests were described by answering closed and open ended questions. In addition, another subset of BUST participants (n = 29) was invited to participate in a focus group study (n = 6 focus groups), approximately 18–24 months after their breast assessment. Descriptive statistics are presented and the qualitative data was analyzed using thematic analysis.

Results: Of all women who filled out the survey, 55.3% reported reluctance towards DBT, mostly related to pain experiences, and 87.3% reported feeling reassured after bilateral DBT. In addition, several themes on patients' imaging experiences were identified. Women's perceptions of pain and burden associated with DBT and the absence of this discomfort during US is described in the theme *comfort*. According to the second theme *interaction,* women appreciate US for its interactional aspect and the opportunity to receive a suggestive diagnosis from the radiologist. The third theme, *perceived efficiency*, reflects women's non-unanimity on the

perceived diagnostic accuracy and necessity of either US or DBT. Also, women expressed their doubts about the targeted focus of US on the symptomatic area, emphasizing the strength of bilateral DBT for the evaluation of the whole breasts. Theme four, *emotional impact*, highlights the stress associated with the diagnostic period and how women feel reassured by each modality in various extents. Lastly, the theme *costs* describes the potential saving of individual and societal costs when performing US only, *protocols* reflects women's experiences with adherence to guidelines and *privacy* is about women's issues with privacy violation.

Conclusions: Both modalities seem to have advantages as well as drawbacks according to the women. Knowledge of patients' perceptions of the exams can be of great value to general practitioners, radiographers and radiologists, as they can take this into account when women need to undergo diagnostic imaging.

No conflict of interest.

277 (PB-101) Poster

ERBB2 mRNA expression in HER2-low breast cancer

X. Teng[1], X. Li[2], S. Xu[1], J. Zhang[1], Y. Bai[1], X. Ba[1], Z. Wu[1], S. Liu[3]. [1]*The First Affiliated Hospital- Zhejiang University School of Medicine, Pathology, Hangzhou, China;* [2]*Shuwen Biotech Co. Ltd., Research Department, Hangzhou, China;* [3]*Shuwen Guanz Diagnostic Laboratories Co. Ltd., Diagnostic Laboratories, Daqing, China*

Background: Trastuzumab deruxtecan significantly increased progression-free and overall survival than the physician's choice of chemotherapy for the HER2-low breast cancer (BC) patients, which opened a new chapter in the treatment of HER2-low BC. However, the ability of traditional immunohistochemistry to distinguish HER2-0 and HER2-low was questioned and some BC patients with suspected low expression of *ERBB2* might not benefit from the new anti-HER2 treatment. High mRNA expression of *ERBB2* partially explained the response to T-DM1 in HER2 positive breast cancer, which brings up the possibility of precise detection of mRNA expression of *ERBB2* to define HER2-low cohort and its guidance on drug administration.

Methods: *ERBB2* mRNA level of formalin-fixed, paraffin-embedded BC post-surgery specimens with HER2 negative status via immunohistochemistry/FISH confirmed by three pathologists were detected by MammaTyper® quantitative real-time polymerase chain reaction (qRT-PCR) kit. The consistency of HER2 immunohistochemistry scoring by three pathologists were analyzed by interclass correlation coefficients (ICC), and compared with MammaTyper ® results.

Results: 177 cases were included. The ICC value of three pathologists assessed for HER2-0 vs. HER2-low is 0.934. However, among these 177 cases, 42 cases were unanimously rated as HER2-0, 115 cases as HER2-low, and 20 cases were evaluated inconsistently for HER2-0 or -low by three pathologists. The *ERBB2* expression tested by MammaTyper® of HER2-low group was higher than that of HER2-0 and inconsistency group (38.7 ± 1.28 vs 37.91 ± 1.34 [adj. $p < 0.01$], 38.7 ± 1.28 vs 37.66 ± 2.16 [adj. $p < 0.01$]), respectively. While, the mean value of inconsistency group was even lower than that of HER2-0 group (37.66 ± 2.16 vs 37.91 ± 1.34 [adj.$p = 0.78$]), indicating that IHC is not accurate in judging the expression of *ERBB2* at the boundary value. However, 45.23% (19/42) of cases in HER2-0 group were showed *ERBB2* low expression ($38.2 \leq \Delta\Delta Ct \leq 40.4$) by MammaTyper®.

Conclusion: Compared with IHC/FISH, MammaTyper® qRT-PCR assay may be a promising alternative for actual detection of *ERBB2* expression and define HER2-low breast cancer.

No conflict of interest.

278 (PB-102) Poster

Triple negative breast cancers: Rising menace in the developing world and treatment challenges

S. Patel[1], M. Sethi[1], A. Prem[1], D. Pandey[1]. [1]*MPMMCC, Department of Surgical Oncology, Varanasi, India*

Upcoming reports suggest rising incidence of breast cancers in the developing world. Young patients with Triple negative breast cancers (TNBC) constitute an important problem statement, often with heterogenous management practices.

Materials and Methods: Prospectively maintained database in the department of Breast Oncology was screened. All ladies with TNBC and presenting to the out-patient clinic were included.

Results: 615 ladies diagnosed with TNBC and managed at the centre were identified. Median age at diagnosis was 48 years. The age distribution was as follows: less than 30 years – 5.4%, 31–40 years – 20.7%, 41–50 years – 33.5%, 51–60 years – 25.2%; 61–70 years – 12.2% and more than 70 years – 3.1%. At presentation, 358 (58.2%) patients, 129 (21.0%) patients, 47 (7.6%) patients and 75 (12.2%) patients were treatment-naïve, had inadequate index surgery, were completely treated, had partial treatment outside respectively. Young patients (less than 50 years) were more likely to be referred after an inadequate index surgery or partial treatment to tertiary centre ($p < 0.001$). Amongst patients presenting with de-novo disease, patients presented in following stages – II (76, 21.2%), III (201, 56.1%), IV (73, 20.4%). In Stage IV, 29 patients (8.1%) were diagnosed as oligometastatic and treated with curative intent. Of patients treated with curative intent (n = 302), 218 (72.2%) received neoadjuvant chemotherapy (NACT) while the remaining 84 (27.8%) were operated upfront. 37 of 218 (16.9%) patients had progression on NACT, while 38 (17.1%) patients had stable disease. Amongst patients undergoing surgery (n = 265), only 21.5% underwent breast conservation surgery. Low axillary sampling was done in 24 patients (9%). In remainder, axillary staging showed level II involvement in 13 patients (4.9%) level IIIa involvement in 25 patients (9.4%) and IIIc involvement in 12 patients (4.5%). Pathological complete response was seen in 111 patients (41.8%) and it has significant association with the number of chemotherapy cycles received, and taxanes as a part of NACT ($p < 0.05$). Median follow up was 13 months. Recurrence was seen in 61 patients during the study period, in following places: visceral – 27 (44.3%), loco-regional – 19 (31.14%), skeletal – 7 (11.5%) and CNS – 8 (13.1%).

Conclusions: Significant proportion of patients present to the tertiary centre after an inadequate preliminary treatment elsewhere. This has important management implications for the high-risk subgroup of young TNBC patients who demand timely management for best outcomes. Timely referral from community and wider utilization of systemic therapy as NACT is required to possibly improve the treatment outcomes in this cohort. This may also reduce the extent of surgical treatment leading to more breast conservation surgeries.

No conflict of interest.

POSTER SESSION **18 November 2022**

Risk Factors

279 (PB-103) Poster

Mammographic breast density correlated with worse prognosis of early breast cancer regardless of menopausal status

J.S. Lee[1], W.-G. Kim[2], H.-K. Jung[3]. [1]*Inje University Haeundae Paik Hospital, Surgery, Busan, South Korea;* [2]*Haeundae-paik hospital, Pathology, Busan, South Korea;* [3]*Haeundae-paik hospital, Radiology, Busan, South Korea*

Background: Breast density (BD) is known to affect breast cancer risk, but it may be associated with breast cancer survival. The underlined mechanism remains unclear. Aldehyde dehydrogenase 1 (ALDH-1) and $CD44^+CD24^-$ are the most consistently used biomarkers to identify and characterize breast cancer stem cells (CSCs). However, correlation between expression of CSCs and BD remains unclear. The interpretation of results from previous studies on mammographic BD and survival is complicated by the association between confounding factors and survival. We aimed to clarify the association between CSCs and BD, and further evaluated the correlation with overall survival (OS).

Materials and Methods: 159 women with operable breast cancers were retrospectively studied. Including clinical values were age, co-morbidity (hypertension, hyperlipidemia, Diabetes Mellitus), body mass index, and menopausal status. BD was categorized according to the American College of Radiology Breast Imaging Reporting and Data System. In addition, Aldehyde dehydrogenase 1 (ALDH-1) and $CD44^+CD24^-$ which the most consistently used biomarkers to identify breast cancer stem cells (CSCs) was evaluated by immunohistochemistry. We examined overall survival (OS) with the log-rank test.

Results: Positive expression of CSC was 33.3% (53/159 patients). The expression of CSC correlated with premenopausal status, high histologic grade, high Ki-67 expression, and low expression of ER or PR but not correlated with BD. During mean 74 months, high BD was correlated with worse OS in either pre- or postmenopausal patients ($p = 0.04$). In a subgroup analysis, patients of high BD was worse OS ($p = 0.04$) compared with a group with non-CSC expression. Co-morbidity was significantly correlated with poor disease free survival in non-CSC expressed group compared with CSC expressed group ($p = 0.01$). In cox-regression analysis, co-morbidity (HR = 0.05, 95% CI: 0.006–0.44, $p = 0.007$) and BD (HR = 0.14, 95% CI: 0.02–1.16, $p = 0.06$) correlated with worse OS.

Conclusion: High BD could be a worse prognostic factor in operable breast cancer regardless of menopause status. We could suggest that co-

morbidity may be more causally associated with worse OS that treating co-morbidity may improve prognosis.

No conflict of interest.

280 (PB-104) Poster

Clinicopathologic Risk Factors of Brain Metastasis in Breast Cancer Patients: A Systematic Review and Meta-analysis

K.B. Garcia[1], A.A. Lubay[1], O. Malilay[2]. [1]*Pasig City General Hospital - Mary Chiles General Hospital Consortium, Surgery, Pasig City, Philippines;* [2]*Pasig City General Hospital - Mary Chiles General Hospital Consortium, Surgery, Pasig, Philippines*

Background: Breast cancer brain metastasis (BCBM) has an incidence rate of 5.1% among Breast Cancer (BC) patients. In BCBM, cancerous cells come from a primary tumor that implant and grow in the brain leading to potentially lethal neurologic symptoms and signs. With more clinical options and therapeutics strategies becoming available, a multi-disciplinary approach for treatment is needed in order to best meet BCBM patients' needs, however, systematic guidelines for the screening of high-risk asymptomatic patients are still lacking and the BCBM diagnoses are performed only after symptoms manifestation. Therefore, understanding the clinical and pathologic drivers of BCBM aids in improving medical interventions by guiding future research directions. This study aims to determine the clinicopathological risk factors of brain metastasis (BM) among BC patients.

Methods: Retrospective cohort studies on the clinicopathological characteristics of BM versus non-BM (NBM) patients were retrieved through reputable search databases. Review Manager version 5.4.1 was used for statistical analyses. In the presence of heterogeneities, a pragmatic approach was undertaken to employ both random-effects (RE) and fixed-effect (FE) meta-analyses. The statistical significance of the pooled effect estimates was examined by the Z-test. Interstudy variations and heterogeneities were estimated using Cochran's Q-statistic with $P < 0.05$ indicating a statistically significant heterogeneity. The risk of bias and the quality of studies were assessed at a study level using ROBINS-I tool.

Results: A total of four (4) retrospective cohort studies were included in the analyses. Random-effects meta-analyses with $I^2 < 50\%$ ($P > 0.05$) had shown significant association ($P < 0.05$) on the increased incidences of BCBM development for HER2+ expression [OR: 2.43, 95% CI: 1.88–3.12, $P < 0.00001$] and for pre-menopausal status [OR: 1.77, 95% CI: 1.13–2.76, $P = 0.01$]. Fixed-effect meta-analyses had shown significant association ($P < 0.05$) on the decreased incidence of BCBM development for TNBC disease [OR: 0.66; 95% CI: 0.47–0.92; $P = 0.02$]. The risk of bias was low to moderate in the majority of studies.

Conclusion: HER2 positivity and pre-menopausal status are risk factors for increased BCBM development while the absence of regional lymph node metastases and ILC findings are less likely to progress to BCBM. Higher T and N categories, higher histological grade, ER negativity, and PR negativity may be associated with higher risks of BCBM while lower T categories, HER2 negativity, and TNBC may likely be associated to less BCBM development. More powerful relevant and upcoming randomized clinical trials with larger sample sizes among BCBM patients versus non-BM patients must be made exploring certainty on the clinicopathological factors contributing to BM among BC patients.

No conflict of interest.

281 (PB-105) Poster

Use of frailty measurements in observational studies on older patients with breast cancer: A systematic review

D. Sanchez[1], M.G.M. Derks[2], J.A. Verstijnen[3], D. Menges[1], J.E.A. Portielje[2], F. Van den Bos[4], E. Bastiaannet[1]. [1]*Epidemiology Biostatistics and Prevention Institute & University of Zurich, Epidemiology and Biostatistics, Zurich, Switzerland;* [2]*Leiden University Medical Center, Department of Medical Oncology, Leiden, Netherlands;* [3]*Maasstad Hospital, Department of Medical Oncology, Rotterdam, Netherlands;* [4]*Leiden University Medical Center, Department of Gerontology and Geriatrics, Leiden, Netherlands*

Background: Among women, breast cancer (BC) is the most frequently diagnosed cancer and is ranked as the leading cause of cancer death. Given that aging is one of the strongest risk factors for the development of breast cancer, older adults (65+) are disproportionately affected. At the same time, more than half of older cancer patients are considered frail or pre-frail and are at increased risk of adverse outcomes including treatment intolerance, as well as morbidity, and mortality. Frailty is thus recognized as an important metric to guide decision-making in geriatric oncology. This study characterizes the use of frailty measurements in observational studies on older women with breast cancer.

Materials and Methods: MEDLINE, EMBASE, and Cochrane Library were systematically queried to identify observational studies (cohort, case-control, cross-sectional) on older women with breast cancer which evaluate survival or mortality before or after treatment, published from 2017–2022. Studies were managed using Covidence software and assessed for inclusion with predefined criteria by independent reviewers. Data was extracted with respect to the characteristics of the studies. Frailty measurements were identified, the proportion of studies using frailty measurements was calculated, and the prevalence of frailty among BC patients was determined.

Results: A total of 9823 studies were screened on title and abstract after deduplication. Based on specified criteria, 217 full text studies were assessed for eligibility, 71 of which were excluded, mainly due to incorrect target population with respect to age, or incorrect outcome assessment. Overall, 146 studies were included. Preliminary results revealed that frailty status was not considered in all identified observational studies. Among studies that measured frailty, a relevant proportion of female BC patients were considered frail. Detailed results will be shown at the conference.

Conclusion: Despite having significant prognostic importance, the use of frailty measurements is not a compulsory practice in observational studies on breast cancer in older women. Additionally, although multiple frailty screening tools have been developed, there is no gold standard measurement used to detect frailty. As a result of such heterogeneity in clinical practice, an established definition of frailty remains elusive. Efforts to create a unified definition and gold standard may improve targeted care and health outcomes for older breast cancer patients.

No conflict of interest.

282 (PB-106) Poster

Local recurrence of breast cancer after mastectomy. Impact of residual tissue in cancer follow-up

M. Jimenez Gomez[1], C. Duch[2], A. Martinez Solá[1], P. Maso Marrodan[3], P. Nicolau Batalla[3], M. Vernet Tomas[3], N. Argudo Aguirre[1]. [1]*Hospital Parc de Salut Mar, Breast Cancer Unit. General Surgery Department, Barcelona, Spain;* [2]*Universidad Pompeu Fabra, Faculty of Medicine and Surgery, Barcelona, Spain;* [3]*Hospital Parc de Salut Mar, Breast Cancer Unit. Obstetrics and Gynecology Department, Barcelona, Spain*

Background: Conservative surgery is the standard treatment for breast cancer nowadays. However, there are cases in which mastectomy is imperative. Although surgery removes the mammary gland, there is a risk of developing local recurrence of 2–9.5% according to the literature. The residual tissue is usually between 5 and 15% and this is found in 21–76% of mastectomy cases. The objective of this study is to analyze the rate of local recurrence after mastectomy, as well as its risk factors and the method by which they are diagnosed to assess the follow-up protocol.

Material and Methods: A retrospective observational study of breast cancer patients who underwent mastectomy between 2000 and 2020 was conducted. A total of 929 mastectomies were performed in our hospital. Of 809 remaining cases, a local recurrence was observed in a total of 51 mastectomy patients. We studied the main variables for our comparative statistical analysis, we analyzed risk factors for local recurrence and overall survival with a 15-year follow-up.

Results: 772 patients with breast cancer were analyzed, of which 6% of the total presented local recurrence. 43% of the patients who presented local recurrence died ($p < 0.001$). 52% of the diagnoses were made by detecting a palpable mass or by physical exam. 47% occurred in residual tissue, 17% in the same breast that underwent surgery, and 23% in the skin scar. When we compared the risk factors with the appearance of local recurrence, a significant association was obtained with axillary involvement in the final surgical piece ($P = 0.004$) positive axillary lymphadenectomy ($p = 0.012$), triple negative histological subtype ($p = 0.002$) and negative progesterone receptors ($p = 0.04$). After univariate Cox regression analysis, it was observed that the risk of local recurrence increased when positive lymph nodes were obtained in the piece ($p = 0.006$) and if the axillary lymphadenectomy was positive ($p = 0.015$). Survival at 5 years after diagnosis was 84% among patients with local recurrence versus 88% who did not recur. Survival at 10 years drops to 63% if local recurrence is diagnosed and 78% if it is not diagnosed ($p = 0.008$). The presence of local recurrence showed statistically significant differences with breast cancer mortality ($p = 0.009$).

Conclusions: Local recurrency rate after mastectomy was 6%. 17% from the ipsilateral residual breast tissue and 23.5% from the wound. The detection of affected lymph nodes in the surgical specimen, positive axillary lymphadenectomy and the triple negative subtype were shown to be risk factors for local recurrence while positive progesterone receptors is a protective factor. Given the high mortality in patients diagnosed with local recurrence of breast cancer, the detection of risk factors associated with its

development and the creation of a follow-up protocol for the early detection of these is of vital importance.

No conflict of interest.

283 (PB-107) Poster

Depression, anxiety and the risk of breast cancer among premenopausal and postmenopausal women: an individual participant data meta-analysis

M. Basten[1], L.A. van Tuijl[2], K.Y. Pan[3], M. Spaan[4], A. de Graeff[5], J. Dekker[6], A.W. Hoogendoorn[3], F. Lamers[3], A.V. Ranchor[2], R. Vermeulen[7], A.C. Voogd[8], M.I. Geerlings[1]. *[1]PSY-CA group, University Medical Center Utrecht, Utrecht University, Julius Center for Health Sciences and Primary Care, Utrecht, Netherlands; [2]University Medical Center Groningen, University of Groningen, Department of Health Psychology, Groningen, Netherlands; [3]Amsterdam UMC location Vrije Universiteit Amsterdam, Department of Psychiatry, Amsterdam, Netherlands; [4]The Netherlands Cancer Institute, Division of Psychosocial Research and Epidemiology, Amsterdam, Netherlands; [5]University Medical Center Utrecht, Department of Medical Oncology, Utrecht, Netherlands; [6]Amsterdam UMC- VUMC, Department of Rehabilitation Medicine and Department of Psychiatry, Amsterdam, Netherlands; [7]Utrecht University, Institute for Risk Assessment Sciences, Utrecht, Netherlands; [8]Maastricht University Medical Centre, Department of Internal Medicine, Division of Medical Oncology- GROW, Maastricht, Netherlands*

Background: Depression and anxiety may increase the risk of breast cancer through immunosuppression, inhibited DNA repair or unhealthy behavior. In contrast, depression and anxiety may be related to lower estrogen levels, which may decrease the risk of breast cancer. This protective mechanism may specifically play a role in premenopausal women. We examined whether the association between depression and anxiety and breast cancer incidence differed between pre- and postmenopausal women.

Materials and methods: We performed two-stage individual participant data meta-analyses based on nine prospective cohorts of the PSY-CA consortium (N = 162,155; person years (PY) = 1,594,085, breast cancer incidences = 3,381). We considered depression and anxiety diagnoses and symptoms. Menopausal status was self-reported. In each cohort we examined the relation between each predictor and breast cancer incidence using Cox regression. Analyses were performed in pre- and postmenopausal women separately. We tested for effect modification by menopausal status in the total sample. Models were adjusted for sociodemographic factors (minimally-adjusted model) and other confounders (maximally-adjusted model). Effect estimates were pooled using random-effects meta-analyses.

Results: In minimally-adjusted models, depression diagnosis and symptoms were not associated with breast cancer incidence. We found non-significant opposite associations of depression diagnosis with decreased risk of breast cancer in premenopausal women (HR = 0.91, 95%CI:0.70;1.18) and with increased risk in postmenopausal women (HR = 1.11, 95%CI:0.75;1.64), but there was no effect modification by menopausal status (Relative Excess Risk due to Interaction (RERI) = 0.30, 95%CI:-0.77;1.36). For anxiety, decreased risk of breast cancer was found for anxiety diagnosis in premenopausal women (HR = 0.86, 95%CI:0.79;0.94) and for anxiety symptoms in postmenopausal women (HR = 0.94, 95% CI:0.90;0.98), but effect sizes were very similar for both groups. Maximally-adjusted models showed similar results.

Conclusions: We found no evidence for differential relations between depression, anxiety and breast cancer incidence in pre- and postmenopausal women. The potential preventive effect of anxiety on breast cancer incidence deserves further attention.

Table: Depression and anxiety and risk of breast cancer in pre- and postmenopausal women in minimally-adjusted models

		Premenopausal women		Postmenopausal women	
	N cohorts	Events (PY)	HR (95%CI)	Events (PY)	HR (95%CI)
Depression diagnosis	6	1607 (937,837)	0.91 (0.70–1.18)	1158 (369,162)	1.11 (0.75–1.64)
Depression symptoms	9	1205 (760,101)	0.98 (0.92–1.05)	1048 (369,162)	0.97 (0.80–1.17)
Anxiety diagnosis	5	1531 (885,731)	0.86 (0.79–0.94)	1040 (325,009)	0.83 (0.51–1.35)
Anxiety symptoms	6	842 (519,436)	0.96 (0.87–1.07)	723 (226,318)	0.94 (0.90–0.98)

No conflict of interest.

284 (PB-108) Poster

Impact of biomarkers and other diseases on breast cancer risk and mortality: prospective cohort study in the UK Biobank

Y. Zhang[1], Y. Lin[2], X. Huang[3], W. He[4], K. Czene[5], H. Yang[1]. *[1]Fujian Medical University, Department of Epidemiology and Health Statistics, Fuzhou, China [2]University of Groningen, Department of Epidemiologie, Groningen, Netherlands [3]Fujian Maternity and Child Health Hospital, Department of Breast, Fuzhou, China [4]Zhejiang University, Department of Nutrition and Food Hygiene, Hangzhou, China [5]Karolinska Institutet, Department of Medical Epidemiology and Biostatistics, Stockholm, Sweden*

Background: Breast cancer is the most common cancer and the leading cause of cancer-related death among women. However, evidence concerning comprehensive panels of biomarkers in blood and urine with the development of breast cancer is limited, and little is known about the natural history from preclinical biomarkers to breast cancer mortality.

Material and methods: In the UK Biobank cohort, 273,324 women entered the cohort during 2006–2010 and were followed up until 2019 to identify biomarkers and diseases associated with breast cancer incidence and mortality. The strengths of these associations were evaluated using the multivariable Cox regression. For those biomarkers and diseases with both increased risk of breast cancer incidence and mortality, multi-state survival models were further applied to examine the effects of biomarkers on transitions between different states of the disease.

Results: Among the 9148 incident breast cancer cases diagnosed after cohort entry, 630 died due to breast cancer over the same period. Twelve biomarkers were found to be significantly associated with the risk of breast cancer, including mainly inflammatory-related biomarkers and endogenous hormones. Women diagnosed with breast lump and carcinoma in situ of breast were at high risk of breast cancer incidence and mortality. In addition, we further found that serum C-reactive protein (CRP) was more likely to be associated with breast cancer incidence and its transition to breast cancer mortality, while testosterone and insulin-like growth factor-1 (IGF-1) were more likely to impact the early stages of breast cancer development.

Conclusions: The wide range of biomarkers and breast cancer risk highlight the need of closer surveillance for chronic inflammation and endogenous hormones in disease course. Serum levels of CRP, testosterone and IGF-1 might be used as biomarkers for screening high-risk individuals.

No conflict of interest.

285 (PB-109) Poster

A retrospective evaluation of factors associated with upstage to malignancy for breast lesions of uncertain malignant potential (B3): findings from an American cohort

J. Casaubon[1], E. Vicks[2], S. Niakan[1], A. Perez Coulter[3], R. Cho[1], A. Friedrich[1], H. Mason[1]. *[1]UMass Chan Medical School - Baystate Health, Surgical Oncology, Springfield, USA; [2]UMass Chan Medical School, Population and Urban Rural Community Health, Worcester, USA; [3]Baystate Medical Center, Surgery Clinical Research, Springfield, USA*

Background: The management of breast lesions of uncertain malignant potential (B3) diagnosed by core needle biopsy (CNB) remains controversial and varies by country, institution, lesion characteristics, and patient preference. Due to the risk of upstage (the discovery of cancer not detected by CNB) management includes surgical excision (SE), vacuum assisted core needle biopsy, and observation.

Our practice is to offer SE to all patients diagnosed by CNB with atypical ductal hyperplasia (ADH), flat epithelial atypia (FEA), intraductal papilloma (IDP), or radial scar/complex sclerosing lesion (RS). To personalize care and decrease unnecessary surgery, our goal is to identify factors associated with upstage.

Materials and methods: We performed an IRB approved retrospective study of patients who underwent SE after CNB from 2010–2021. Patients were identified using an IRB approved repository that captures patients treated at our tertiary care regional health system in the Northeastern United States.

We included women 18 or older found to have ADH, FEA, IDP, or RS during CNB, and underwent SE. We evaluated pathology from SE to identify if cancer (DCIS, IDC, or "other" including ILC and pLCIS) was discovered. We used ANOVA and Fischer's Exact test for continuous variables, and Chi-Squared for categorical outcomes.

Patients who had a combination of diagnoses on CNB were excluded as this confounded interpretation. We did not include patients with lobular neoplasia as our practice is to observe unless there is pathologic and imaging discordance, or Phyllodes tumors, as these are not technically upstaged.

Results: 719 patients underwent SE. 254 were excluded for having multiple diagnoses on CNB leaving 465 total (98 ADH, 49 FEA, 182 IDP, 136 RS). Mean age was 55.3 years, median 54.2.

Overall UR was 9.2% (43/465). There was no difference in race/ethnicity (p = 0.27), BMI (p = 0.87), symptomatic vs. screen detection (p = 0.9), or breast density (p = 0.71).

Patients who upstaged were older (mean 59.5 vs. 54.9 years, p = 0.01), had prior history of breast cancer (14.3% vs 5.2%, p < 0.001), experienced delay between surgical consultation and SE (mean days 104 vs 47, p = <0.001), and had more peripherally located (mean distance from nipple 73.6 vs 63.2 mm, p = 0.03) or larger lesions (14.1 vs 10.2 mm, p = 0.01).

Factors associated with increased UR for *individual* lesions included: association with a palpable mass (20.8 vs. 5.5%, p = 0.02) and family history of breast/ovarian cancer (33.3 vs 12.2%, p = 0.02) for ADH, mammographic size for FEA (32 vs. 10.5 mm, p < 0.001), increased age for IDP (mean 65 vs 55, p < 0.001), decrease age for RS (mean 39.2 vs 55.1 years, p = 0.04), and personal history of breast cancer for FEA (25 vs 0%, p < 0.001) and IDP (33.3 vs 3%, P < 0.001).

Conclusion: Enhanced understanding of factors associated with upstage allows for personalized decision making.

No conflict of interest.

286 (PB-110) Poster

Tumor-Infiltrating lymphocytes and its relationship with survival in a series of primary breast cancer patients according to the different surrogated molecular subtypes

C. Falo Zamora[1], J. Azcarate[2], A. Petit[2], S. Fernandez-Gonzalez[3], A. Garcia-Tejedor[3], A. Vethencourt[4], S. Vazquez[4], H. Perez Montero[5], M. Laplana[5], E. Martinez[5], R. Taco[2], E. Guerra[2], M. Varela[6], F.J. Perez[7], A. Stradella[4], M.J. Pla[3], M. Gil-Gil[4], S. Pernas[4], R. Ortega[8], T. Soler-Monso[2]. *[1]ICO-Hospitalet, Medical Oncology, Barcelona, Spain; [2]Hospital Universitari de Bellvitge, Pathology, Barcelona, Spain; [3]Hospital Universitari de Bellvitge, Gynecology, Barcelona, Spain; [4]Institut Catala d'Oncologia, Medical Oncology, Barcelona, Spain; [5]Institut Catala d'Oncologia, Radiotherapy, Barcelona, Spain; [6]Institut Catala d'Oncologia, Pathology, Barcelona, Spain; [7]Institut Catala d'Oncologia, Direction assistance, Barcelona, Spain; [8]Hospital Universitari de Bellvitge, Radiology, Barcelona, Spain*

Introduction: Tumor-Infiltrating Lymphocytes (TILS) is a well-known predictor of response to primary chemotherapy[1,2] and a good prognostic factor for survival in breast different subtypes[3]. In SABCC2021[4] we presented data on the relationship between TILs cut-off 20% and pCR (15.6% vs 41.4%, p = 0.0001). In the present study we have analyzed the association of the level of TILs cut-off 20% and survival in the different molecular subtypes at 5 and 10 years.

Material and methods: A series of 476 breast cancer patients treated from January 2009 to December 2016 with primary chemotherapy (NACT) based on anthracyclines and taxanes plus trastuzumab for Her-2 positive ones was analyzed. TILs were assessed in diagnostic core biopsy pre-NACT. Survival curves were plotted by Kaplan Meier graphics according to TILs cut-off 20% in the different molecular subtypes and compared by log-rang. DDFS at 5y and 10y was calculated. Cox proportional hazards models were used to calculate hazard ratios (HR) and the 95% CI of each prognostic factor by univariate and multivariate analyses. Statistical significance set at 0.05.

Results: After a mean follow up of 97 months (SD 35.6), there have been 95 distant recurrences: 68 out of 295 (23.1%) in TILs low (< o = 20%) and 27 out of 181 (14.9%) in TILs high (TILs >20). The HR for survival in those cases with TILs low compared to TILs high was 1.624 (95%CI 1.04–2.53). In patients with TILs low the 5y-DDFS was 77.9% (95CI 73.1%-82.8%) and in TILs high 86% (95CI 80.9%-91.1%), p = 0.033. That difference was especially significant in the TNBC where patients with TILs low presented a 5yDDFS of 57.8% (43.9%-71.8%) whereas TILs high 5yDDFS was 86.6% (78.4%-94.7%), p = 0.000. In the other subtypes the 5yDDFS between TILs low and TILs high did not reach statistical significance: in luminal A 85.8% vs. 77.8%, p = 0.761; in luminal B 77.6% vs. 86.7%, p = 0.360; in luminal B Her2: 84.8% vs. 88.5%, p = 0.727 and in HER2RRHH negative 84.8% vs. 88.5%, p = 0.628. 10yDDFS showed similar results. In the multivariate analyses those variables with independent statistical significance for survival were histologic subtype, TNM, molecular subtype, RCB and vascular invasion. TILs remain out of the equation.

Conclusions: The presence of TILs at diagnosis is a positive prognostic factor for survival, especially in the TNBC cases. Accordingly, it would be recommended that the percentage of TILs be included in all pathological reports.

	N (%)	events (%)	Univariate (95%CI)	Multivariate (95%CI)
	Tils <0 = 20%	295 (62)	68 (23.1)	1.6 (1.0–2.5)
	>20%	181 (38)	27 (14.9)	Ref
Molecular subtype				
LA	45(9)	8 (17)	Ref	Ref
LB	143 (30)	31 (22)	1.3 (0.6–2.8)	1.6 (0.7–3.5)
LBHEr2	91 (19)	15 (16)	0.9 (0.4.2.2)	2.6 (1.0–6.4)
HER2	77 (16)	10 (13)	0.7 (0.3–1.9)	3.5 (1.2–9.5)
TN	120 (26)	31 (26)	1.7 (0.8–3.9	6.0 (2.6–13.7)

No conflict of interest.

287 (PB-111) Poster

Predicting factors of local recurrence in ductal carcinoma in situ of the breast

C. Pumarola Brussosa[1], H. Castillo[1], C. Mula[1], I. Cebrecos[1], X. Caparros[1], G. Oses[2], I. Torras[1], E. Mension[1]. *[1]H. Clínic Barcelona, Breast Unit, Barcelona, Spain; [2]H. Clínic Barcelona, Radiation Oncology Department, Barcelona, Spain*

Background: Ductal carcinoma in situ of the breast (DCIS) accounts for approximately 20% of breast cancer cases nowadays [UpToDate, Barrio], affecting therefore thousands of women worldwide.

The prognosis of DCIS after surgical treatment is excellent, with a mortality rate <5% in 15 years [Barrio] and a cancer specific survival exceeding 98% after 10 years [Groen].

Various risk factors of recurrence have been described so far, which vary among series: young age at diagnosis, high nuclear grade, the size of DCIS [Sunil], positive surgical margins, family history of breast cancer, increased breast density, obesity and nulliparity or late age at first birth [Groen]. The presence of comedonecrosis has been associated with earlier recurrences and micropapillary pattern with extensive disease volume [Sunil]. Finally, the risk of death is lower in tumours with positive oestrogen receptors.

Therefore, it is important to identify patients with higher risk of recurrence in order to selectively offer an adjuvant treatment that improves the prognosis of the disease. The aim of this study is to evaluate possible predictive factors of local recurrence of DCIS.

Material and methods: This is a longitudinal, retrospective study of women with DCIS treated in Hospital Clínic of Barcelona. Data from patients diagnosed with DCIS from 1990 until 2021 has been gathered in order to assess variables potentially associated to local recurrence of the disease. Patients diagnosed with DCIS and invasive breast cancer have been excluded.

Results: Data from 302 patients was analysed, with an average age of 57 years old and an average follow-up time of 10 years. 77.2% of patients underwent a breast conserving surgery and 22.8% a mastectomy. The margins of resection were affected in 9.3% of cases, and in 38.7% of the cases were <2 mm. Comedonecrosis was present in 60.9% of tumours. As for hormone receptors, almost 50% expressed oestrogen receptors and one third had positive progesterone receptors.

The prevalence of local recurrence (LR) has been assessed according to different clinical and histopathological features. In our analysis, the prevalence of LR did not significantly differ according to the age, the tumour size, the surgical margins, the presence of comedonecrosis, or the treatment with RT. On the other hand, it was significantly higher in tumours with a high nuclear grade (100% of LR were GII-III tumours vs 88.43% without LR, p = 0.043) and in tumours with negative expression of hormonal receptors (38.46% of LR had negative hormonal receptors vs 19.01% without LR; p = 0.024).

Conclusion: In this retrospective study, both the recurrence rate and the proportion of invasive recurrences are similar to those described in the literature. A higher prevalence of LR of DCIS has been seen in high-grade tumours and in those tumours with negative hormone receptors, as evidence also shows.

No conflict of interest.

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