

concentration during NAC, while no trend was observed in oxyhemoglobin, deoxyhemoglobin, and bulk lipid. The percent change in water after two to three months of chemotherapy correlates strongly with age ($r=0.752$, $p=0.0019$).

Conclusion: Water concentration correlated with the MRI fibroglandular density. Ovarian suppression induced by NAC may be responsible for the reduced breast density, explaining the significant water concentration reduction in premenopausal subjects. No significant changes were noted in bulk lipid in any subject. This suggests that relatively fast changes in breast density induced by NAC occur due to the reduction of fibroglandular tissue rather than by increases or replacement by bulk lipid. These results suggest that DOSI is a low-cost, bed-side imaging modality capable of monitoring breast density as a prognostic marker.

96

Poster

A Retrospective Analysis of Follow-up in Patients with Suspicion of Breast Tissue Superposition in Digital Screening Mammograms

L.M. van Roozendaal¹, R. Schipper¹, M. Van Goethem², M. Smidt¹, M. Lobbes³. ¹Maastricht University Medical Center, Surgery, Maastricht, The Netherlands; ²Antwerp University Hospital, Radiology, Antwerp, Belgium; ³Maastricht University Medical Center, Radiology, Maastricht, The Netherlands

Background: Superposition caused by overprojection of breast tissue in screening mammograms might cause unnecessary anxiety and additional imaging or follow-up. When the clinical repeated mammogram shows no abnormalities of the breast, follow-up at the outpatient clinic after 6 months with mammography is common policy in Maastricht University Medical Center and Antwerp University Hospital. A breast MRI can be a short-term alternative. Breast MRI has the advantage of high sensitivity for detecting breast cancer, but only moderate specificity. No evidence regarding the necessity and type of follow-up is available. This study retrospectively analyzed the results of 6 month follow-up versus single breast MRI in case of suspicion of breast tissue superposition.

Material and Methods: From October 2009 till August 2011 418 women were referred from the breast cancer screening program. Of these, 70 patients were diagnosed with suspicion of breast tissue superposition on the digital mammography by using repetition of the mammogram, special views and ultrasound. Patients were divided into three groups; they received 6 month follow-up with mammography, single breast MRI or no follow-up. Final follow-up results were analyzed for the occurrence of malignancy in these groups.

Results: Of the patients with suspicion of superposition ($n=70$), 62 (88.6%) were referred with BI-RADS 0, and 8 (11.4%) with BI-RADS 4. Follow-up consisted of mammography in 6 months, single breast MRI, or no follow-up, in 34 (48.6%), 33 (47.1%) and 3 (4.3%) patients, respectively.

In the '6 month follow-up' group, no malignancies were found. In the 'single breast MRI' group, only 1 malignancy was found (3.0%). The pathology results after surgery showed an invasive ductal carcinoma grade 1, with a size of 0.5 cm and estrogen positive receptors. The 'no follow-up' group is too small to make assumptions.

Conclusions: If superposition of breast tissue is suspected in patients referred from screening, 6 month follow-up with mammography would probably suffice, whereas performing single breast MRI as problem-solver is mostly likely cost-ineffective.

97

Poster

Nipple Discharge – Does It Matter?

V.M.T. van Verschuier¹, T.M.A.L. Klem², S.M. de Castro¹, N.B. Tomaso¹, M. Weimann³, G. Brutel de la Riviere⁴, E.P. Steller¹, B.C. Vrouwenraets¹.

¹Sint Lucas Andreas Ziekenhuis, Surgery, Amsterdam, The Netherlands;

²Sint Franciscus Gasthuis, Surgery, Rotterdam, The Netherlands; ³Sint Lucas Andreas Ziekenhuis, Radiology, Amsterdam, The Netherlands;

⁴Sint Lucas Andreas Ziekenhuis, Pathology, Amsterdam, The Netherlands

Nipple discharge (ND) is the third most common complaint received at breast cancer clinics and an alarming symptom for many women. In various guidelines a distinction is made between physiological and pathological ND. However, the meaning of ND as a primary complaint for breast cancer is unknown. The value of additional cytological examination for ND, aside from imaging, has also not been investigated extensively.

We retrospectively reviewed medical charts of all women that visited our breast cancer clinic between 2003 and 2009 with ND as their primary complaint. All underwent medical history, physical examination, imaging, cytological and/or histological examination, if necessary, and follow-up.

The group consisted of 140 women with an average age of 46 years (13–91 years). A malignancy was found in 9 patients (6.4%). In two of these cases, DCIS was found. Women with a malignancy were generally older (median 59 ± 21) than women without a malignancy (45 ± 15) ($P=0.03$).

Other risk factors for having breast cancer were a palpable mass (6/9 (67%) vs. 25/131 (19%); $P=0.004$), a BIRADS 4/5 mammography (4/9 (44%) vs. 1/131 (1%); $P<0.001$) or ultrasonography (4/9 (44%) vs. 5/131 (4%); $P=0.001$).

Pathological ND (persistent, spontaneous, unilateral nipple discharge with a bloody, purulent or clear aspect) was found in 94 patients (67%), of which 8 (8/9 (89%)) exhibited a malignancy. Physiological ND ($n=29$, 21%) was not associated with breast cancer in any of these patients. ND of 17 patients was unclassifiable. Pathological ND was not an indication of a malignancy ($P=0.196$), neither was ND with a bloody aspect ($P=0.5$). The negative predictive value of pathologic ND for a malignancy was 98%. Cytology of ND was performed 73 times (52%); in 13 cases atypia was found. Only one of these patients had breast cancer ($P=0.3$).

Conclusion: The incidence of breast cancer for patients that visit a breast cancer clinic with complaints of ND is low (6.4%). A non-pathological classification of ND is reassuring. Neither pathological ND, nor abnormalities found in cytological examination were found to be important for the diagnosis of breast cancer in this study. Valuable factors for predicting breast cancer were the familiar elements of the 'triple diagnostics': a palpable mass found in physical examination, imaging and, if necessary, additional cytological or histological examination of the lesion.

98

Poster

Incidental Breast Lesions Detected on CT Scans, Mammograms & Ultrasonograms – a Secondary Extension of National Health Service Breast Screening Programme in UK?

M.A. Parvaiz¹, A. Allan¹, A. Ismail¹, J. Fussey¹, B. Isgar¹. ¹New Cross Hospital, General/Breast Surgery, Wolverhampton, United Kingdom

Background: Incidental breast lesion detection is increasing with growing usage of diagnostic cross sectional radiology tests. Also, patients presenting to symptomatic breast clinics may have incidental breast pathologies detected by mammography or ultrasonography.

Methods: A 3-year prospective study, including patients with incidental breast abnormalities detected by Computerized Tomography (CT) scans done for various reasons. Also, patients presenting to breast symptomatic clinics and subsequently diagnosed to have incidental breast pathologies were also included.

Results: A 169% increase has been seen in the total number of thoracic CT scans done over 3 years. 26 out of 14718 patients having CT scans during this time had incidental breast lesions.

55 out of 3643 patients (1.5%) over the same time period had incidental breast pathologies picked up on mammograms or ultrasonograms through symptomatic breast clinics.

Diagnoses	Incidental findings on CT scans n (%)	Incidental findings in symptomatic patients n (%)
Breast cancer	13 (50)	27 (49)
Benign breast pathologies	12 (46)	28 (51)
Lymphoma	1 (4)	0

Out of 956 breast cancers diagnosed over this three-year period, 13 (1.36%) were identified by CT scans, whereas 27 (2.84%) were incidentally detected in symptomatic clinics. Both groups combined produce 4.2% (40/956) of all breast cancers diagnosed.

Conclusions: A significant number of breast lesions are incidentally found on CT scans as well as mammograms/ultrasonograms of symptomatic patients. They could be regarded as secondary extension of National Health Service Breast Screening Programme. This also signifies why every single radiological test should be thoroughly assessed for any unexpected abnormalities.

99

Poster

Free Hand Breast Core Biopsies in a Selected Group Are as Good as Image Guided Biopsies

M.A. Parvaiz¹, A. Ismail¹, J. Fussey¹, B. Isgar¹. ¹New Cross Hospital, General/Breast Surgery, Wolverhampton, United Kingdom

Background: There has been an increasing trend towards image guided core biopsy than free hand biopsy for symptomatic breast lesions. We aimed to study our own practice.

Methods: All patients presenting to one stop breast clinic needing core biopsies over an 18 month period under a single consultant were prospectively included in this study. Information was collected regarding method & number of biopsies, time delay between patient initial assessment, core biopsy and results given.

Results: 400 consecutive breast core biopsies were performed over this 18 month period.

	Free hand biopsy	Image guided biopsy	p value
Total number (%)	304 (76%)	96 (24%)	
Median number of cores taken per biopsy (range)	2 (1-8)	4 (1-7)	<0.00001
Median number of days lapsed between patient assessment and core biopsy (range)	0 (0-50)	8 (0-34)	<0.00001
Median number of days lapsed between patient assessment and result given (range)	7 (2-52)	16 (2-44)	<0.00001
Sensitivity	294/304 (96.7%)	95/96 (98.9%)	0.19
Cancer Ratio	1:1.1	1:2.5	0.04

Conclusions: 76 % of biopsies have been performed free hand with no significant difference in diagnostic sensitivity compared with image guided biopsies. In a selected group, free hand biopsies provide the added advantage of early diagnosis and subsequent treatment.

100

Poster

Examination of the Sentinel Lymph Node Identification in Breast Cancer That Used the Contrast-enhanced Ultrasonography and Blue Dye Without Radioisotope

K. Futsuhara¹, K. Omoto², M. Sakuragi¹, O. Sekine¹, K. Suzuki¹, F. Konishi¹, N. Taniguchi³. ¹Saitama Medical Center, Jichi Medical University, Department of Surgery; ²Saitama Medical Center, Jichi Medical University, 1st Department of Integrated Medicine Laboratory Me; ³Jichi medical University, department of clinical laboratory medicine, Saitama, Japan

Background: The utility of Sentinel lymph node (SLN) biopsy is clear, therefore the axillary lymph node dissection is omitted. At present, the SLN identification method has technique of the radioisotope and the blue dye method, and combination method or independent method is performed. There were a merit, a demerit in each, and we performed blue dye independent method thus far, but we have experienced the case that identification of SLN has difficulty with. Omoto reported the technique using the contrast-enhanced ultrasonography with Sonazoid as a new method to make up for these faults in 2009. The Combination method of radioisotope and blue dye method is very effective because identification rate, but there is the problem that being bombed and the difficult treatment. Therefore we planned feasibility study of SLN identification method by the combination method with contrast-enhanced ultrasonography with Sonazoid (CEUS) and blue dye.

Materials and Methods: Twenty-six patients with Primary breast cancer were recruited. The cases of axilla lymph node metastasis clinically were excluded. The method is sonazoid 2ml intracutaneous injection at the subareolar and identified SLN guiding ultrasonography guide after enough massages and marked the skin of the part. Indigo carmine 1ml intracutaneous injection at the subareolar was performed during an operation, and make an incision in the marked point by CEUS, and SLN biopsy is performed.

Results: As for the identification of SLN by CEUS, one SLN was 18 cases, two were 8 cases, and an average was 1.3 of SLN. As for the identification of SLN by blue dye, an average number of SLN was 2.11(1-7), non SLN was 2.42(1-6). After the axillary incision, an average time of SLN identification was 10.8 minutes(3-22).

Conclusions: Positioning of SLN which was more precise than before incision was enabled by CEUS combined with conventional blue dye method, and it contributed to shortening in SLN identification time. Furthermore, the identification of the lymphatic vessel was enabled by CEUS, and the identification of SLN which it was hard to identify was possible by the blue dye method. As for the SLN identification method by CEUS, the precision of the blue dye method improves without the danger of the being bombed; the combination method with CEUS and blue dye was feasible.

101

Poster

Feasibility of Contrast-enhanced and High-resolution 7 Tesla MRI in Patients with Suspicious Breast Lesions

B.L. Stehouwer¹, D.W.J. Klomp¹, P.R. Luijten¹, K.A.F. Houwert², P.J. van Diest³, W.P.T.M. Mali¹, M.A.A.J. van den Bosch¹, W.B. Veldhuis¹.

¹University Medical Center Utrecht, Radiology, Utrecht, The Netherlands;

²Zuwe Hofpoort Hospital, Radiology, Woerden, The Netherlands;

³University Medical Center Utrecht, Pathology, Utrecht, The Netherlands

Background: 7T MRI offers diagnostic possibilities that have the potential to improve the staging of breast cancer patients. The purpose of this study was to assess the feasibility of 7T contrast-enhanced breast MRI, using a sensitivity-optimized RF coil setup, and its amenability to BI-RADS-MRI-conform analysis.

Materials and Methods: 18 women with 21 suspicious lesions on mammography or ultrasound (BI-RADS 4 (n=4), and BI-RADS 5 (n=14)) were included for 7T imaging (Philips Healthcare, Cleveland, USA), using a homebuilt two-channel unilateral RF breast coil. The scan protocol included a fat-suppressed 3D T1w gradient echo dynamic series during which 0.1 mmol/kg Gadobutrol was injected [TR/TE 5.0/2.0ms, FOV 160³ mm³, acquired res. 1 mm isotropic, temp. res. 63s]; and a high resolution T1w 3D gradient echo SPAIR sequence [TR/TE/TI 7.0/2.9/120ms, FOV 120³ mm³, acquired res. 0.45 × 0.57 7times; 0.45 mm³]. Two radiologists scored all exams blinded for clinical information. Image quality of the dynamic series was scored as insufficient, sufficient, good or excellent. All lesions were scored according to BI-RADS-MRI criteria. High-resolution images were similarly scored for image quality, and for additional clinical value using 4 options: none; increased reader confidence; change in interpretation or other. Only biopsy-proven malignant lesions were included in further analysis.

Results: Image quality of the dynamic series was scored sufficient (n = 8/8, (radiologist 1/ radiologist 2)), good (n = 9/10) and excellent (1/0). All 18 malignant lesions were detected by both radiologists, scored according to the BI-RADS-MRI criteria and assessed as a BI-RADS-MRI category 4 or 5 lesion, i.e. suspicious abnormality or highly suggestive of malignancy, respectively. High-resolution images were obtained in 15 patients. They showed great detail of the lesions' morphological features. Image quality was scored sufficient (n = 1/0), good (n = 2/9) and excellent (n = 12/6). More than half of the high-resolution scans increased reader confidence (n = 13/9 cases). Moreover, in some cases (n = 3/5) the radiologist changed his interpretation of BI-RADS-MRI descriptor(s).

Conclusion: This study has shown the technical feasibility, at least sufficient image quality, and amenability of contrast-enhanced and high-resolution 7T MR exams to BI-RADS-MRI-conform analysis. This allows for further exploration of the clinical potential of high-field breast imaging while simultaneously providing BI-RADS-conform diagnoses at 7T.

102

Poster

Completion Axillary Dissection Can Safely Be Omitted in Screening Detected Breast Cancer Patients with Micrometastases in the Sentinel Node Biopsy

L. Rydén¹, L. Dihge¹, M. Fernö², C. Ingvar¹, D. Grabau³. ¹Department Of Clinical Sciences Surgery, Surgery, Lund, Sweden; ²Department Of Clinical Sciences Oncology, Oncology, Lund, Sweden; ³Department Of Clinical Sciences Pathology, Pathology, Lund, Sweden

Background: The need for completion axillary dissection in breast cancer patients with micrometastases in the sentinel node biopsy is controversial.

Material and Methods: During 2001 to 2010 a total of 1822 breast cancer patients had surgery at Lund University Hospital. Of 1822 patients, 1323 had a sentinel node biopsy and all patients with micro- and macrometastases had axillary dissection. Isolated tumour cells in the sentinel lymph nodes were not offered any further axillary surgery. The sentinel lymph nodes were analyzed by frozen sections at the time of surgery and on paraffinembedded tissue for definitive pathological result.

Results: Micrometastases >0.2 mm and ≤2.0 mm were found in 42 (8%) of 521 screening detected cases and in 80 (10%) of 802 cases with clinical breast cancer. None of the screening detected cases with micrometastases had metastases in the completion axillary dissection whereas metastatic non-sentinel nodes were found in 17 (21%) of the clinical cases with micrometastases. Screening detected cases with micrometastases had a median tumour size of 14 mm (7-30 mm) as compared with a median tumour size of 18 mm (5-51 mm) of the clinical cases. No statistical difference was seen in age (median 61 vs 57 years), number of sentinel nodes (median 3.0 vs 2.5), number of axillary nodes (mean 13 vs 12 nodes), size of micrometastases (median 1 mm in both groups), ER status (83 vs 91% cases positive), PgR (69 vs 80% cases positive), or histological grade (grade 1, 2 and 3: 31, 55, 14 % vs 24, 49, 27%). For clinically