Material and Methods: The tissue specimens from patients were collected after breast surgeries and were snap frozen in liquid nitrogen. Part of all tissue was send for routine histopathology. Lipid extraction was performed by using well established Folch method (Folch, 1957) using cholesterol and methanol (2:1 ratio). Tissue samples weighing 200 mg were grounded in the presence of liquid N_2 and then mixed with cholesterol: methanol (2:1) solution and further extracted. The NMR spectra of the extracted lipids was recorded immediately after the sample preparation. These experiments were performed on a Bruker Avance 800 MHz spectrometer.

Results: Over a period of eighteen months histopathologically confirmed 11 benign and 8 CaB were subjected to NMR analysis. Median age for both groups was 47 yrs. The spectral region from 0.5 ppm to 6 ppm shows strong presence of various lipids like cholesterol (Chol), esterified cholesterol (cholE), different side chains of saturated and un-saturated fatty acid, phosphatidylcholine(PL), triacylglycerides (TAG) and there resonance assignment was carried out by this experiment. Qualitatively, there is no difference in these two tissues (benign and malignant).There was significant quantitative difference between different lipid components. In Cancer breast the relative ratio of TAG/PL was found fifteen times lower then benign while that of CholE/Chol was two times higher in Cancer breast. No difference between saturated and unsaturated fatty acid chain in two groups was seen.

Conclusion: ^{1}HNMR analysis of lipid extract of breast tissue in Indian females shows there is significant elevation of phosphotidycholine, plasmalogen and esterified cholesterol with decrease in triacylglycerol in cancer breast compared to benign tissue implying that there metabolism is definitely altered in carcinogenesis.This study analyzes the role of NMR as an additional diagnostic tool on the basis of examination lipid extract.

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Axillary Staging − a Useful Pre-operative Planning Tool

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Background: Pre-operative identification of a positive axilla will avoid a patient having to return for a second procedure after a positive sentinel lymph node biopsy as well hopefully reduce false-negative lymph node biopsy which may lead to under-treatment of the axilla.

Materials and Methods: We assessed consecutive patients over a 10-month period (April 2010–January 2011) who presented with a symptomatic breast cancer. All patients underwent axillary ultra-sound at time of diagnosis by the breast radiologist, and core biopsy of any suspicious nodes. Patients referred via the national screening programme, those receiving primary endocrine treatment and those with in-situ carcinoma were excluded. Data was recorded on the pre-operative ultra-sound and biopsy results as well as the final histology following axillary surgery. Recommendations regarding type of axillary surgery were discussed in a multi-disciplinary setting.

Results: Seventy-one patients were assessed during this time period, with a mean age of 60.7 years. Primary tumour size varied from 11−48 mm (mean 24 mm), there were 22 grade 3 carcinomas and 17% of patients were positive for HER2.

Pre-operative ultra-sound identified a positive axilla in 15% of patients thereby avoiding a second operation in 11 women. The sensitivity of axillary ultra-sound was 64% and specificity 94%. Nearly a third of the patients with a false negative axillary ultra-sound had a histological diagnosis of invasive lobular carcinoma.

Conclusions: Pre-operative axillary ultra-sound and core biopsy of suspicious lymph nodes should be considered mandatory in all patients diagnosed with invasive breast cancer. It should be used as an adjunct to formal surgical staging of the axilla by sentinel lymph node biopsy or axillary dissection. Lobular carcinomas appeared to be associated with a higher false negative axillary ultrasound rate. Accurate pre-operative staging tools as well as intra-operative techniques to assess the sentinel lymph node will reduce the number of patients returning for a second axillary procedure following a positive sentinel node biopsy.

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Male Breast Cancer − University Hospitals of Leicester Experience

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Introduction and Aim:

- Male breast cancer accounts for 1% of all breast cancers.
- To analyse the presentation, treatment & outcome of male breast cancer in Leicester.
- Incidence was compared yearly to female numbers.

Methods:

- Analysis of data of all male patients who presented with breast cancer between January 1995 and December 2009.
- We recorded clinical presentation, receptor status, 5 years survival rate, treatment methods and distant metastasis.
- Ratio of episodes of male and female breast cancers every year.

Results:

- 57 patients were recorded.
- Mean age of onset was 71.5 years with a range of 31−90 years
- The most common site was central
- The mean size was 23.3 mm (range:1 mm-55 mm)
- The most common histological type is invasive ductal carcinoma
- 97.6% patients were oestrogen positive
- 88.9% patients were progesterone positive
- 10.5% patients developed metastasis. The sites of metastasis are shown in the graph.
- 5 years survival was 55.6%
- A total of 29 male patients (51%) diagnosed between 1995–2009 have died. Causes of death were identified for 16 of these patients and are shown in the graph
- Average age at death was 79.4 years (range: 54−92)
- 41 patients underwent surgery
- 38 patients underwent a mastectomy and 3 had wide local excisions.
- 16 Patients had no surgery and the reasons are shown in the chart.
- The average incidence ratio between male to female is 0.7%

Conclusions:

- In Leicester Male Breast cancer accounts for 0.7% of all breast cancer
- Most common site was central
- Majority were oestrogen and progesterone positive
- Most were invasive ductal carcinoma
- Most common surgical treatment was mastectomy
- 5 year survival is 55.6% which falls between 44% (1982) to 75% (1986) found at Helsinki University Hospital.
- Most common cause of mortality in these patients was due to the breast cancer.
- The number of new female breast cancer patients is slowly increasing over the years, whereas the incidence of male breast cancer patients is variable, however has decreased since 2006.
- There is no direct correlation between male and female breast cancer incidence.

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Correlating Breast Density Measured by MRI and Diffuse Optical Spectroscopic Imaging During Neoadjuvant Chemotherapy

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Background: Using MRI, we have shown that the density of the contralateral normal breast is reduced during neoadjuvant chemotherapy (NAC). Diffuse optical spectroscopy imaging (DOSI) can quantify components of breast density because of its strong sensitivity to hemoglobin, water and bulk lipid concentrations. In this study, DOSI was used to image normal breast tissue of breast cancer subjects undergoing NAC and the results were compared to fibroglandular tissue volume measured by MRI.

Material and Methods: A total of 15 breast cancer subjects (9 pre- and 6 post-menopausal) undergoing NAC were investigated. Broadband DOSI measurements of the contralateral normal breasts of the subjects were performed using a handheld probe placed on the breast surface. Tissue concentrations of hemoglobin, water, and lipid were calculated at each measurement point. MRI was performed on a 3.0T Philips scanner for 7 of the 15 subjects. All subjects were measured prior to the first infusion and repeatedly throughout NAC. The fibroglandular tissue was segmented on MRI, and the volume was calculated for comparison.

Results: Of the 7 subjects with MRI, there were a total of 22 corresponding DOSI+MRI studies done at different times during the NAC. The MRI fibroglandular tissue volume had a high correlation with water concentration ($r=0.659$, $p=0.0008$) and total hemoglobin ($r=0.650$, $p=0.0011$), and weaker correlation with bulk lipid concentration ($r=-0.503$, $p=0.017$). In the whole study population, premenopausal and postmenopausal subjects exhibited a 12.9% ($\pm$14.0% SD) reduction and 5.3% ($\pm$2.1% SD) increase, respectively, of normal breast tissue water

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.

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

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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.

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Nipple Discharge − Does It Matter?

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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.

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

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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.

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

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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.