is a simple, minimally invasive, and reliable technique for the initial determination of axillary lymph node status in patients with breast cancer.

O-107 The role of axillary ultrasound (US) and fine needle aspiration cytology (FNAC) as pre-operative axillary staging procedure in patients with operable breast cancer

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Introduction: Sentinel Lymph Node Biopsy (SLNB) is the axillary staging procedure of choice in patients with operable breast cancer. However, patients with positive sentinel lymph nodes require further treatment by either axillary node clearance (ANC) or radiotherapy. The role of axillary ultrasound (US) and fine needle aspiration cytology (FNAC) in selecting patients for SLNB or ANC remains unclear.
Methods: A prospective cohort study was undertaken to assess the role of axillary US and FNAC in patients with operable breast cancer. Between October 2005 and September 2006, 100 patients with operable breast tumours and no clinically palpable axillary nodes were examined by axillary US. 24 patients with enlarged or 'malignant' nodes also underwent axillary FNAC.
Results: Overall, 44 patients had US and/or FNAC evidence of axillary nodal involvement. Only one patient with definite US evidence of nodal involvement had a negative ANC. The sensitivity and specificity of US and FNAC in determining nodal involvement were 64% and 70%; 77% and 100% respectively. In the absence of pre-operative US and FNAC, SLNB would have been inappropriate in 32% of patients. With the help of axillary US and FNAC, only 11% of SLNB procedures yielded positive nodes.
Conclusions: Axillary US and FNAC of suspicious nodes should be included in investigation of patients with operable breast cancer. It assists in the selection of the most appropriate axillary staging procedure and may reduce the rate of positive sentinel nodes.

O-108 Ultrasound scan monitoring of response to neoadjuvant chemotherapy in early breast cancer: good predictor for success of breast conservation surgery, but correlates poorly with final histology size

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Introduction: This study was conducted to assess accuracy of ultrasound scan (USS) in determining size of residual breast tumour during and after neoadjuvant chemotherapy (NC) and the likelihood of achieving breast conservation surgery (BCS).
Methods: In this retrospective study over 4 year period, 61 women with large operable breast cancers ($T_{2-4}N_{0-2}M_0$), unsuitable for BCS, were consecutively treated with NC (FEC + Taxotere) at Chase Farm Hospital. Response was monitored clinically and radiologically (USS) during the course of treatment and compared with final pathology.
Results: BCS was achieved in 48 (79%) patients. Reasons for failure of BCS were cancer progression in 2 patients, involved resection margins in 6, multi-focal disease in 3 and patient choice in 2. USS size, when compared to final histology size was accurate (within −3 to +3 mm) in only 19 (31%) patients. USS under-estimated the size in 32 (53%) patients. The under-estimation was 4–7 mm in 15 (25%) and 8–24 mm in 17 (28%) patients. USS over-estimated the tumour size by more than 3 mm (3–15 mm) in 10 (16%) patients. Clinical response (seen in 90% patients) was predictive of successful conservation in 84% whereas radiological response (80% patients) correlated with successful outcome in 90%.
Conclusion: Although USS does not correlate well with the final histopathological size of the breast tumour, it is a sensitive predictor of response to NC & the final outcome i.e. breast conservation. However, the fact that it underestimates the size should be borne in mind when planning breast conservation after NC.

O-109 Is early response a useful predictive factor in neoadjuvant chemotherapy

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Aim of study: To determine whether response after 2–3 cycles of neoadjuvant chemotherapy correlates with histopathological response obtained after completion of neoadjuvant chemotherapy. Contrast enhanced MRI was the imaging tool used in this study.
Methods: Women with histologically proven breast cancer with a tumour size $\geqslant$2 cms were considered for neoadjuvant chemotherapy. Using a prospectively maintained database we identified 77 women with 78 breast cancers who underwent neoadjuvant chemotherapy between 2002–2004. Prior to commencing chemotherapy all patients had gadolinium enhanced MRI of breasts. Tumour bulk, extent and activity were measured on MRI. Patients were started on a combination chemotherapy using FEC-75. After 2 cycles, MRI was repeated and response assessed. A response score between −1 (progression) and +4 (complete response) was given to each patient. Responders continued with the same chemotherapy. The minimal/non-responders continued on the same regimen or were switched to a taxane. All patients underwent lumpectomy or mastectomy with level-II axillary clearance after six cycles of chemotherapy. ER+ patients were commenced on appropriate endocrine therapy. They also received post-operative loco regional radiotherapy as per unit guidelines.
Results: Median age was 44.5 years. Median baseline tumour size was 5 cm. pCR was obtained in 13 patients. (16.5%) 12 of these patients scored 2 or 3 on 2nd MRI. Of the 51 patients who had a lower score on interim MRI, 1 achieved pCR when switched to alternative chemotherapy. In our study we found small tumour size and ER negativity predicted for pCR. Survival data will be presented.
Conclusions: Early response in neoadjuvant chemotherapy seems to be a predictor for complete pathological response. MRI reliably identifies early responders in neo adjuvant chemotherapy.

O-110 The challenges of using radiological 'tumour response' as an endpoint in Neo-tAnGo: a national neo-adjuvant chemotherapy breast cancer trial

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When designing a neo-adjuvant clinical trial with radiological 'tumour response' as an endpoint, specifications/recommendations are required in the trial protocol regarding the appropriate scanning techniques and format for reporting findings on the case record forms. The type of radiological scan and number of recorded dimensions of a tumour may vary, not only across hospitals but also within-hospitals across patients or assessment times. An additional issue is whether response on all existing or

only target tumours is to be evaluated. As a consequence, the ability to make meaningful inter-patient, inter-tumour or inter-time-point comparisons can be challenging. This abstract details the **Neo-tAnGo** group's methodological approaches to these challenges.

Neo-tAnGo is a national 800-patient breast cancer trial assessing neo-adjuvant chemotherapy in patients with T2 tumours or above (>2 cm). A secondary endpoint is radiological tumour response, assessing treatment effect in terms of change in tumour size. Mammograms and/or ultrasounds and/or MRI scans are undertaken at baseline and up to two breast and one axillary lesion are identified as target lesions. Scans are then repeated after 4 and 8 cycles of neo-adjuvant chemotherapy. At each time-point and for each target lesion, the scan type(s) and largest diameter(s) observed (maximum of two) are reported, along with a clinical judgement of response.

The frequency of scan type(s) undertaken, number of dimensions reported, resulting incidence of valid comparisons, clinical response categorisation, statistical approaches adopted and general observance of the RECIST criteria will be reported on the 550 patients who have completed chemotherapy.

O-111 Functional evaluation of stem cells in breast tumours

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Introduction and Aim: Side population (SP) cells have been discovered in many tissues, several cancer cell lines and solid tumours including brain and breast. These SP cells exhibit many features of stem cells. Their role in normal breast development and breast cancer is uncertain and we hypothesise that SP cells have independent functional status in relation to transporter mechanisms compared to the main population (MP) cells.

Methods: SP cells were identified using dual wavelength flow cytometry combined with Hoechst 33342 dye efflux. SP cells exclude Hoechst dye via an ABC half transporter, ABCG2. We examined 6 breast cancer cell lines for the presence of SP cells using immunochemistry for stem cell and breast cancer cell markers (ABCG2). In addition we exposed SP and MP cells to mitoxantrone and determined the effect on cell viability.

Results: SP cells were found only in MCF-7 and MFM-223 cell lines. Both populations were found to express stem cell and typical breast cancer cell markers. However, it was only the population of SP cells which were capable of pumping out Hoechst through the ABCG2 transporter mechanism. Real-Time PCR arrays for cancer drug resistance and metabolism genes showed an upregulation of Cytochrome P450 transporters, ABCB1 and PPARG in SP cells when compared to MP cells.

Conclusion: Our results show a differential expression of cancer drug resistance and metabolism genes between SP cells and MP cells suggesting that the former may have an important role in chemotherapy resistance within the tumour microenvironment.

O-112 The Cambridge Breast Intensity Modulated Radiotherapy Trial: dosimetry results for 1089 patients

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Introduction: 2D radiotherapy (RT) breast plans can lead to substantial dose inhomogeneities, which may cause increased normal tissue toxicity. We report the dosimetry results to date of our NCRN-adopted randomised trial comparing standard 2D RT with IMRT (intensity-modulated RT).

Methods: Following 3D imaging, a standard plan was produced for all patients. Plans were classified as having significant dose inhomogeneities if they exceed the upper limit of ICRU 50 (>107% of prescribed dose). Those patients with satisfactory dose homogeneity were treated with standard RT. Patients with significant dose inhomogeneities were randomised to standard breast RT or IMRT. The intervention group were re-planned with forward-planned IMRT.

Results: 317/1089 (29%) had acceptable dose homogeneity with standard 2D RT. The mean difference in breast volume between randomised and non-randomised patients was 594 cm^3 ($p < 0.0001$, 95% CI 526–662 cm^3). However, there was considerable overlap in the range of breast volumes between the 2 groups. The mean improvement in volumes >107% for IMRT plans was 34.3 cm^3 ($p < 0.0001$, 95% CI 25.7–43.0 cm^3). The mean improvement in volumes <95% for IMRT plans was 47.4 cm^3 ($p = 0.0001$, 95% CI 32.1–62.7 cm^3).

Conclusion: This trial, which closes to recruitment in June 2007, will quantify the clinical benefit of breast IMRT, in a patient group who consume 30% of RT resources. It will also provide DNA samples linked with high quality clinical outcome data, for a translational study investigating individual patient variation in normal tissue toxicity. This will bring us closer to the ultimate aim of individualised RT based on patient's genetics.

O-113 Impact of a higher radiation dose on local control and survival in breast-conserving therapy of early breast cancer: 10-year results of the Randomized Boost Versus No Boost EORTC 22881-10882 Trial

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Purpose: To investigate the long-term impact of a boost dose on local control, fibrosis, and overall survival for patients with stage I–II breast cancer undergoing breast-conserving therapy.

Patients and Methods: A total of 5,318 patients with microscopically complete excision followed by whole-breast irradiation of 50 Gy were randomly assigned to a boost dose of 16 Gy or no boost dose (median follow-up: 10.8 years, median age 55 years).

Results: Local recurrence was reported as the first treatment failure in 278 patients with no boost versus 165 patients with boost at 10 years, the cumulative incidence of local recurrence was 10.2% versus 6.2% for the no boost and the boost group, respectively. The hazard ratio of local recurrence was 0.59 in favor of the boost, with no statistically significant interaction per age group. The absolute risk reduction at 10 years per age group was the largest in patients $\leqslant$40 years of age: 23.9% to 13.5%. Severe fibrosis was statistically significantly increased in the boost group (4.4% versus 1.6%). Survival at 10 years was 82% in both arms.

Conclusion: A boost dose of 16 Gy led to improved local control in all age groups, more severe fibrosis, but no difference in survival.