

hypothesis that PET results may directly be influenced by the bio-molecular characteristics of primary BC.

Methods: 145 T1N0 BC patients were studied from 06 1999 to 11 2006. FDG-PET was performed no later than 48 hours before surgery. Lymphoscintigraphy was performed within 6 hours before surgery. SN biopsy was followed in all cases by a complete ALND. Pathologic involvement of the SN and the other non-SNs was evaluated on definitive sections and represented the basis of the comparison between PET imaging and SN biopsy.

Results: The median age was 54 years (range 24–70). All patients had pT1 BC except 3 pts with pT2 BC. The average histological tumor size was 16 mm (range 1–35 mm). All lymph nodes detected by lymphoscintigraphy were in axilla, and the detection rate was 100%. All patients underwent complete ALND. 62 patients out of 145 had nodal metastases (42.7%) and 29 had one positive axillary node.

PET results showed 45 true positive and 17 false negative, whereas SN biopsy resulted false-negative in 7 cases and true-positive in 55 cases. The negative predictive value of PET and SN biopsy was 80.5% and 92.2% respectively. However, if micrometastasis detected in SN biopsy may explain in part the PET results, the analysis of clinical, pathological and bio-molecular factors on the primary tumor showed two different patients' population inside PET evaluated N+ patients. A subgroup of more aggressive tumors (ER-, GII, Her2+) were mainly in the PET true-positive patients, whereas in PET false-negative patients, LumA, Mib1 low rate BC were statistically significant detected ($p=0.005$). Overall, the Kaplan Meier survival estimates on the entire patients' population showed a significant worse curve in N+PET+ patients respect to all the other after a median 7 years follow-up; N+PET- and N-PET+/- curves were overlapped ($p=0.017$).

Conclusions: Intrinsic biologic features of primary tumor are probably determinant of FDG-PET results and on clinical meaning of nodal metastases in term of prognostic value and therapeutic planning. PET false negative cases may identify less aggressive indolent metastasis. Removal of these axillary nodes may be facultative without the risk of understaging the disease.

600

Poster

Is a Clinicopathological Scoring System Valid in Selecting Patients for Sentinel Lymph Node Biopsy?

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Background: Sentinel lymph node biopsy is widely used as an alternative to axillary clearance in early breast cancer. However, selecting those patients most likely to require axillary clearance from initial investigations can be difficult. Carmichael et al. outlined a clinicopathological scoring system to select patients for sentinel node biopsy versus axillary clearance in 2006. This was prospectively assessed favourably by Pinkney et al. in 2007. A retrospective validation series in our unit also supported the implementation of this scoring system. We now present our experience of the prospective use of this scoring system for stratifying patients for sentinel node biopsy versus axillary clearance.

Materials and Methods: Carmichael's 10-point scoring system was calculated for all invasive breast cancer patients at the pre-operative multidisciplinary team meeting over an 18 month period between 2007 and 2009. The score was used with clinical information and patient preference to decide on the nature of the axillary surgery undertaken. The lymph node status from either sentinel node or axillary clearance results was then compared with the pre-operative Carmichael score.

Results: 190 patients with a mean age of 61 years were assessed using Carmichael's scoring system. The accuracy of the scoring system was 62% with a false positive rate of 25% and a false negative rate of 12%. A low score reflected a 20% node positive rate (21% in validation series) whilst a high score reflected a 45% node positive rate (85% in validation series).

Conclusions: Despite the results from our validation series, this test has not shown sufficient accuracy when used prospectively. The scoring system appears to overestimate the need for axillary clearance. Whilst there is a place for a clinicopathological test in a sub-group of patients, the requirement for this is likely to be superseded by intra-operative sentinel node assessment techniques. Until these techniques are broadly implemented, the decision regarding axillary surgery in breast cancer patients remains a clinical judgement in our unit.

601

Poster

Factors Influencing Requirement for Re-excision in Breast Conservation for Ductal Carcinoma in Situ

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Background: Previous results from the UK National Breast Cancer Screening Programme have highlighted that there were a higher proportion of women with ductal carcinoma in situ (DCIS) only undergoing more than one procedure for complete excision in our region than in other regions in Scotland. While an internal review of those individual cases was performed for audit purposes, we sought to determine any causative or predictive factors to improve the numbers of patients with DCIS completing treatment with one operation.

Methods: All patients undergoing breast conserving surgery for DCIS from February 2010 for a twelve month period were identified from the local cancer audit database. Patients undergoing mastectomy as first operation for DCIS, and patients with microinvasive or invasive disease were not included.

Results: In the twelve month period from Feb 2010, forty-three patients were diagnosed with DCIS. Of 35 patients that had breast conserving surgery for DCIS, 26 required only one operation, 8 required two procedures and one required three procedures. There was no difference in age or mode of presentation between those that required one or more operations for disease control. Tumour size on final pathology was significantly greater in those that had more than one operation ($p=0.03$). In those who had one operation, in no case was the disease extent underestimated on mammography by greater than 10 mm, and in 5 cases the disease was overestimated by >10 mm. In those that had more than one operation, the disease was underestimated in 3 cases (>10 mm) and not overestimated in any case ($p=0.01$). Initial excision specimens from those that required more than one procedure were of similar mean weight as those with more than one procedure, but had a significantly greater volume (mm^3 ; $p<0.0001$), despite overall pathological size after all treatment being larger in this group. In 88% of those undergoing one operation DCIS was diagnosed on core biopsy (B5a), whereas only 55% of those who required more than one procedure were B5a on core biopsy ($p=NS$). Grade of DCIS (low, intermediate or high) was not a factor in determining need for re-excision.

Conclusion: Factors influencing complete excision of DCIS with a single procedure were smaller tumour size, underestimation of extent of disease on mammography (by >10 mm), larger volume excision at first procedure, and core biopsy not showing DCIS pre-operatively.

602

Poster

Sentinel Lymph Node Micrometastases. How to Act?

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Background: Complete axillary node dissection (ALND) is the standard surgical treatment for women with sentinel lymph node (SLN) micrometastases of breast cancer. In recent years, some studies have compared SLN and ALND, and even if more data is necessary, it appears that SLN alone do not result in inferior survival. However, patients with ALND are more likely to suffer from morbidities such as paresthesias, shoulder pain and lymphedema.

We analyze the rate of axillary micrometastases found in our patients as well as the clinical and histopathological features and current status of these women.

Materials and Methods: Retrospective observational study including 26 patients with breast cancer and nodal micrometastases diagnosed in the period 2007–2010 in our multidisciplinary unit.

Results: From January 2007 to November 2011 we have obtained a positive result for micrometastases in 26 patients. We used hematoxylin eosin staining intraoperatively between 2007 and 2009. From 2010 we are using the OSNA method (detection of CK19 copy number), making the 65.38% of this determinations by this technique. Average age of these patients: 60.99 years. Average tumor size after surgery: 20 mm. We found infiltrating ductal carcinoma in 22 patients (84%) and infiltrating lobular carcinoma in four of them (7.69%). 22 women had hormone-sensible carcinomas. 13 of them luminal A and 9 of them Luminal B. 4 tumors overexpress erb-2. There was no triple-negative phenotype. 61% of the tumors were grade II tumors, 27% of them were grade III tumors and 3.8% of them were grade I tumors.

The performance of radical or conservative surgery depended on the criteria of clinical guidelines. We perform ALND in 54.1% of these patients and SLN alone in 45.8%. The average number of lymph nodes obtained (ALND + SLN) was 12. We found 1 SN affected of micrometastases in 73% of the cases, 2 SN affected in 23% and 3 SN affected in 3.84%.

When we continued with ALND, we found just one additional micrometastasis in one patient.

Systemic treatments were performed following the clinical guidelines conforming to European or American standard NCCN.

In their first visit post-surgery, these 26 patients filled the EuroQol test, scale of quality of life related to health. The mean score in these 26 patients was 67 medium score of quality of life. Although 81% maintained its principal activity, 81% also complained of moderate / severe pain. At the moment, these 26 patients are free of disease.

Conclusions: The standard approach in women with sentinel lymph node micrometastasis is performing lymphadenectomy. Data shows that, although it may be useful for better staging, this attitude doesn't seem to increase survival.

From our experience, we think that it is necessary to individualize the decision in each case and, depending on the patient characteristics, to decide before the intervention, with the participation of a multidisciplinary team, what attitude would be the best in each patient in case of micrometastases.

603

Poster

Could Axillary Dissection Be Avoided After Neoadjuvant Chemotherapy in Patients with Prior Positive Axillary Sentinel Lymph Node by a RT-PCR Method?

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Background: Many women with large primary breast tumours are offered neoadjuvant chemotherapy in order to downstage these tumours to improve surgical options. The optimal timing for sentinel lymph node biopsy (SLNB) in patients receiving neoadjuvant therapy has been debated, because a higher false negative rate for SLNB performed after induction therapy has been reported, especially in those patients with micrometastasis in SLN or chemosensitive tumours.

Material and Methods: Forty-nine patients diagnosed with breast cancer classified as T2 or larger were recruited by our institution from January 2010 until April 2011. The SLN was evaluated by the OSNA method (RT-PCR mRNA Cytokeratin 19) and classified into negative, micrometastasis (>500 and <4000 copies), and macrometastasis (>4000 copies). After neoadjuvant chemotherapy based on anthracyclines and taxanes, patients with previously positive SLN were submitted to complete axillary dissection, which was evaluated by permanent paraffin sections.

Results: At least one sentinel lymph node with metastasis was identified in 26 patients, 7 were classified as micrometastasis by the OSNA method (27%) and 19 as macrometastasis (73%). The subsequent axillary dissection after neoadjuvant chemotherapy showed no residual disease in any patients with previous SLN affected by micrometastasis. Otherwise, in patients with macrometastasis in the SLN, the axillary dissection showed residual disease in 9 cases (47%) ($p = 0.2$, *Chi-Square*).

Conclusions: Axillary dissection could be avoided after systemic treatment in patients with micrometastasis in SLN detected by the OSNA method. In patients with macrometastasis the possibility to prevent axillary dissection could depend on the tumour response to chemotherapy and the breast cancer intrinsic subtype. But given the small number of patients we cannot draw conclusions. Larger randomised trials are necessary to learn if completion of axillary dissection will be needed in all patients with macrometastasis in SLN biopsy prior to neoadjuvant chemotherapy.

604

Poster

The Management of Papillary Lesions of the Breast Diagnosed Using Core Needle Biopsies

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Background: Papillary lesions of the breast include a broad spectrum of lesions, from benign papillomas to papillary carcinomas. It is difficult to determine whether a lesion is benign or malignant based on the fragmented material of a core needle biopsy (CNB). This study evaluated patients with papillary lesions examined using CNB.

Methods: We retrospectively reviewed 1635 CNB performed between 2004 and 2008, and identified 70 papillary lesions. The initial diagnosis by CNB of these 70 lesions were 45 intraductal papillomas (IDP), 3 intracystic papillomas (ICP), 8 atypical ductal hyperplasia (ADH), 1 flat epithelial atypia (FEA), and 13 unclassified papillomas. All cases were reviewed

for the subsequent follow-up methods, and final pathological diagnosis. Furthermore, concerning IDP and ICP, we evaluated the clinicopathological factors associated with upgrade rate.

Results: After CNB, excisional biopsies were performed in 49 cases and Mammotome[®] biopsies in 5 cases. CNB was repeated in 5 patients. 10 patients underwent regular follow-up. One patient was lost during follow-up. Amongst patients diagnosed as IDP and ICP at initial CNB, the final diagnosis after excisional biopsy, Mammotome[®], and repeated CNB, 4/38 turned out to be malignant. Amongst patients initially diagnosed as ADH and FEA, 5/9 were malignant. Amongst patients with unclassified papillomas, 5/12 were malignant. The total upgrade rate was 23.7% (14/59). In patients with IDP and ICP, distance from the nipple to the nearest tumor edge correlated with upgrade rate. It was shown that upgrade rate was higher when the distance was more than 2 cm from the nipple ($p = 0.027$).

Conclusion: To avoid overlooking of malignancy, surgical excision is advantageous for papillary lesions, particularly in cases of IDP and ICP that are located far from the nipple.

605

Poster

A Novel Technique for Lumpectomy Margin Assessment: a Cost-effectiveness Analysis

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Background: Positive or close margins are one of the strongest predictors of reoperation for breast cancer lumpectomy surgery, and reoperation is costly for the patient and the payor due to a delay in adjuvant therapy, additional treatment costs, additional patient anxiety, and less favorable cosmetic outcomes. The aim of this study is to evaluate various lumpectomy margin analysis methods (standard post-surgical pathology, frozen section analysis (FSA), and MarginProbe device) in terms of reduced reoperation rates, quality adjusted life years (QALYs), and cost-effectiveness.

Material and Methods: We developed a decision analytic model to compare 3 strategies: standard post-surgical pathology (low accuracy), FSA (high accuracy but also high cost), and MarginProbe (intermediate accuracy). MarginProbe (Dune Medical Devices, Caesarea, Israel) is a novel device for intraoperative margin analysis based on evaluation of electrical properties of tissue. In the model, all patients initially have a lumpectomy. If margins are clear, the woman proceeds to external radiation therapy. If margins are suspicious, the patient is a candidate for radiation or reoperation (either re-excision followed by radiation, or mastectomy and immediate reconstruction). Model inputs (surgical outcomes and utilities) were derived from the literature. Costs were based on Medicare reimbursements and calculated in 2011 \$USD. We determined the incremental cost-effectiveness ratios (ICERs) of MarginProbe device and FSA and ran sensitivity analyses on the cost and accuracy of these methods.

Results: Compared to standard post-surgical pathology, MarginProbe reduces reoperation rates by 55.2% and FSA reduces reoperation rates by 89.7%. Use of MarginProbe is likely to prevent 552/1000 second surgeries, thus saving approximately \$2.2 billion per 1000 women. The ICER of MarginProbe is projected to be less than \$10,000/QALY, which is well below an internationally accepted range for ICER. The use of the MarginProbe is cost-saving as long as it costs less than \$655. FSA is expected to prevent 897 / 1000 surgeries, hence saving about \$3.7 billion. The ICER for FSA is estimated to be less than \$20,000/QALY.

Conclusions: Re-operation rates vary from 15 to 50% for breast cancer lumpectomy surgery. Both MarginProbe and FSA reduce re-operation rates, thus saving money and improving patients' quality of life. Although FSA is accurate, it has limited clinical utility secondary to being expensive, time-consuming and technically difficult to perform. Thus it is recommended to explore the use of cost effective techniques such as MarginProbe as this has widespread implications for hundreds of thousands of women diagnosed with breast cancer worldwide each year.

606

Poster

Feasibility of Sentinel Lymph Node Detection with Radioisotopic Method Alone After a Grade IV Anaphylactic Reaction to Patent Blue in Breast Cancer Surgery

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Background: A breast cancer patient died secondary to a grade IV anaphylactic reaction to Patent Blue (PB) dye occurred at the Curie Institute the 19th February 2011. This study was conducted in order to determine