Conclusion: When using periareolar injection of radioactive tracer combined with peritumoral injection of blue dye, significantly less patients have tumour positive axillairy lymph nodes when comparing them with patients in whom both tracers are injected peritumoral. This can partly be explained by the fact that for the last two years we perform standard ultrasound examination of the axilla before SLNB, diagnosing metastatic disease in 6–7% of metastatic patients without the use of SLNB.
We conclude that the use of periareolar injection technique is a good and easy alternative to deep techniques, however close follow up is needed to ensure that local recurrence rates are comparable for both groups.

333 POSTER

Are lymphogenic micrometastasis in breast cancer a prelude to macrometastases?

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Background: Since the introduction of the sentinel lymph node biopsy (SNB) in patients with breast cancer, micrometastases are detected in 15–20% of patients. The clinical relevance of these small lymphogenic metastases is unclear. There is a well established correlation between lymph node (macro-) metastasis and tumour size. If micrometastases are merely a prelude to larger lymph node metastases, one would expect a similar relation for micrometastasis. We evaluated the relation between lymphogenic micrometastasis and various primary tumour characteristics.
Patients and methods: Between June 1999 and December 2004, 514 patients cT1/2N0 breast cancer underwent surgery that included SNB as a staging procedure. The presence of lymph node metastasis was evaluated after serial sectioning of the sentinel node(s) with 250 micrometer intervals and staining with H&E and immunohistochemistry staining. Based on the presence of tumour in the sentinel node, patients were categorised in three groups: N0: no metastasis (n = 295) N1micro: micrometastasis <2 mm (n = 83) and N1: metastasis ⩾2 mm (n = 136).
Results: In contrast to the increasing frequency of macrometastasis in relation to tumour size (primary tumour <1 cm, 13%; 1–2 cm, 21%; 2–3 cm, 40%; and >3 cm, 41%; P < 0.001), the frequency of micrometastasis in the sentinel lymph node was not correlated with the size of the primary tumour: 17%, 15%, 19%, 18%, respectively. Bloom and Richardson grade, mitotic activity index, estrogen recptor status, and carcinoma type (ductal/lobular) could not be shown to have an impact on the occurrence of macro- and micrometastasis.
Conclusion: In contrast to the increasing chance of lymfogenic macrometastasis in larger primary breast cancers, the occurrence of micrometastasis was not influenced by tumour size. There appears to be a difference between the chance of micrometastasis and the development of macrometastasis. Micrometastasis merely being a prelude to macrometastasis appears unlikely.

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The consequences of long-time arm morbidity in node-negative breast cancer patients with sentinel node biopsy or axillary clearance

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Background: Several studies have evaluated long time morbidity after sentinel node biopsy (SNB) and axillary clearance (AC) recording self reported morbidity or measuring arm circumferences or ranges of shoulder motions. Statistically significant differences in favour to SNB have been observed, but the consequences of the reported differences have been addressed in relatively few studies. Our aim was to evaluate long-time morbidity in axillary node negative breast cancer patients three years after sentinel SNB or AC emphasising the consequences of morbidity like work-related events and the need of physiotherapy.
Patients and methods: Morbidity was evaluated in 92 breast cancer patients three years after SNB only and in 47 patients after AC using a questionnaire. The circumferences of the upper extremities and the range of the shoulder movements were also measured.
Results: Two (2%) SNB and eight (17%) AC patients were not able to use the ipsilateral upper extremity to former extent, P < 0.005. One SNB (1%) and one (2%) AC patient were retired or on a long-time sick leave because of arm morbidity, P = NS. Clinically apparent upper extremity lymphoedema was observed in one (1%) SNB patient and in 6 (13%) AC patients, P < 0.005. Two (2%) SNB patients had received manual lymph drainage, one of them because of breast oedema. None of the SNB patients needed a compression sleeve. Seven (15%) patients had received manual lymph drainage after AC, three (6%) of them wore also compression sleeve, P = 0.0009 for manual lymph drainage for arm oedema, P > 0.05 for compression sleeve.
Conclusions: The risk of remarkable long-time arm morbidity after SNB is minimal. Work-related events seem uncommon due to arm morbidity, regardless the extent of axillary surgery.

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Is sentinel lymph node biopsy (SLNB) necessary in women undergoing contralateral prophylactic mastectomy (CPM)? Magee Womens hospital experience

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Introduction: SLNB remains controversial with prophylactic mastectomy. This retrospective study was undertaken to determine if SLNB is justified in patients undergoing CPM.
Methods: Between 1999 and 2004 a total 155 patients underwent CPM and 80 of them (51.6%) had SLNB performed. 103 of index tumors were diagnosed as invasive tumor. Multicentricity and/or multifocality were reported in 49.7% of index tumor specimens, and estrogen receptor was positive in 60% of them. Two invasive and 3 DCIS were diagnosed in 155 CPM specimens (n = 5, 3.2%). Both blue dye and gamma detection probe technique were used to identify the SLN in 95% of patients with CPM, and blue dye was used in 4 patients.
Results: Median number of identified SLN is 2 (range 1–6) at CPM site. There was no malignant tumor at CPM specimens of 2 patients (Fibrocystic change, Sclerosing Adenosis), but both of them had positive SLNB for metastatic carcinoma (n = 2/80 = 2.5%). Final treatment decision might be affected in 7 patients in CPM group (4.5%) if all 155 would have underwent SLNB (2 SLNB were positive, 2 invasive tumor were diagnosed at CPM specimens, and 3 DCIS were diagnosed at CPM specimens). There was no evidence of arm lymphedema in patients who had undergone CPM and SLNB at a median follow-up of 24 months.

Table 1: Age, malignant histology, family history, BRCA result and time of CPM surgery in all CPM patients

	Total CPM (n = 155)	CPM+SLNB (n = 80)
Age (min-max) years	47 (26–70)	47.5 (26–70)
Malignant histology	5 (3.2%)	4 (5%)
Family history	81 (52.3%)	37 (46.3%)
BRCA 1 or 2 (+)	11 (7.1%)	5 (6.3%)
Immediate CPM	132 (85.2%)	68 (85%)

Conclusion: Even though SLNB is a minimally invasive method of evaluating the lymphatic basin, this retrospective study dose not support its use in patients undergoing CPM.

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Surgical biopsy for nonpalpable breast lesions: should be abandoned as initial management?

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Background: In this retrospective clinical study an analysis of the histologic findings of nonpalpable breast lesions, treated by open surgical biopsy in our Breast Unit was performed. Aim of that analysis was to clarify if the surgical biopsy could still be a valuable initial management of nonpalpable breast lesions.
Patients and methods: A series of 750 women underwent 784 preoperative localizations of nonpalpable, mammographically detected, breast lesions during the last 12-year period. Indications for biopsy were; 1) clustered microcalcifications, 2) solid mass, and 3) a radiological parenchymal distortion, that were not classified as benign by BI-RADS. The lesions were localized preoperatively using hook-wire methods, and all biopsies were performed under general anesthesia.
Results: Histology revealed carcinoma in 210 (26.8%) cases; noninvasive in 143 (68.1%) cases and infiltrating in 67 (31.9%) cases. The highest malignancy rate was found in cases with microcalcifications (137 carcinomas out of 380 cases, 36%), while for the remaining 404 cases, 73 (18%) cancers were found. Lymph node invasion was present in 22% of patients with invasive cancers. Frozen section was available for 540 cases (68.9%), and it was in all accurate in terms of positiveness of malignancy. General anesthesia was used in all cases without any side effects.

Conclusion: The hook-wire localization of nonpalpable breast lesions is simple, accurate and safe method for detection of early breast cancers. Frozen section is feasible and accurate in the majority of these lesions, and therefore, diagnostic and therapeutic one step surgical procedure could be performed.

337 POSTER

Clinical implications of tumour-positive internal mammary lymph nodes in breast cancer

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Background: Since the introduction of the sentinel lymph node biopsy in breast cancer patients there has been a renewed interest in the lymphatic drainage pattern to the internal mammary chain nodes. In this study we evaluated the frequency of lymphatic drainage to the internal mammary chain, the rate of positive nodes and the clinical implications of its presence.
Material and methods: Between May 1999 and December 2004 494 consecutive patients underwent a sentinel lymph node procedure for primary breast cancer, clinically stage T1–2N0. In all patients preoperative lymphoscintigraphy was combined with intraoperative gammaprobe use. In patients with internal mammary sentinel lymph nodes on lymphoscintigraphy, lymph node extirpation was attempted through an intercostal parasternal incision.
Results: The sentinel lymph node identification rate was 99.2%% (490/494). In 87 patients (17.6%) ipsilateral internal mammary lymph nodes were visualised, in 76 of them (87.5%) the lymph node(s) could be removed. In all 88 patients with sentinel nodes in the internal mammary chain we found concomitant axillary sentinel lymph nodes. In sixteen of the 76 patients in whom internal mammary sentinel nodes could be retrieved, metastasis were found (21.1%). In 12 of these patients this resulted in expansion of the radiotherapy field, while in only six patients internal mammary lymph node metastasis was the indication for adjuvant systemic therapy. In the remaining 10 patients systemic therapy was indicated based on primary tumour features and/or axillary lymph node positivity. More extensive radiotherapy and adjuvant systemic treatment was indicated solely on internal mammary lymph node positivity in 12/88 13.6% and 6/88 6.8% respectively of the patients in whom internal mammary sentinel nodes were visualised. This means 2.4% and 1.2% for all patients.
Conclusions: Sentinel lymph nodes in the internal mammary chain are a common feature and can be excised successfully in the majority of patients. The implications of sentinel node positivity are limited. The proportion of patients in whom adjuvant systemic therapy is indicated is negligible and the proportion of patients in whom the radiotherapy field is expanded is comparable to or even lower than the false negativity rate of the (axillary) sentinel lymph node procedure.

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Intraoperative radiotherapy with electrons (ELIOT) for breast carcinoma: the preliminary study on treatment tolerance at the European Institute of Oncology

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Background: At present, radiation therapy after breast-conserving surgery is generally delivered to the whole breast over a period of 5 to 6 weeks. Such a prolonged postoperative radiotherapy is a burden to patients and hospitals and forces many women with difficult access to Radiotherapy Centers to chose mastectomy instead. Furthermore, for patients receiving chemotherapy, the start of conventional radiotherapy may be delayed so long as to increase the risk of local relapse. These problems might be eliminated if effective radiotherapy could be given as a single treatment intraoperatively, immediately after surgery. Since the majority of local recurrences in selected patients occur close to the former tumor bed, even when radiotherapy is omitted, the question arises whether a sole tumor bed irradiation might be a therapeutic alternative to total breast irradiation.
Material and methods: One hundred and one consecutive patients with invasive breast cancer of tumor size up to 2.5 cm were prospectively treated at European Institute of Oncology with ELIOT directed only at the region of the tumor bed as part of their breast-conserving therapy from 1999 to 2000. The trial was based on a dose-escalation starting from 10 Gy: we tested the dose levels of 10, 15, 17, 19 and 21 Gy. The dose-levels of 10 and 15 Gy were followed by a reduced course of external fractionated radiotherapy. Most patients received 21 Gy intraoperatively. The focus of this study was the early and intermediate results of treatment in terms of toxicity, complications, cosmetics, local control.
Results: After a mean follow-up of 42 months, only 23 patients of the 84 patients who received a dose of 17 to 21 Gy had experienced mild or moderate side effects, including breast fibrosis 16 patients, mild in 15, severe in 1, which resolved within 24 months. Postoperative infection 2 patients, hematoma 3 patients and lyponecrosis in the treated area 3 patients.
Conclusions: Early results on treatment tolerance suggest, that ELIOT could be offered to the patients a potential advantage of reduced treatment-related toxicities and improvements in the quality of life. Less exposure of normal breast tissue, greater accessibility for elderly or frail patients, a more convenient schedule for working patients, the ability to deliver radiation before chemotherapy without a potential delay in local therapy, and possibly less cost, should lead to greater appropriate use of ELIOT in patients with breast carcinoma.

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Reduction of ipsilateral breast tumor recurrence rate by Intraoperative Radiotherapy (IORT) boost technique

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Introduction: Ipsilateral breast tumor recurrence (IBTR) after breast conserving surgery is rare (1–2% per year), but can be further reduced by proper surgery and modern radiotherapy techniques. The Salzburg Concept of intraoperative radiotherapy (IORT) applies the combination of IORT in boost modality and postoperative whole breast irradiation.
Patients and Methods: 378 women with stage I or II breast cancer were included in this study. All patients had breast conserving surgery and received 51 Gy to 56.1 Gy of postoperative radiation to the whole breast in 1.7 Gy fractions, but patients received different boost strategies. Group 1 (n = 188) received electron boost radiation of 12 Gy subsequent to the irradiation to the whole breast, group 2 (n = 190) received electron boost radiation of 9 Gy directly to the tumor bed intraoperatively, followed by whole breast irradiation. The groups were treated sequentially, group 1 from January 1996 to October 1998 and group 2 from November 1998 to March 2001. The groups are comparable looking at age, menopausal status, tumor size, grading and nodal status. All statistical tests are two-sided.
Results: After a median follow up period of 81.0 months in group 1 and a median follow up period of 51.1 months in group 2, 12 IBTRs (6.4%) could be observed in group 1 and no IBTR could be observed in group 2 (0.0%). The five year actuarial rates of IBTR were 4.3% (95%CI: 1.9% to 8.3%) and 0.0% (95%CI: 0.0% to 1.9%) respectively (P = 0.0018). Distant recurrences occurred in 24 patients (12.8%) in group 1 and in 8 patients (4.2%) in group 2. The five year actuarial rates of distant recurrence were 8.6% (95%CI: 4.9% to 13.5%) and 4.2% (95%CI: 1.8% to 8.2%) respectively (P = 0.08). The five year disease-free survival rates were 90.9% (95%CI: 85.8% to 94.7%) in group 1 and 95.8% (95%CI: 91.8% to 98.2%) in group 2 (P = 0.064).
Conclusions: Immediate IORT-boost yields excellent local control and results in statistically significant lower IBTR rates compared to the treatment with conventional postoperative electron boost after five years of follow-up.

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Population analysis of the randomised EORTC trial 22922/10925 investigating internal mammary and medial supraclavicular (IM-MS) lymph node Irradiation

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Purpose: To describe the patient population that has been included in the large prospective multicentre EORTC "IM-MS" trial 22922/10925.