

Image guided radiotherapy of breast cancer is based on the assumption that we must irradiate only region with lymph flow from the tumour-regions containing SLN.

**Results:** axillary region contained SLN in all 49 patients, in 24 of them it was only region with visualised SLN. In another 26 patients we detected additional regions containing SLN: 11 (22%) tumours drained to Ax+SSCL, 8 (16%) – Ax+IM, 7 (14%) – Ax+SSCL+IM lymph-nodes. In 13 patients with "internal tumours" 5 (38%) had SLN in the Ax region only, 5 (38%) – Ax+IM, 2 (16%) – Ax+SSCL, 1 (8%) – Ax+IM+ISSCL. After SLN visualization standard radiotherapy portals were reduced in 12/13 (92%) cases.

In 36 patients with "external tumours" 18 (50%) had SLN in the Ax region only, 3 (8%) – Ax+IM, 9 (25%) – Ax+SSCL, 6 (17%) – Ax+IM+ISSCL. After SLN visualization standard radiotherapy portals were changed in 27/36 cases (75%): in 50% – reduced, in 25% – enlarged.

**Conclusion:** Visualization of SLN help to optimized extent of radiation fields in 75% of patients with external and 92% – with internal tumour localization.

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POSTER

#### Is fine needle aspiration cytology useful in male breast lesions?

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**Background:** The purpose of this retrospective study was to determine the value of fine needle aspiration (FNA) cytology in the work-up of male breast lesions. A malignancy in the male breast is a rare pathologic finding and a challenge for the pathologist with limited cytopathologic experience. Focussed was on items as atypia and inadequacy. The results of the study were compared with the recent literature on male breast tumors since 2001.

**Materials and Methods:** From 1993 to 2008 8,484 FNAs of the breast were examined in our institute, 147 FNAs were from unilateral lesions of the male breast. The FNAs were classified in the categories proposed by the 1996 National Cancer Institute-sponsored conference approach: malignant, suspicious for malignancy, atypical, benign and unsatisfactory. Cytohistologic correlation was done with the data from the available histopathology records. Sensitivity, specificity, accuracy, positive and negative predictive values were calculated.

**Results:** In 85 cases of the 147 FNAs on male breasts histologic correlation was available. On FNA the 16 malignant cases were classified as positive (n=12), suspicious for malignancy (n=2) or atypical (n=2). Of the 35 benign lesions on histology only 3 cases were classified as atypia and one as suspicious for malignancy on FNA. In the unsatisfactory FNAs (n=64), no carcinomas were diagnosed. The sensitivity and specificity were 100 and 89.7%, respectively. The overall accuracy was 92.7% and the positive and negative predictive values were 75 and 100%, respectively. Our results confirm the outcomes of the studies on male breast lesions in the recent literature.

**Conclusions:** FNA on benign breast lesions yielded many unsatisfactory cases. However, due to the good cytohistologic correlations and favourable statistic figures, we can conclude that FNA cytology is an excellent diagnostic tool in the work-up of male breast carcinomas.

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POSTER

#### Value of sentinel lymph node biopsy in ductal carcinoma in situ of the breast

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**Background:** Though the role of axillary staging in invasive breast cancer has been established, the value of the sentinel lymph node biopsy (SLNB) in ductal carcinoma in situ (DCIS) of the breast remains controversial.

**Material and Methods:** A retrospective study of the medical records of all patients with DCIS diagnosed by core-needle biopsy during a 4 year period (2005–2008) was performed. Patients with an invasive component in histology were excluded.

**Results:** During the 4-year study period, 1013 patients were operated for breast cancer; 44 patients had a preoperative diagnosis of DCIS (without invasive components) on core-needle biopsy. The majority of these patients were referred through the national breast cancer screening program and had no palpable masses at physical examination; mammography mostly showed pathologic clusters of microcalcifications with no ultrasonographic substrate. Definitive preoperative diagnosis of DCIS was based on examination of core-needle biopsies, mostly performed stereotactically (vacuum-assisted biopsy). All patients underwent SNLB combined with either wide local excision (57%) of the primary tumor or mastectomy (43%). On definitive pathological examination, invasive growth was found in 10 patients (23%) (Table 1). Sentinel node (SN) positivity was found

in 4 patients (9%), 3 of whom demonstrated positivity at intraoperative frozen section examination. All but 1 of these 4 SN-positive patients were ultimately proven to have invasive breast cancer. All 4 patients underwent axillary lymph node dissection (ALND); in 1 patient further axillary metastases were found.

**Conclusion:** In patients with an initial diagnosis of DCIS on core-needle biopsy, SNLB should be performed routinely, as a substantial portion of these patients will be upstaged to invasive breast cancer based on definitive histological examination; moreover, the 9% SN-positivity rate found in this study exceeds the 5% threshold for SNLB performance maintained in most studies and guidelines.

Table 1

	N (%)
<b>preoperative diagnosis DCIS</b>	44 (100%)
<b>postoperative diagnosis</b>	
DCIS	34 (77%)
invasive breast cancer	10 (23%)
<b>SNLB</b>	
negative	41 (93%)
positive	4 (9%)
<b>ALND</b>	4 (9%)
further metastases (apart from SN)	1 (25%)

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POSTER

#### Treatment of small invasive breast cancer with ultrasound-guided radiofrequency ablation followed by immediate resection

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**Background:** The trend towards less invasive local treatment of breast cancer has led to studies evaluating minimally invasive techniques to locally eradicate tumors. Radiofrequency ablation (RFA) is a minimally invasive thermal ablation technique. After performing an ex vivo study which resulted in complete cell death in 17/20 breast cancer lesions, an in vivo study was initiated to determine the feasibility, safety and complications of this procedure.

**Materials and Methods:** Postmenopausal women with a small ( $\leq 1.5$  cm) invasive ductal carcinoma – diagnosed by core needle biopsy – were considered eligible for this study. RFA was performed in the operating room, followed by immediate resection (lumpectomy or mastectomy). A needle electrode was placed in the centre of the tumor using ultrasound guidance. Subsequently, the tumor was ablated for a period of 12 minutes. Pathologic evaluation of the specimens was performed using conventional hematoxylin-eosin (HE) staining as well as cytokeratin 8 staining and NADH diaphorase to assess cell viability.

**Results:** Up to now, 8 patients with an average age of 67 years (range 58–72) have been included. The mean tumor size was 14 mm (range 8–24). Histopathological examination revealed complete cell death in all lesions. One patient suffered a burn wound due to heat conduction by a localization wire placed in the tumor before the procedure, which healed completely after conservative treatment.

**Conclusions:** In vivo ultrasound-guided radiofrequency ablation can result in complete cell death in invasive breast cancer. To avoid skin burns the distance of the tumor to the skin should be more than 1 cm and the placement of a localization wire before the procedure should be avoided.

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POSTER

#### Are lymphogenic micrometastases in breast cancer a prelude to macrometastases?

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**Background:** The increased observation of lymph node micrometastases in breast cancer patients since the introduction of the sentinel lymph node (SLN) procedure offers an opportunity to study the development of metastatic disease within a lymph node.

**Patients and Methods:** Between June 1999 and May 2008, 1417 patients with cT1/2N0 breast cancer underwent a SLN biopsy (SLNB) as a staging procedure. Primary tumour characteristics and proportional metastatic involvement of regional lymph nodes (TNM-class pN0i+, pN1mi, and pN1-3) were collected prospectively.

**Results:** In our study population a linear relation between tumour size and the occurrence of regional lymph node metastases was observed: primary tumours  $\leq 1$  cm 18.7%, 1–2 cm 35.8%, 2–3 cm 50.8%, and  $>3$  cm 68.1% ( $p < 0.001$ ). The relation between macrometastases and tumour size was similar (6.4%, 21.6%, 31.8%, and 54.1% respectively) while the proportion of patients with pN0i+ and pN1mi was constant (12.1%, 14.1%, 19.0%, 14.2%) (Table 1).

**Conclusion:** The constant frequency of small metastases (N0(i+) and Nmi) with increasing tumour size suggests that metastasizing is a constant process in the course of time. According to the results presented in this study micrometastases are a prelude to macrometastases and can not be seen as a different phenomenon.

Table 1. Tumour diameter compared to different N-stages

Tumour diameter	N0	N0(i+)	Nmi	Nmacro
$<1$ cm	80.6	3.2	8.9	6.4
1–2 cm	64.2	5.0	9.1	21.6
2–3 cm	49.2	3.8	15.2	31.8
$\geq 3$ cm	31.9	1.8	12.4	54.1

Values shown are percentages; N0: no regional lymph node metastasis; N0(i+): clusters of tumour cells in regional lymph nodes  $<0.2$  mm; N1mi: metastasis in axillary lymph nodes with a size between 0.2 mm and 2 mm; Nmacro:  $\geq 1$  axillary metastasis (at least  $\geq 2$  mm).

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## POSTER

### False positive sentinel node findings in breast cancer – a review of 473 sentinel node biopsy cases

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**Background:** Benign epithelial displacement has been suggested to cause false positive ITC (isolated tumour cells) findings in SNB (sentinel node biopsy). Detailed analysis have showed that some ITC cases represent cells from a papillary lesion adjacent to the primary tumour, lacking atypia present in the primary tumour cells. Our aim was to study the prevalence of and reasons for false positive ITC findings in SNB in breast cancer.

**Methods:** We reviewed all original frozen section – and permanent section – slides of 473 SNB-cases, consisting of 73 ITC cases and of 400 SNB-negative cases a, according to the original assessment.

**Results:** We found 4 false positive cases possibly representing macrophages with keratin deposit material or dendritic cells. No benign epithelial cells, foreign material nor nevus cells were detected in the 473 SNB cases. Five micrometastases and 64 ITC were found among the 69 true positive cases originally regarded as ITC. All micrometastases were cases with interpretation depending on the definition applied. Seven false negative cases, including three micrometastases and four ITC, were detected among the originally 400 SNB negative cases. No association between the ITC finding and the preoperative biopsy method of the primary tumour was detected,  $p = 0.859$  Table 1.

Table 1: Association between preoperative biopsy method and the sentinel node findings

Sentinel node status	FNAC N = 231	CNB N = 209	Surgical biopsy N = 24	Biopsy method not registered N = 9
Negative, N = 397	190 (48%)	178 (45%)	20 (5%)	9 (2%)
ITC, N = 68	36 (53%)	28 (41%)	4 (6%)	0 (0%)
Micrometastasis, N = 8	5 (62%)	3 (38%)	0 (0%)	0 (0%)

ITC = isolated tumour cells, FNAC = fine needle aspiration cytology, CNB = core needle biopsy

**Conclusions:** No signs of benign epithelial displacement was detected in the examined ITC cases. Furthermore, ITC were not detected more frequently in patients with more invasive preoperative biopsy methods.

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## POSTER

### Impacts of surgical margin status in breast-conserving surgery on local recurrence

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**Background:** The association between a microscopic close or positive resection margin and the subsequent risk of local recurrence after conservative surgery and radiation is controversial. Using various definitions of close margins, an increased risk of local recurrence has been reported by some series, but not others.

**Material and Methods:** Between August 1999 and February 2004, 373 patients who were diagnosed as invasive breast carcinoma after breast-conserving surgery received adjuvant radiation therapy at Seoul National University Hospital. Among Of them, 7 were excluded due to incompleteness of radiotherapy or loss of medical records. Thus, 366 patients were analyzed retrospectively in this study. Surgical margin status were as follows; 312 negative margins, 17 close (defined as 2 mm or less) margins by DCIS, 25 close margins by invasive carcinoma, 4 positive margins by DCIS. 8 patients had positive margins by invasive carcinoma, and then 6 of them underwent further resection and achieved negative margin eventually.

**Results:** The median duration of follow-up was 72 months (range; 8–110 months). The 5 years local recurrence-free survival (LRFS) in patients with close or positive margin by invasive carcinoma was not significantly lower than that of patients with negative margin (92.0% vs. 95.8%,  $p = 0.49$ ), but the 5 years ultimate local control rate after salvage treatment in patients with close or positive margin by invasive carcinoma was lower than that of patient with negative margin (92.3% vs. 98.4%). There were no statistical differences in LRFS between patients with close or positive margin by DCIS and those with negative margin. Other pathologic factors such as T stage ( $p = 0.34$ ), N stage ( $p = 0.95$ ), presence of DCIS component ( $p = 0.29$ ), presence of infiltrative tumor border ( $p = 0.15$ ), presence of endolymphatic tumor emboli ( $p = 0.12$ ) had no significance for LRFS. Also the time interval between surgery and radiotherapy ( $p = 0.22$ ) as well as the sequence between radiotherapy and chemotherapy ( $p = 0.41$ ) had no significance for LRFS. However, The sequence of hormone therapy was revealed to be important; initiation of hormone therapy after completion of radiotherapy resulted in lower 5 years LRFS (80.0% vs. 93.1%,  $p < 0.01$ ).

**Conclusions:** According to this study, patients with close or positive margin by carcinoma in situ had experienced no failure. And with adjuvant radiotherapy, close or positive margin by invasive carcinoma did not raise the risk of local recurrence significantly, but lowered ultimate local control rate compared with negative margin. Delayed hormone therapy was a prognostic factor to increased local recurrence-free survival. Because of the low incidence of local recurrence, the large-scale studies are needed to obtain conclusive outcome.

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## POSTER

### Predicting the likelihood of non-sentinel lymph node metastases in breast cancer patients by three nomograms suitable for different institutions

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**Background:** Several tools for predicting the likelihood of non-sentinel lymph node (non-SLN) involvement in SLN positive breast cancer patients have been created so far. However, they are of limited value outside the institution they were developed because of different methodological protocols. Furthermore, they do not include the results of preoperative ultrasound (US) examination of the axilla, which is an important predictor of non-SLN metastases. The aim of our study was to create and validate different nomograms for predicting the likelihood of non-SLN involvement that would be applicable in different institutions and that would also include the results of the preoperative US examination of the axilla.

**Methods:** From January 2000 to January 2009 534 breast cancer patients underwent axillary lymph node dissection (ALND) due to metastatic SLN at our institution. Three nomograms (based on the logistic regression results) for predicting the likelihood of non-SLN metastases were created – (i) nomogram suitable for institutions where intraoperative examination of SLNs is not routinely performed in patients with low risk for SLN involvement (our institution), (ii) nomogram suitable for institutions where intraoperative examination of SLNs is not performed and (iii) nomogram suitable for institutions where intraoperative examination of SLNs is standardly performed. The nomograms were validated using bootstrap methods. Calibration curves were illustrated. Mean absolute error and mean area under the ROC curve were calculated for each nomogram.