suspicious ALN metastasis on 18FDG-PET/CT scan were defined as group A and B.

Results: Group A was related with malignant potential of breast cancer (high histologic grade and score of c-erbB2, p53 expression, presence of necrosis and lymphovascular invasion) and ALN status (higher Nstage). The analysis of group statistic revealed group A had relatively large primary tumor and metastatic LN, high expression of Ki-67 and many metastatic LN than group B. In the listed categories, each cut-off values were 1.85 cm, 0.95 cm, 17.5% and 3 by ROS analysis.

Conclusion: The 18FDG-PET/CT for detecting ALN metastasis in invasive ductal carcinoma was related with high histologic grade of primary tumor. We demonstrated that the accuracy of 18FDG-PET/CT in detecting ALN metastasis is expected high when the tumor is bigger than 1.85 cm, Ki-67 is higher than 17.5%, number and maximum diameter of metastatic ALN is more than 3 and 0.95 cm. But 18FDG-PET/CT may not be necessary when ALN is bigger than 0.95 cm, because preoperative confirmation may possible by fine-needle biopsy.

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A practical approach to additional lesions at preoperative breast MRI in patients eligible for BCT − Results

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Background: Contrast-enhanced magnetic resonance imaging (MRI) detects additional breast lesions in approximately 35% of the patients eligible for breast-conserving therapy (BCT). Preoperative breast MRI is increasingly used, and the need for clinical guidelines rises. The aim of this prospective study was to evaluate the efficacy of our institutional guidelines, established to handle additional lesions at preoperative MRI.

Materials and Methods: Six-hundred-and-ninety-four patients with pathology-proven breast cancer and eligible for BCT underwent preoperative breast MRI. The incidence of additional lesions detected at MRI and impact on management were evaluated. Additional lesions were classified based on the localization with respect to the index lesion. Additional lesions were pathology-proven (using second-look target ultrasound and fine needle aspiration (FNA)/biopsy) or considered benign by follow-up. Lesions for which no pathology proof was available prior to surgery, were defined as unidentified breast objects (UBOs). Patients with UBOs in a different quadrant than the index tumour underwent BCT as planned with annual follow-up. UBOs localized close to the index tumour were excised with wider local margins.

Results: Preoperative MRI detected 143 additional lesions in 121 patients. Of these lesions, 44.1% were proven malignant. UBOs were found in 12.1% of patients. None of the UBOs resulted in malignant disease at follow-up after BCT. Most UBOs near the index tumour were malignant (78.6%). In only one patient an additional lesion in a different quadrant was considered to be malignant after ultrasound-guided FNA cytology, but turned out to be benign (fibroadenoma) at final pathology after mastectomy.

Conclusions: The institutional guidelines to handle additional lesions at preoperative breast MRI proved to be sensitive to include malignant disease in the surgical planning without causing conversions to mastectomy for benign lesions in all but one patient. Yet, some adjustments are recommended to enhance the guidelines. In the light of the effectiveness of target ultrasound (and FNA and biopsy) for the management of additional lesions, we question the need for MRI-guided biopsies of UBOs.

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Utility of new brightfield dual-color in situ hybridization (BDISH) method for evaluating HER2 gene status of breast cancer patients

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Background: HER2-targeted therapy is an effective treatment for HER2-overexpressed breast cancer patients. Dual-color FISH method for HER2 gene and chromosome 17 centromere (CEN17) is utilized for the quantitative analysis of HER2 gene status. However, FISH assays are a time-consuming, extremely labor intensive, and expensive application that requires a specialized fluorescence microscope. Furthermore, it is difficult to preserve the FISH signal during a long term archive storage. In order to simplify the analysis of HER2 gene status, BDISH method has been developed recently for visualizing HER2 gene and CEN17 simultaneously on the same tissue section. Our study objective was to demonstrate the utility of BDISH method for evaluating the HER2 gene status of breast cancers by comparing BDISH results to FISH results.

Materials and Methods: HER2 BDISH results were analyzed among 52 archived breast cancer tumors that have been previously tested with HER2 FISH and HER2 immunohistochemistry (IHC). Then, two HER2 assays were reevaluated within the same small areas (5 mm in diameter) that were selected based on representative HER2 immunohistochemical staining. HER2 gene status was determined using the HER2/CEN17 ratio (Negative: HER2/CEN17 <2.0, Positive: HER2/CEN17 $\geqslant$ 2.0). HER2 IHC was scored 0, 1+, 2+, or 3+.

Results: Overall concordance rate between BDISH and original FISH results was 82.7%. Concordance rates between BDISH and FISH results based on IHC score groups were 100%, 81.3%, 57.1%, and 100% for 0, 1+, 2+, and 3+, respectively. However, when BDISH and FISH results were reevaluated within the selected small areas based on HER2 IHC staining, the overall concordance rate was 98.1%. Concordance rates between BDISH and FISH within the selected small areas based on the IHC score groups were 100%, 100%, 92.9%, and 100% for 0, 1+, 2+, and 3+, respectively.

Conclusions: The concordance rates between HER2 BDISH and FISH within the selected areas based on HER2 IHC scores were very high (98.1%). The discordance cases between BDISH and original FISH results were likely due to examining different tissue areas and possibly tumor heterogeneity. We confirmed that BDISH method is a useful new technology for examining HER2 gene status of breast cancer patients.

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Sensitivity of integral computer-aided detection (CAD) with full-field digital mammography (FFDM) for detection of breast cancer according to different histopathological types and appearance

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Background: To retrospectively evaluate the sensitivity of computer-aided detection (CAD) for full-field digital mammography (FFDM) in 360 histopathologically verified breast cancers with regard to mammographic appearance and histopathological tumor type.

Materials and Methods: 360 consecutive biopsy proven breast cancers imaged with FFDM (Senographe DS or GE Essential, GE Healthcare) from January 2001 through February 2009 were evaluated retrospectively using CAD (Hologic R2, version 8.3.17). Each case included a craniocaudal and mediolateral oblique view. In all cancer cases the malignant lesion was seen in at least one projection according to radiologist review. A CAD mark was scored true positive (TP) if it correctly indicated a malignant lesion. All other CAD marks were considered false. Cancer cases were classified as microcalcifications (64), masses (196), or both (100). Histopathological findings were classified as invasive ductal carcinoma (IDC), invasive lobular carcinoma (ILC), ductal carcinoma in-situ (DCIS) or other. Sensitivity values for CAD according to mammographic appearance and, histopathological findings were analyzed using chi-squared tests.

Results: A TP mark was observed on 319 out of the 360 cancers (89%). Calcifications were significantly ($p < 0.001$) more likely to be marked than masses, 163/164 (99%) compared to 244/296 (82%). The probability of a mass TP mark was significantly related to histological type ($p < 0.001$), with sensitivity being greatest for IDC at 76% (167/221) compared to 67% (38/57) for ILC, 31% (16/51) for DCIS and 74% (23/31) for other types. The probability of a calcification TP mark was also significantly related to histological type, with sensitivity being greatest for DCIS, with 75% (38/51), compared to 43% (96/221) for IDC, 33% (19/57) for ILC and 32% (10/31) for other types. Median radiological tumor size was 15 mm. A TP mark was significantly ($p = 0.02$) more likely in tumors larger than the median (94% vs 83%). This was observed for both masses and calcifications.

Conclusion: CAD prompted the significant majority of radiological abnormalities related to cancers and was most accurate for detection of calcification and DCIS, less so for mass lesions and ILC. FFDM with integral CAD is a valuable tool for breast cancer detection, though less reliable for mass lesions and invasive lobular malignancy.