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The role of imaging diagnosis using 3D-MRI in breast cancer

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Introduction: In breast cancer patients, accurate diagnosis of ductal spreading is of great importance for deciding surgical procedure. The role of imaging diagnosis using 3D-MRI in deciding of ductal spreading was assessed.

Material and Methods: Preoperative 3D-MRI was underwent 314 cases of breast cancer patients. These patients could be divided into five groups according to 3D-MRI images: pattern 1) localized type, 2) spiculated type, 3) widely enhanced type A (enhanced are: less than Quadrant) and 4) widely enhanced type B (enhanced are: more than Quadrant) and 5) multifocal type. Diagnosis of ductal spreading was confirmed histologically and relation between 3D-MRI patterns and ductal spreading were assessed retrospectively.

Results: The rate of histological confirmed ductal spreading were seen in 54% (14/26 cases), 60% (91/151 cases), 87% (39/45 cases) and 83% (19/23 cases) of patients with 3D-MRI pattern 1), 2), 3) and 4), respectively. Patient selection for breast conserving surgery was based by 3D-MRI images. The proportion of breast-conserved surgery were obtained 96% (25/26 cases), 95% (143/151 cases), 89% (40/45 cases), 26% (6/23 cases) and 88% (61/69 cases) of patients with 3D-MRI pattern 1), 2), 3) 4), and 5), respectively. Local failures were seen 2 cases in pattern 2), one case in 4) and one case in 5) (1-64 months, median follow up 30 months).

Conclusion: These results suggest that MRI will be the useful breast imaging tool in diagnosing ductal spreading in breast cancer patients. Safety breast conserving surgery was achieved by MRI guided surgery.

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Potential benefit of semi-automatic volumetric measurement of extent of breast tumors from contrast-enhanced MRI

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Contrast-enhanced (CE) magnetic resonance imaging (MRI) is known to accurately visualize invasive breast tumors. The efficacy of the technique is currently investigated to monitor response to neoadjuvant chemotherapy for breast cancer. Large inter- and intra-observer variations in the assessment of the largest diameter of the tumor from MRI have, however, been found, leading to reduced ability to accurately determine changes in tumor extent. The aim of this study is to assess whether semi-automatic volumetric measurement of breast tumors from CE-MRI decreases measurement variation and increases precision with respect to tumor extent as measured from histopathology.

25 Patients who underwent breast-conserving therapy for 26 tumors (21 invasive ductal, 4 invasive lobular and 1 mucinous carcinoma) were included. Detailed histopathological analysis was performed on the whole excision specimens including measurement of tumor volume and largest diameter of the tumor. Preoperative CE-MRI (3D FLASH) was obtained for all breasts. Two experienced breast-MR radiologists (R1, R2) independently assessed the largest diameter of the tumor from MRI. After manually indicating a point in the tumor, a previously developed computerized system was used to automatically segment the breast tumors in 3D and to determine the tumor volume. Two observers (O1, O2) independently segmented the 26 tumors. Linear regression analysis was used to assess the precision and random variation in volumetric and largest-diameter measurements of tumor extent.

Semi-automatic volumetric measurement of tumor volume was more accurately correlated with histopathology than conventional measurement of the largest diameter of the tumor (O1: slope = 0.97, intercept = 0.26, adjusted R-square = 0.79, O2: slope = 0.92, intercept = 0.26, adjusted R-square = 0.76 vs. R1: slope = 0.68, intercept = 0.72, adjusted R-square = 0.52, R2: slope = 0.72, intercept = 0.47, adjusted R-square = 0.66). The measurement precision relative to pathology increased, on average, by 30% using volumetric measurement. The variation in measurement dropped from 18% for the manual assessment of the largest diameter of the tumor to 10% for the semi-automatic volumetric measurement.

Compared to conventional assessment of the largest diameter of the tumor, semi-automatic volumetric measurement of breast tumors from CE-MRI leads to smaller variations as well as improved precision with respect to tumor extent as measured from histopathology.

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Role of fluorodeoxyglucose positron emission tomography (FDG-PET) in the staging of patients with breast cancer candidated to surgery

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Medical efforts and financial expenditures devoted to initial breast cancer staging represents a heavy burden on health care resources. Although the value of breast cancer staging in patients candidated to surgery has been questioned in recent years, it continues to be considered as a "standard" procedure. Limited data are available on the accuracy of FDG-PET in the staging of breast cancer patients suitable for surgery. A retrospective review of 228 consecutive patients with operable breast cancer staged according to the TNM staging system as T1-3, N0-2 and referred to the European Institute of Oncology (EIO) during a period between 2002 and 2005, was performed. Patients had histologically proven breast cancer and conventional staging (Chest x ray, liver ultrasound and bone scan). Definitive surgery and preoperative FDG-PET scan was performed at the EIO for all the patients. Primary tumors and involved axillary lymph nodes were identified in 179 (78%) cases. The positivity rate was different for lobular versus ductal invasive breast cancer patients (60 vs 79%, p = 0.08, Fisher exact test) and for grade I tumors versus grade II-III tumors (57% vs 84%, p = 0.003). Thirteen patients (6%) had an uptake at distant sites (bone 4, liver 2, thyroid 2, pleura 1, internal mammary node 1, contralateral breast 1, unspecified 2) whereas standard staging investigations (Chest X-ray, liver ultrasound and bone scan) were negative in all the examined patients. Further examinations confirmed the presence of metastasis in two cases (bone and internal mammary nodes). Preliminary results indicated that FDG-PET is a sensitive diagnostic method for preoperative staging of patients with breast cancer. The cost-benefit balance in the initial staging of operable breast cancer for this technique should be further studied.

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Managing postmenopausal nipple discharge

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Background: An initial postal survey of the management of single episode nipple discharge in postmenopausal women revealed an overwhelming conservative approach with normal radiology. It was our experience that these women often returned with significant disease.

Aim: The aim of this study was to determine the long term clinical outcome of postmenopausal women presenting with a single episode nipple discharge.

Method: We prospectively studied 47 postmenopausal women, not on HRT, who presented to our breast service with a single episode nipple discharge between 1999 and 2004.

All had normal initial clinical assessment, mammography and ultrasound scanning. Their details were collected and any future attendances flagged by the appointments system. Subsequent management was recorded.

Results: 39 (83%) returned with a further episode of ipsilateral nipple discharge between 5 and 161 weeks (mean 71) from first appointment. Clinical assessment was abnormal in 8 (3 Paget's disease, 3 palpable lumps, 2 skin dimpling). Repeat radiology was abnormal in 24 (61%) and all these had surgery. Final pathology revealed 14 cancers (5 invasive, 3 intraduct, 6 in situ), 4 papillomatosis, and 6 duct ectasia.

Conclusion: 29% of our study group developed malignancy. We would recommend careful follow up and early operative intervention in postmenopausal women presenting with a single episode nipple discharge.