MRI-detected breast lesions less than 5 mm in size: variables that influence the likelihood of malignancy

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Introduction:

Magnetic Resonance Imaging (MRI) can detect breast cancer that is not visible on mammography or ultrasound. Small breast lesions (<5mm in size) detected with breast MRI only, often present a diagnostic dilemma. It has been reported that the likelihood of cancer in MRI-detected breast lesions decreased significantly with decreasing lesion size, and, as a consequence, that in general it is not necessary to biopsy MRI-detected breast lesions <5mm. However, as small breast cancers do occur, it would be clinically relevant to identify the subgroup of patients with small MRI-detected breast lesions in which biopsy is warranted.

Purpose:

1) To assess the prevalence of cancer in patients with MRI-detected breast lesions <5mm in size
2) Identify MR imaging characteristics of malignant breast lesions <5mm in size.

Materials and Methods:

We retrospectively reviewed data of 27 patients with 30 MRI-detected suspicious breast lesions <5mm in size who underwent MRI-guided needle localization and surgical biopsy at our institution between 1998 and 2005. Indications for MRI of the breast included high risk screening (n=5), suspicious clinical findings (n=5), indeterminate findings on conventional imaging (n=7), and staging of known breast cancer (n=10). MRI-guided needle localizations were performed in an open 0.5T Signa-SP imager, with patients in prone position by using a dedicated breast coil. Hookwires were placed with a freehand technique. MRI findings were correlated with pathology.

Results:

Breast lesion size on MRI varied from 2 to 4mm. Analysis of lesion morphology according to the BI-RADS-MRI lexicon criteria revealed oval smooth margins (n=12), round smooth margins (n=11), irregular margins (n=5), spiculated margins (n=1), and lobulated margins (n=1). Kinetic enhancement curves of the 30 lesions were coded as benign (gradual wash-in of contrast) in 7, indeterminate (wash-in of contrast followed by plateau phase) in 10, and suspicious (wash-in followed by wash-out of contrast) in 11 cases, in 2 lesions curve analysis was not possible because of their small size. Histopathologic analysis showed 11/30 malignancies (37%) including 3 invasive ductal carcinomas, 3 invasive lobular carcinoma, 1 tubular carcinoma, and 4 DCIS. The other 19 lesions proved to be high risk lesions in 10 % (n=3) and benign lesions in 53% (n=16). Although, no morphologic features significantly differentiated between benign and malignant small breast lesions, all 11 malignancies presented with abnormal enhancement kinetics, either classified as indeterminate (n=4) or as suspicious (n=7). The likelihood of malignancy of small <5mm breast lesions was the highest in patients who underwent breast MRI for staging of known breast cancer (7/10:70%), and the lowest in patients with breast MRI for work-up after indeterminate findings on conventional imaging (1/7:14%).

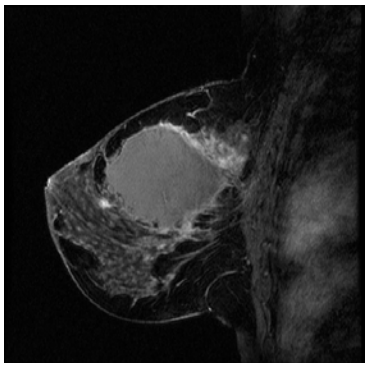

Figure 1a

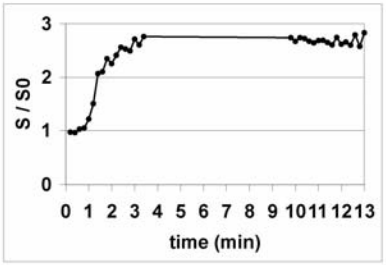

Figure 1b

Sagittal contrast-enhanced MRI of the breast reveals a 4mm irregular mass anterior of a lumpectomy site that was originally thought to have clear margins. Corresponding enhancement kinetics revealed rapid wash-in of contrast in the initial phase followed by washout of contrast in the post-initial phase. This lesion was classified as BI-RADS Vand proved to be invasive ductal carcinoma on pathology.

Conclusion:

In our study, the overall percentage of malignancies in the group of MRI-detected breast lesions <5mm was 37%, which is considerably higher than previously reported. Our findings indicate the importance of kinetic enhancement curves analysis when evaluating small <5mm breast lesions on MRI, since all 11 malignancies presented with abnormal enhancement kinetics.