Adenosis lesions mimicking malignancy on breast MRI

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Aims and objectives

Adenosis Group" lesions of the breast, including sclerosing adenosis and adenosis tumor, are a group of benign proliferative disorders that mimic malignancy on mammography and ultrasonography. In this study, we describe MRI features of a large group of breast adenosis lesions with a suspicious or borderline MRI appearance.
Methods and materials

In a database consisting of 8250 consecutive patients with breast MRI from September 2006 to March 2012, there were 90 lesions with the histological diagnosis of adenosis.

Exclusion criteria: Of the 90 lesions with the histological diagnosis of adenosis, 28 lesions were excluded as they had additional histological features of atypia or malignancy, or revealed negative, benign or probably benign features on MR mammography (BIRADS 1, 2 and 3).

Inclusion criteria: Our inclusion criteria consisted of enhancing lesions with MR mammography findings suggestive for malignancy (BIRADS category of 4 or 5) that proved to be benign by histological diagnosis indicating adenosis.

We identified 62 adenosis lesions (in 53 patients) that were suspicious or highly suspicious with a MRI BIRADS of 4 (57 lesions) and 5 (5 lesions), and were adenosis lesions in biopsy. All the available MRI lesions were further evaluated with a second look breast ultrasound and correlated with digital mammography. In case of a confident positive finding supporting MRI features, the lesion was biopsied under ultrasound-guidance or with the stereotactic mammography system. We did not include patients without any related positive finding on ultrasound exam or mammography. We evaluated 60% [37/62] of the lesions with core needle biopsy and the remaining 40% [25/62] were assessed by excisional biopsy recommended by our pathologist or due to a highly suspicious feature. The patients were followed up for at least 6 months after benign pathology results either with MRI, ultrasound or mammography and confirmation of benignity was followed up either by no recurrence of the lesion or stability in the size and appearance of the lesion.
Results

Based on the defined selection criteria, 62 lesions found in 53 patients were studied retrospectively. These lesions were categorized in two main groups; Group-A consisted of 33 pure adenosis lesions in 26 patients and Group-B consisted of 29 adenosis with other benign lesions in 27 patients.

In Group-A, the mean age of patients was 43.2 years ± 8.2, with the range of 25-55 years. In group-A there are 27/33 (81.8%) lesions compatible with sclerosing adenosis by histological diagnosis, and the remaining 3/33 (9.1%) are adenosis tumor, 1/33 (3%) micrglandular adenosis and 2/33 (6.1%) simple adenosis. In Group-B, the mean age was 43.7 years ± 9.5, (30-63) and the accompanying findings included fibrocystic change 11/29 (38%), fibroadenoma 5/29 (17%), intraductal papilloma 6/29 (20%), ductal and lobular hyperplasia 5/29 (17%).

From the total 62 lesions, five were categorized as BIRADS 5 and the remaining were categorized as BIRADS-category 4. Among all enhancing lesions 40 (64%) were enhancing masses, 21 (33%) were non-masslike enhancement and one was an enhancing focus. The single focus of enhancement (5mm) with irregular shape, rapid initial contrast enhancement and plateau curve type was categorized as BIRADS 4.

Analysis of the whole described enhancing masses based on the ACR lexicon showed that larger size (29/40 [74.4%]), irregular shape (14/40 [35%]), irregular or spiculated margin (25/40 [62.5%]), heterogeneous pattern (19/39 [48.7%]), rapid initial enhancement (40/40 [100%]) and wash-out (27/40 [67.5%]) or plateau curves (7/40 [17.5%]) were the frequent descriptors resulting in a BIRADS 4 or 5 assessment. The non-mass like enhancing lesions revealed focal (8/21 [38.1%]) or segmental distribution (9/21 [42.9%]), clumped pattern (12/21 [57.1%]), rapid initial enhancement (21/21 [100%]); and wash-out (11/21 [52.4%]) or plateau (6/21 [28.6%]) curves as suspicious features. Figure 1 to 3 shows samples of lesions which in breast MRI were categorized as BIRADS 4 or 5.
Fig. 1: A 33-year-old lady with a palpable lump in the lower outer quadrant (LOQ) of the left breast. A: T1 weighted image shows a poorly visualized hypo intense mass in the posterior LOQ of the left breast. B: T2 weighted fat-suppressed image shows an almost isointense lesion. C: Post contrast fat suppressed subtracted first dynamic series shows a mass with an irregular shape and fine spiculated margin, heterogeneous internal pattern, rapid initial enhancement and type 3 dynamic curves. The mass was categorized as BI-RADS 5 on MRI. D: MIP 3D reconstruction image shows location of the mass in the posterior LOQ of the left breast. No other enhancing mass was noted in either breast. Subsequent US-guided CNB revealed pure sclerosing adenosis. E: Axial CAD-Stream color-coded image.
**Fig. 2:** Figure 2. A 37-year-old lady with a palpable firm lump in the retroareolar region of the left breast A and B: Pre-contrast T1 weighted and fat saturated T2 weighted images show asymmetrical parenchymal thickening with minimal retraction in the left upper areolar region. C: Post contrast fat suppressed subtracted first dynamic series shows focal asymmetrical enhancement with clumped and stippled pattern, rapid initial enhancement and type 2 and 3 dynamic curves. The lesion was categorized as BIRADS 4. D: MIP 3D reconstruction image shows location of the mass in the retroareolar region of the left breast. No other enhancing lesion was noted in either breast. E: Sagittal CAD-Stream color-coded image This MRI was interpreted as BIRADS 5. On subsequent US exam, parenchymal distortion was noted and US guided biopsy revealed extensive sclerosing adenosis. Due to suspicious image findings, excision was recommended and pure sclerosing adenosis without any evidence of malignancy was reported on the pathological specimen.

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**Fig. 3:** D E Figure 3. A 38-year-old lady with palpable firmness in the upper outer quadrant (UOQ) of the right breast A: T1 weighted image shows ill-defined low signal intensity mass in the UOQ of the right breast B: T2 weighted fat suppressed image shows a low signal intensity mass C: Post contrast fat suppressed subtracted first dynamic series shows a 28 mm irregular shaped mass with irregular borders, heterogeneous internal pattern and rapid washout dynamic curve This lesion was categorized as BIRAD-4. US-guided CNB revealed fibrocystic changes, nonproliferative type, mixed with sclerosing adenosis. D: MIP 3D reconstruction image shows location of the suspicious mass in the UOQ of the right breast. Besides, in the central aspect of the LOQ of the left breast, a 12 mm lobulated enhancing mass with smooth borders, dark internal septum and rapid wash-out dynamic curves was noted. This lesion was categorized as BIRADS 3 lesion. Simultaneous CNB of this mass revealed sclerosing adenosis in a fibroadenoma, but it was not included in this study. E: Axial CAD-Stream color-coded image. The thin arrow depicts the main lesion in the right breast to be a BIRADS-4 lesion and the thick arrow points to the second lesion on the left side.

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Conclusion

Although MRI is a reliable diagnostic approach, breast lesions containing pure adenosis or adenosis lesions mixed with other benign pathologic entities can share many borderline or suspicious features of malignancy on breast MRI. In addition on breast MRI, sclerosing adenosis may represent diverse morphologic characteristics, including benign and malignant features, among which we only approached the malignant ones. A major restriction of our study is the small number of cases which limited the study from an analytic approach. Further studies with larger patient population and stronger statistical strength to show the malignant presentation of sclerosing adenosis in MRI are warranted. This study corroborates the fact that MRI may detect adenosis lesions as malignant one.
Personal information

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