Importance of magnetic resonance imaging in the diagnosis of breast hamartoma

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Abstract

Aim: Hamartomas are benign breast lesions. Radiologic and clinical evaluation has great importance in the diagnosis for reducing unnecessary procedures. We intend to investigate the contribution of magnetic resonance imaging (MRI) in the diagnosis of hamartomas

Method: Our research has been conducted retrospectively, a total of 55 breast hamartomas were reassessed using mammography (MG) and MRI. In the detection of morphological features of hamartomas were compared efficacy of MG and MRI. ADC values were obtained corresponding to lesion localization and normal breast parenchyma.

Result: MRI was significantly superior to MG in detecting pseudo-capsule and size (p<0.001). There was no significant difference between enhancement pattern and ADC values obtained from breast tissue and hamartoma.

Conclusion: Conclusively, we assume that MRI can provide more detailed information in difficult cases which have not classical mammographic appearances, so MRI can be considered as an alternative imaging for accurate diagnosis and prevent unnecessary biopsies and surgeries.

Introduction

Hamartomas are relatively rare, well-circumscribed, slow-growing lesions of breast comprised of glandular and stromal components and those may closely resemble that of normal breast tissue even fibrocystic foci can be seen within them similar to normal breast tissue. This make it difficult or impossible to diagnose pathologically. Since the pathological appearance is similar to that of normal breast tissue on Fine Needle Aspiration Biopsy, increasing the radiological diagnostic accuracy by defining these benign lesions features is of great importance in establishing a true picture of the actual incidence of hamartomas [1]. They are not surrounded by a real capsule and are separated from adjacent breast parenchyma by a pseudocapsule. The incidence of hamartomas is approximately 4.8% overall benign breast lesions but is getting increasingly more frequent due to breast cancer screening programmes. It generally seen in middle-aged women [2]. On mammography (MG), hypo-hyperechoic breast-in breast appearance can be seen depending on the predominance of fibroglandular or fat tissue contained. Generally, the internal structure is heterogeneous in appearance and contains a large number of hypo and hyperechogenic areas on ultrasonography (US) [3]. On Magnetic resonance imaging (MRI), hamartomas generally seen as well-circumcibed mass within heterogeneous structure, showing varying degree of intensity on T1- and T2-weighted imaging (T1W, T2W) depending on proportion of fibroglandular tissue [4].

Mammographic and ultrasonographic features of hamartomas are well known, but MRI images are less known [5]. Especially in breasts with dense parenchima patterns, fibroglandular tissue and mammographic appearance of lesion is superposing, so it is almost impossible to distinguish lesion borders and to measure their size in certain cases in which the pseudo-capsule is not apparent. On present study, we elucidate the contribution of the diagnosis of hamartoma by examining the features of them on unenhanced, contrast-enhanced dynamic and diffusion-weighted (DW) MRI in addition to mammography. We intend to investigate the contribution of MRI in the diagnosis of hamartomas, either alone or integrated into MG and also explored the role of MRI in reducing unnecessary biopsies and unnecessary surgeries regarding the importance of radiologic and clinical evaluation of Hamartomas.

Material and method

On our research, 46 patients diagnosed with hamartoma and a total of 55 breast hamartomas have been retrospectively reassessed using MG and MRI during a 7-years-old period from 2010 to 2017. Ethical approval obtained from a local comitee of Health Science University of Konya Training and Research center, according to Helsinki Declaration. MG and MRI of all subsequents were assessed by only a single radiologist with15-year experience in the field of breast imaging. Breast density has been mammographically categorized into four groups according to the 5th edition of American College of Radiology BI-RADS [6]. We defined type A and B breast pattern as dominantly lipomatous type 1, dominantly fibroglandulary type 2 was also included type C and D

Key words: breast hamartoma, magnetic resonance imaging, mammography, apparent diffusion coefficient

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important in the diagnosis of breast hamartoma. Because hamartomas contain fibroglandular and fatty tissue in a variety of proportions, this leads many appearances to be seen on the MG and USG. On MG, hamartomas frequently seen as well circumscribed heterogenous solid mass lesions composed of different amount of fat or fibroadenoidal tissue [8] and a thin pseudo-capsule also can be seen. The typical hamartoma appearance can not be identified in breasts which are composed of dense parenchymal pattern. Additionally, the more fibroglandular tissue a hamartom contains, the more mammographically it appears to be dense; which can cause the hamartoma to interfere with the fibroadenoma [9]. Helvie et al. revealed that 30 percent of these solid lesions can not be diagnosed on MG, and there is not a typical mammographic appearance so that only 12 percent of hamartomas can be easily diagnosed without needing further evaluation [10]. On most of our cases, especially in breasts with dense parenchyma patterns, mammographically appeared as heterogeneously increased asymmetric density without pseudo-capsule rather than typical breast-in-breast appearance or salami-slice. The contribution of ultrasonography can be restricted when an atypical appearance is encountered [11]. Our US findings were nonspecific, it was in the form of areas with heterogeneous echo that were not clearly distinguishable from the surrounding parenchyma (Figure 2).

In the setting of small lesion composed of low fat tissue and the pseudocapsule is not present reaching the accurate diagnosis can be challenging [9]. In such a small number of hamartomas with atypical appearance that borders of lesion can not be clearly identified, pathology has been resulted as normal breast tissue, so this may lead to discordance between ultrasonographic, mammographic appearance and pathologic diagnosis. The inconsistency between pathologic data and radiological data does not reassure clinicians and radiologists, which can lead to unnecessary surgical procedures. Mizuta et al. reported a case of myoid hamartoma of which could be diagnosed surgically since there was a discordance between the findings on imaging modalities and the histopathological findings of core needle biopsy [12]. Presence of these challenges and limitations may lead clinicians and radiologists
Table 1. Comparison of MRI and MG detection status of hamartoma pseudo-capsule

| HPK | No | yes | Total | Variable | Ratio±SD | p    |
|-----|----|-----|-------|----------|----------|------|
| Pseudo-capsule of Hamartoma (HPK) |    |     |       |          |          |      |
| Yes | 1  | 0   | 1     | HPK that can be detected by MRI | 0.964±0.188 | <0.001 |
| No  | 17 | 10  | 27    | HPK detected with MG           | 0.357±0.487  |      |
| Total | 18 | 10  | 28    |                                  |          |      |

Pseudo-capsule of Hamartoma (HPK)

Table 2. Comparison of ADC values obtained from hamartoma and normal breast tissue

| ADC          | n  | Mean | SD  | Min | Max | 1Q  | Med | 3Q  | p    |
|--------------|----|------|-----|-----|-----|-----|-----|-----|------|
| Hamartoma    | 27 | 1.44 | 0.26| 0.8 | 2   | 1.3 | 1.5 | 1.6 | 0.909|
| Normal breast tissue | 27 | 1.43 | 0.22| 1   | 1.9 | 1.3 | 1.5 | 1.6 |      |

Figure 2. On USG image, heterogeneous echogenic hamartoma and pseudo-capsule is seen as thin echogenic linear lines

Figure 4a. On axial DWI and 4b. ADC mapping. There is no diffusion restriction seen on hamartoma with high ADC values (>1.1) (Arrowhead). A mass lesion of intraductal carcinoma with a low ADC value of 0.77 showing substantial diffusion restriction in the left breast is observed (Arrow)
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