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Case Report

A case of pleomorphic adenoma of the breast on dynamic contrast-enhanced MR imaging [☆]

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ABSTRACT

Pleomorphic adenoma commonly develops in the salivary gland, but rarely in the breast. The dynamic contrast-enhanced MR imaging findings of pleomorphic adenoma of the breast have not been well described. We report a 43-year-old woman with pleomorphic adenoma of the left breast. The imaging findings, including those on dynamic contrast-enhanced MR imaging, included an oval mass with a smooth margin, which consisted of solid and cystic components. The solid component was hypo-intense on T1-weighted imaging, hyper-intense on short tau inversion recovery imaging, with no apparent restricted diffusion, and had heterogeneous enhancement with dark internal septation and a fast/plateau dynamic contrast enhancement pattern. The cystic component was slightly hyper-intense on T1-weighted imaging, slightly hypo-intense on short tau inversion recovery imaging and had no apparent restricted diffusion or contrast enhancement. Together with its rarity, the similarities of imaging findings and the pathologic findings of pleomorphic adenoma of the breast to those of other tumors make accurate preoperative diagnosis difficult. Therefore, through this case report, awareness of pleomorphic adenoma of the breast on dynamic contrast-enhanced MR imaging will facilitate appropriate surgery and postoperative observation based on an accurate diagnosis.

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Introduction

Pleomorphic adenoma is a common benign tumor in the salivary gland, but it is rare in the breast [1–11]. To the best of our knowledge, reports of the dynamic contrast-enhanced MR

imaging findings of pleomorphic adenoma of the breast are limited. Due to its rarity and similarity to other tumors of the breast, accurate preoperative diagnosis is challenging [2–11]. Therefore, awareness of pleomorphic adenoma of the breast on dynamic contrast-enhanced MR imaging is important to facilitate appropriate surgery and postoperative observation.

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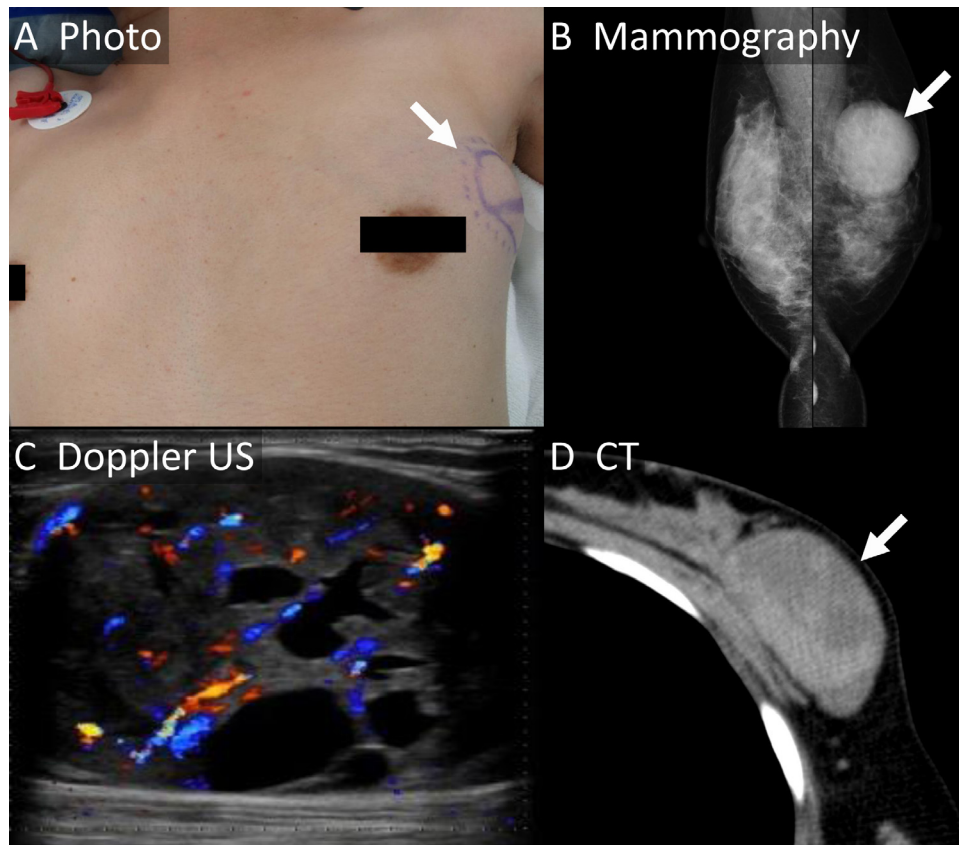


Fig. 1 – Preoperative photo showed a lump in the upper outer quadrant of the left breast (A, arrow). Mammography showed heterogeneously dense breast tissue and a well-defined high-density oval mass of approximately 5 cm in diameter (B, arrow). Calcification was not detected. Doppler ultrasonography (US) demonstrated a hypo-echoic mass with many cystic components and detectable flow signal (C). On CT, the mass contained separate hyper-attenuating and hypo-attenuating areas (D, arrow).

We present the imaging findings, including those on dynamic contrast-enhanced MR imaging, of a rare case of pleomorphic adenoma of the breast.

Case report

A 43-year-old woman was admitted to our hospital with 20-year history of a lump in her left breast that gradually increased in size (Fig. 1A, arrow), tenderness and nipple discharge. Her laboratory findings were not significant. She did not have a family history of breast cancer. On physical examination, a mobile, elastic and hard mass was detected in the upper outer quadrant of the left breast. On mammography, the breast density was heterogeneous, and the lump was revealed to be an oval and homogeneous high-density mass of approximately 5 cm in diameter with well-defined borders (Fig. 1B, arrow). Calcification was not detected. On Doppler ultrasonography, a regularly shaped hypo-echoic mass with irregularly shaped cysts demonstrated posterior acoustic enhancement and detectable flow signal (Fig. 1C). On CT, the mass contained separate low-density and high-density areas (Fig. 1D, arrow). There was no evidence of metastasis. On dynamic

contrast-enhanced MR imaging, the oval mass with a smooth margin consisted of solid and cystic components (Fig. 2). The solid component was hypo-intense on T1-weighted imaging (Fig. 2A, arrow), hyper-intense on short tau inversion recovery (STIR) imaging (Fig. 2B, arrow) and had heterogeneous enhancement with dark internal septation (Fig. 2F-H and Fig. 2J-L). The time-intensity curve exhibited a fast/plateau pattern (Fig. 2I). The solid component had no apparent restricted diffusion (Fig. 2C and D) and its apparent diffusion coefficient (ADC) value was $1.83 \times 10^{-3} \text{mm}^2/\text{s}$ (Fig. 2D, measured within the circle). The cystic component was slightly hyper-intense on T1-weighted imaging (Fig. 2A, asterisk), slightly hypo-intense on STIR imaging (Fig. 2B, asterisk) and had no apparent restricted diffusion (Fig. 2C and D) or contrast enhancement (Fig. 2F-H and 2J-L). Based on the imaging findings, phyllodes tumor, complex fibroadenoma, mucinous carcinoma, intracystic papilloma and encapsulated papillary carcinoma were considered as differential diagnoses. Moreover, core needle biopsy suggested pleomorphic adenoma of the breast or adenosis pathologically. The tumor was diagnosed as Breast Imaging-Reporting and Data System (BI-RADS) category 4 preoperatively and was resected with a clear margin. Pleomorphic adenoma of the breast was confirmed pathologically. Comparing the dynamic contrast-enhanced MR imaging findings

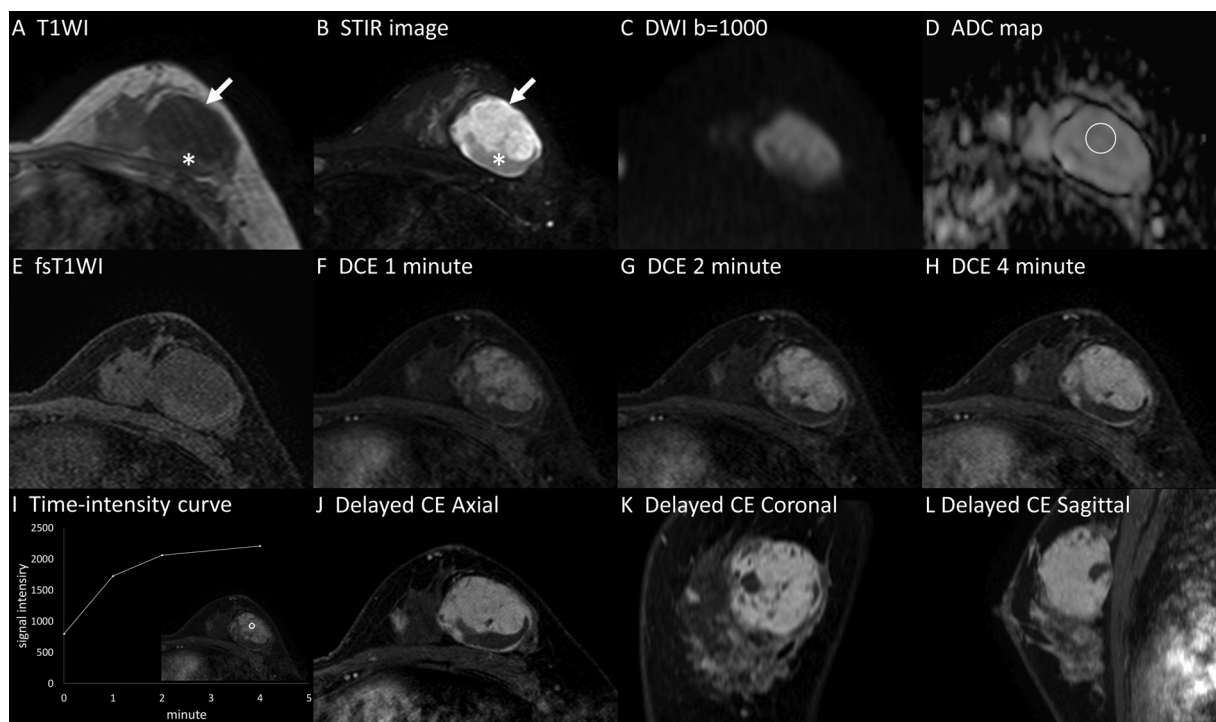


Fig. 2 – The oval mass with smooth margin consisted of solid and cystic components. The solid component was hypo-intense on T1-weighted imaging (A, arrow) and hyper-intense on short tau inversion recovery (STIR) imaging (B, arrow). On diffusion-weighted imaging, the solid component did not exhibit restricted diffusion (C, DWI b = 1000 and D, ADC map) and its apparent diffusion coefficient (ADC) value was $1.83 \times 10^{-3} \text{ mm}^2/\text{s}$ (D, measured within the circle). On dynamic contrast-enhanced study (E; fat-suppressed T1-weighted image (fsT1WI) before injection of gadolinium contrast medium, F; one minute after injection, G; two minutes after injection and H; four minutes after injection), the solid component exhibited heterogeneous enhancement with dark internal septation and the time-intensity curve had a fast/plateau pattern (I, measured within the circle). The cystic component was slightly hyper-intense on T1-weighted imaging (A, asterisk) and slightly hypo-intense on STIR imaging (B, asterisk). The cystic component exhibited no apparent restricted diffusion (C and D) or contrast enhancement (F-H). Moreover, multiplanar delayed contrast-enhanced fsT1WI demonstrated the mass at a high resolution (J-L).

with the pathological findings, the solid component consisted of the myxoid matrix with proliferation of epithelial cells and myoepithelial cells, forming a biphasic ductal structure (hematoxylin-eosin staining, Fig. 3C, arrow). The cystic component comprised protein-rich fluid such as plasma components (hematoxylin-eosin staining, Fig. 3B, asterisk). The resection margin was negative. There was no recurrence one year after the first surgery.

Discussion

Pleomorphic adenoma of the breast was first described in 1906 [1] and less than one hundred cases have been reported to date [2]. Pleomorphic adenoma of the breast is a benign tumor pathologically characterized by a mixture of epithelial/myoepithelial elements and myxomatous matrix/cartilaginous elements [12]. Due to its high local recur-

rence rate and malignant potential [4], a clear resection margin and long-term observation are recommended [5].

Pleomorphic adenoma commonly develops in the salivary glands, but rarely in the breasts. Pleomorphic adenoma of the salivary gland and that of the breast share many MR imaging features, such as a well-defined border, hyper-intensity on T2-weighted imaging and no apparent diffusion restriction, which are considered to be associated with the rich myxoid matrix [13]. In the salivary glands, the reported time-intensity curve on dynamic contrast-enhanced MR imaging had a medium/persistent pattern [13], whereas in our case of pleomorphic adenoma of the breast and in previously reported cases of pleomorphic adenoma of the breast [7,11], the time-intensity curve had a fast/plateau pattern. The difference in dynamic contrast enhancement patterns between the salivary glands and the breasts may reflect the cellularity of the tumors because pleomorphic adenoma of the salivary gland with abundant epithelial elements and small amount of myxoid matrix exhibited the same pattern as the breast [13]. Moreover, the cystic component in our case exhibited no

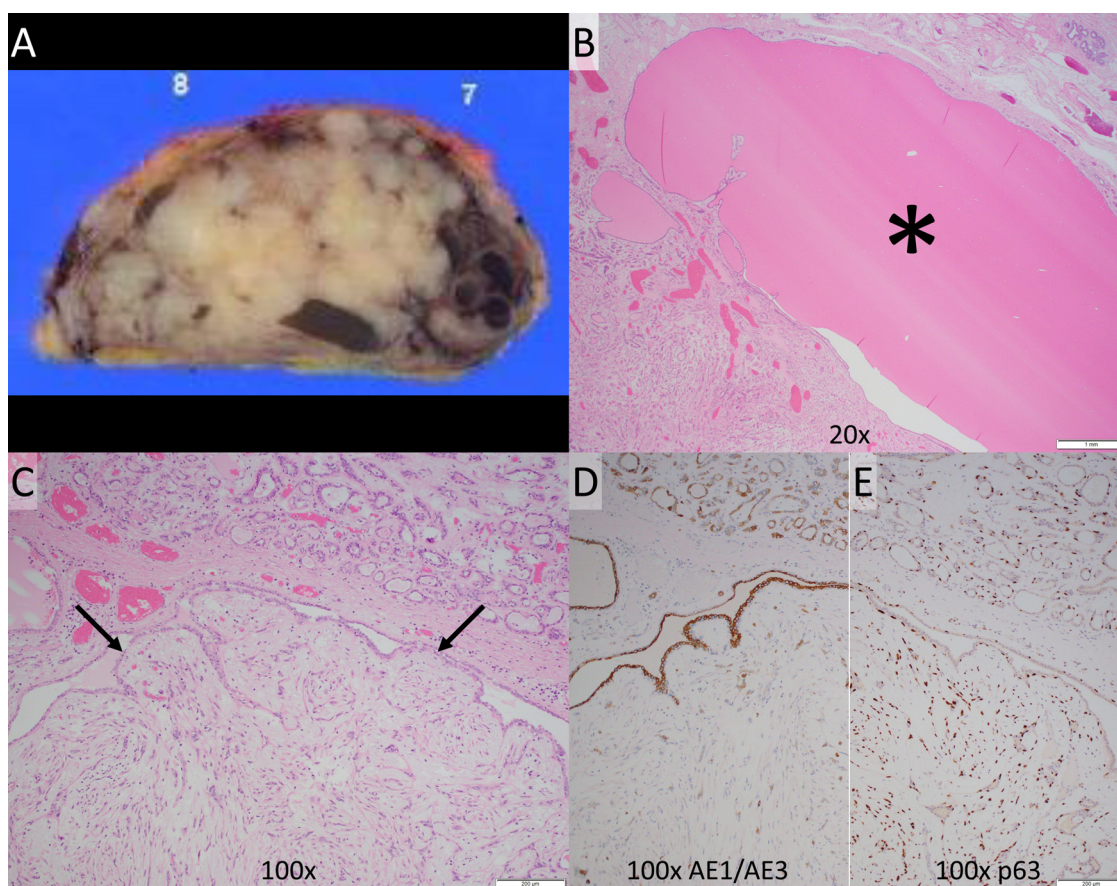


Fig. 3 – Macroscopic examination of the specimen revealed an oval mass of approximately 5 cm in diameter containing yellowish white solid and cystic components (A). Based on histological examination, the solid component was myxoid matrix with proliferation of epithelial cells and myoepithelial cells, forming a biphasic ductal structure (hematoxylin-eosin staining, 100x, C, arrow). Tumoral proliferation of stromal cells was not observed. There was no evidence of nuclear atypia or abnormal mitosis. Immunostaining of AE1/AE3 (100x, D) highlighted the epithelial cells and immunostaining of p63 (100x, E) highlighted the myoepithelial cells. The cystic component exhibited eosinophilic fluid collection (hematoxylin-eosin staining, 20x, B, asterisk), which was considered to be protein-rich material such as plasma components. Necrotic tissue was not observed (Color version of the figure is available online).

apparent contrast enhancement, similar to the cystic component of reported cases of pleomorphic adenoma of the salivary gland [13].

The MR imaging findings and pathological findings of pleomorphic adenoma of the breast may be similar to other tumors of the breast such as phyllodes tumor, complex fibroadenoma, intracystic papilloma, encapsulated papillary carcinoma, mucinous carcinoma, metaplastic carcinoma and primary sarcoma [2–11,14]. As pleomorphic adenoma of the breast is rare and similar to other tumors, accurate preoperative diagnosis is challenging. Further accumulation of cases is necessary to establish the dynamic contrast-enhanced MR imaging findings of this rare tumor. Similar to tumors of the salivary gland [13], analysis of the MR imaging findings, including the dynamic contrast enhancement pattern, may be the key to differentiate benign pleomorphic adenoma of the breast from malignant tumors more accurately.

In conclusion, we reported a case of pleomorphic adenoma of the breast, including its features on dynamic contrast-

enhanced MR imaging. Awareness of the features of pleomorphic adenoma of the breast on dynamic contrast-enhanced MR imaging will facilitate appropriate surgery and postoperative observation based on an accurate diagnosis.

Patient consent

Written and informed consent was received from the patient.

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