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Juvenile fibroadenoma of breast: A case report

L. Shi[1], L. Chang[2*], J. Wang[2], Y. Zhang[2], S. Li[1]

[1]*Tangshan Maternal and Child Health Hospital, Hebei, China*
[2]*Tangshan Gongren Hospital, Hebei, China*

► ***Case report***

***Corresponding author:**
Liming Chang, Ph.D.,
***E-mail:** 240612799@qq.com*

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ABSTRACT

Juvenile fibroadenoma of the breast is a rare benign tumor, which mostly occur in young women. It is often manifested as a huge tumor with obvious enlargement of the breast, regular shape and clear boundary in the breast. This study reported an 18-year -old female, whose physical examination revealed a tough and mobile mass approximately 1.5 cm in diameter on her right breast, the patient had no clinical symptoms. MRI showed a irregular nodules with radial burrs, equisignal on T1WI, slightly high signal density on T2WI, high signal density on DWI, and heterogeneous signal on apparent diffusion coefficient (ADC) images, Enhanced scan showed margin enhancement, and the time-signal intensity curve (TIC) showed plateau and wash-out types. The mass was surgically excised, and histopathological examination revealed that it was a juvenile fibroadenoma tumor.

INTRODUCTION

The majority of adolescent breast diseases were benign lesions, such as fibroadenoma and mastitis. Juvenile fibroadenoma was a relatively rare type of fibroadenoma, which occured in adolescent females. Color Doppler ultrasound was a routine examination method for breast diseases, and meanwhile MRI was regarded as an important supplementary method. Previous studies reported that the tumors were mainly unilateral giant mammary gland with lobulated or circular masses, more than 10cm in diameter. MR showed the tumor had a complete envelope with clear boundary, and enhanced distinctly, and no reinforced separation inside. In this case, the tumor diameter is less than 2.0cm. So far, there has been no MR report on juvenile fibroadenoma of breast with a smaller diameter.

Case report

An 18-year-old female with a mass on her right breast. During physical examination a tough and mobile mass approximately 1.5 cm in diameter was palpated in the areola area just above the right breast, and patient's right breast was smaller than the contralateral side.

Magnetic resonance device:Germany Siemen 1.5T Areao MR scanner. The MRI indicated that the patient's right breast had an irregularly shaped nodule (approximately 1.8cm×1.9cm×1.2cm in size) in the middle of the breast image with radial spicules, showed equisignal on T_1WI, slightly high signal density on T_2WI, high signal density on DWI, and heterogeneous signal on apparent diffusion coefficient (ADC) images. Hyperintensity foci with a catheter-like shape in front of the nodule were observed on T_1WI. Enhanced scan showed margin enhancement, and the time-signal intensity curve (TIC) showed plateau and wash-out types (figures 1-3).

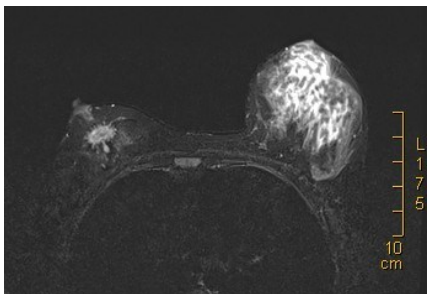


Figure 1. T2 weighted image with lipid suppression sequence. An irregularly shaped nodule at the center of the right breast showing heterogeneous high signal density surrounded by radial spicules. There was a small teardrop-shaped nodule posterior to the irregularly shaped nodule.

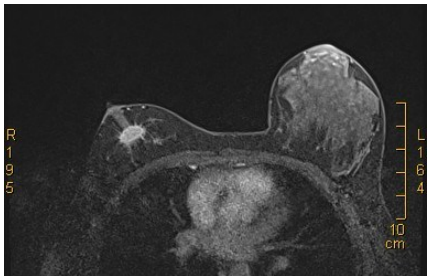


Figure 2. Enhanced T1 weighted image showing heterogeneous enhancement of the lesion and prominent margin enhancement.

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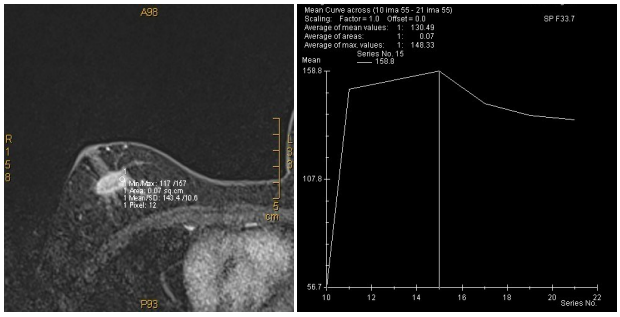


Figure 3. Time-signal intensity curve (TIC). (A–B) The portion of the TIC corresponding to the tumor is the wash-out type.

Pathological examination showed the gross specimen to be approximately 2.2 cm × 1.8 cm × 1.5 cm in size and firm in consistency, with black-gray cut surface. Microscopic pathological examination showed that this mass was in peritubular growth, with prominent proliferation of mesenchymal cells and epithelial cells. The number of mesenchymal cells was elevated and the cells were in bundles. The areas of fibrosis were focally visible. The epithelial cells showed band-like and papillary hyperplasia, without evident atypia. No mitotic figures were observed (figure 4). Immunohistochemistry of the mass indicated estrogen receptors (+), progesterone receptors (+), C-erbB-2 (0), Ki-67 (3%+), smooth muscle actin (+), p63 (+), and cytokeratin 5/6(+) (figure 5).

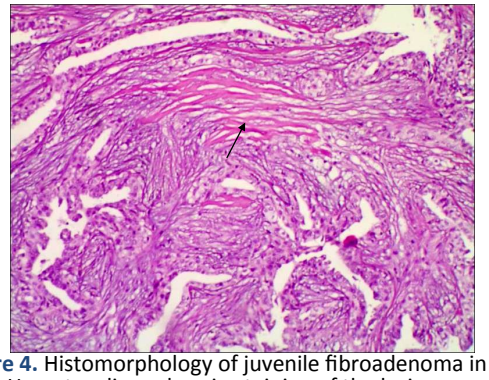


Figure 4. Histomorphology of juvenile fibroadenoma in this case. Hematoxylin and eosin staining of the lesion revealed peritubular growth and mesenchymal and epithelial cell hyperplasia. Mesenchymal cells were elevated in number and arranged in bundles. Fibrotic areas were focally visible. The epithelial cells showed band-like and papillary hyperplasia (100× magnification).Arrows refer to fibrotic areas and hyperplastic epithelial cells.

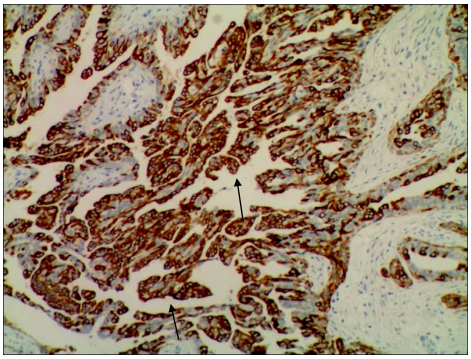


Figure 5. Immunohistochemistry showing cytokeratin 5/6 (+) (100× magnification).Arrow refers to the positive staining area.

DISCUSSION

Juvenile fibroadenoma has relatively low incidence, and it most often occurs in adolescent females [1, 2]. The cause of juvenile fibroadenoma is still inconclusive. Most researchers believe that it is related to the unstable levels of estrogen in adolescent women before and after menarche and to the high sensitivity of estrogen receptors [3].

Previous reports have bene dominated by giant juvenile fibroadenomas, with the affected breasts being large than the contralateral side [4]. They often appear regular in shape on MRI, and the TIC often showed a wash-in or plateau type [5]. However, this case report is different from previous reports. The diameter of this patient's lesion was small at only 1.7 cm, and the affected breast was smaller in size with fewer glands.

The spicules surrounding the lesion showed uniform spacing and length. The enhanced-MRI showed mild spicule enhancement, suggesting that the spicule-like structure was fast-growing and had elastic collagen fibers [6]. The DWI of the lesion showed a slightly high signal density, and the ADC image showed a slightly low signal density. From the enhanced scan, the TIC of the peripheral areas showed a wash-out type, and the TIC of the central area showed a wash-in type. These patterns suggest active hyperplasia in the surrounding glandular epithelial cells, with high cell density and small extracellular space. The center of the lesion might be a fibrotic area with weak early enhancement, which gradually grew more intense as the contrast agent diffused.

Juvenile fibroadenoma often needs to be differentiated from phyllodes tumors, medullary carcinomas, and mucinous adenocarcinomas [7–9]. Phyllodes tumors are often large, fast-growing masses that are prone to bleeding, with the TIC showing a wash-in type and gaps without enhancement. Medullary carcinoma occurs most frequently in young females and may be lobulated, manifesting as swelling growth with clear margins and homogeneous signals; its DWI has high signal density with reduced ADC values, and TIC shows mostly a plateau or wash-out type. Mucinous adenocarcinoma usually occurs in postmenopausal women. In those cases, it shows smooth or spicule-like margins and is characterized by high signal density on DWI and high signal density on ADC (typically >2.2 × 10^{-3} mm^2/s), and wash-in or plateau TIC. It is often confused with adenoma.

This case of juvenile fibroadenoma was differentiated from invasive ductal carcinoma, which is more likely to occur in middle-aged and older people in whom it is often irregular or lobulated in form with unclear margin and spicules of different lengths. An enhanced scan of invasive ductal carcinoma often shows heterogeneous enhancement

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or prominent margin enhancement with TIC of wash-out or plateau type. The spicule-like structures of invasive ductal carcinoma represent tumor cells with strong proliferation, and the spicules showed readily visible enhancement and variable length, thickness, and spacing, unlike in our case [10].

In summary, the imaging manifestations of this case of juvenile fibroadenoma were rare. The morphological characteristics and degree of enhancement of the spicule-like structures of juvenile fibroadenoma should be carefully analyzed to help distinguish it from malignant tumors and facilitate accurate diagnosis.

***Ethical considerations*:** The patient signed informed consent.

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***Declarations of interest*:** None.

***Contributors*:** L.S., collected the case. L.C. and L.S. reviewed the literature and contributed to drafting the manuscript. J.W. acquired data. Y.Z. and S.L. performed the MRI imaging analysis. L.C. revised the manuscript to be submitted.

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