Radiology Case Reports 17 (2022) 2919–2922

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journal homepage: www.elsevier.com/locate/radcr

Case Report

Pseudoangiomatous stromal hyperplasia in a healthy young adult male☆

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ARTICLE INFO

Article history:
Received 3 March 2022
Revised 9 May 2022
Accepted 12 May 2022

Keywords:
Pseudoangiomatous stromal hyperplasia
Breast
Male
Benign
Tomosynthesis
Ultrasound

ABSTRACT

This case report describes the occurrence of a rapidly enlarging pseudoangiomatous stromal hyperplasia (PASH) tumor in a 20-year-old male patient. The diagnosis was made via tomosynthesis and ultrasound-guided biopsy with pathological correlation consistent with PASH. The patient's case was discussed, and he was recommended to undergo surgical resection of the mass to alleviate symptoms due to its large size. Surgical pathology confirmed the original diagnosis and the patient had an uncomplicated postoperative course. Here, we exhibit our imaging findings; review classic presentations of PASH on mammography, ultrasound, and MRI; and discuss histological characteristics of this benign entity.

Introduction

First described in 1986, pseudoangiomatous stromal hyperplasia (PASH) is a benign disease process of the breast that is typically observed in pre- and perimenopausal women [1]. Nontumor forming PASH has been established as an incidental microscopic finding in breast tissue, found in up 23% routine breast biopsy specimens [2]. However, the development of a tumorous form is much more rare [3]. The development of this tumor type in men is even more rare, with only 7 cases previously reported in the English literature [4–10]. Herein, we describe the rare presentation of a young adult male patient with a large, rapidly growing unilateral PASH tumor.

Case report

The patient was a healthy 20-year-old male with no significant past medical history who presented to the clinic with

☆ Competing Interests: None.

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https://doi.org/10.1016/j.radcr.2022.05.033

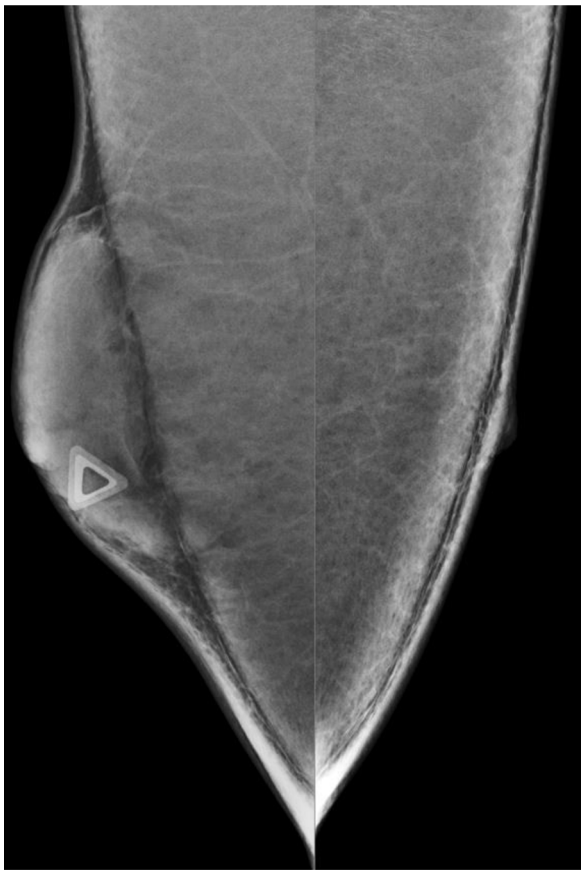

Fig. 1 – Tomosynthesis: bilateral mediolateral oblique projections with a right breast global asymmetry encompassing the majority of the breast tissue and measuring approximately 65 mm in dimension in a 20-year-old male. The triangle corresponded to a palpable abnormality.

complaints of an enlarging right breast mass over the past 2 months. The mass had been increasing in size, but did not contribute to any other physical symptoms such as pain, erythema, discharge, or decreased range of motion. On initial physical exam, the mass measured approximately 2 × 2 cm and was nontender, nonfluctuant, and immobile. The patient was recommended to undergo bilateral mammography and sonography in order to better characterize the mass. Two months after initial evaluation, the patient underwent bilateral tomosynthesis and breast ultrasound. Tomosynthesis demonstrated global asymmetry in the right breast, which encompassed the majority of the breast tissue approximately 65 mm in greatest dimension. Findings of tomosynthesis are shown in Fig. 1. The right breast ultrasound revealed a mass in the 9:00-12:00 subareolar area of the right breast. The visualized axillary lymph nodes were unremarkable. The findings were given a category of BI-RADS 4A and biopsy of the mass was recommended. The sonographic findings are shown in Fig. 2. The patient underwent ultrasound-guided biopsy with histopathology indicating benign breast tissue with PASH. Ultrasound-guided biopsy and postbiopsy mammogram are shown in Fig. 3. Surgery was consulted and the patient's case was discussed at interdisciplinary tumor board. The patient's mass at this point had grown into a 9 × 9 cm mass taking up most of the central breast. Partial mastectomy was suggested due to the patient's young age and the large tumor size. Surgical removal of the mass and the postoperative course were uncomplicated. Pathology of the surgical specimen confirmed the diagnosis of PASH.

Discussion

The vast majority of patients who develop the tumorous form of PASH are either premenopausal or actively receiving some form of hormonal therapy (ie, hormone replacement therapy, oral contraceptives), suggesting that tumor development is regulated by sex hormones [3,11]. This is further supported by the finding of progesterone, estrogen, and androgen receptor positivity on immunohistochemical testing. Although PASH occurs predominantly in females, 7 cases have also been reported in the male population [4–10]. Generally, males who develop this condition have some extent of underlying gynecomastia, indicating that increased breast tissue and hormonal imbalance are important risk factors for disease progression [8].

The presentation of PASH tumors varies widely among patients. In a study of 57 patients with imaging evidence of PASH tumor, 44% initially presented with a palpable mass that prompted further mammographic evaluation. Conversely, in 53% of patients, the first sign of abnormality was revealed on screening mammography as a round circumscribed mass, with no preceding clinical correlation [3].

On gross examination, PASH may resemble a fibroadenoma. Similar to the clinical and imaging features of fibroadenoma, a PASH tumor is described as a single, discrete, well-demarcated mass that ranges from solid to elastic in consistency. The rate of growth and the size of PASH vary widely from one case to another, ranging from microscopic foci to lesions that measure up to 18 cm in diameter [7]. Histologically, a PASH tumor may resemble the histological presentation of a low-grade angiosarcoma or a phyllodes tumor, largely due to the slit-like spaces lined by outstretched spindle cells through the acellular mammary stroma [12,13]. PASH can be differentiated from these mimicking conditions via immunohistochemistry of the spindle cells, which are characteristically vimentin and CD34 positive and factor VIII negative [13]. Furthermore, unlike the vascular channels filled with red blood cells in angiosarcoma, the slit-like spaces in PASH do not contain erythrocytes, hence the term "pseudoangiomatous" [13].

Features of PASH may be viewed on various imaging modalities, including mammography, sonography, and magnetic resonance imaging (MRI). The most classic mammographic presentation of the tumor is a noncalcified, round, circumscribed mass. Less frequently, PASH may present as a focal asymmetry on mammography. In up to 22% of patients, PASH may present with no imaging findings despite the presence of a histopathologic diagnosis [12,14–16]. Ultrasound findings are generally nonspecific, revealing a round, circumscribed, and hypoechoic mass. Rarely, the mass may exhibit more worrisome features such as increased echogenicity, het-

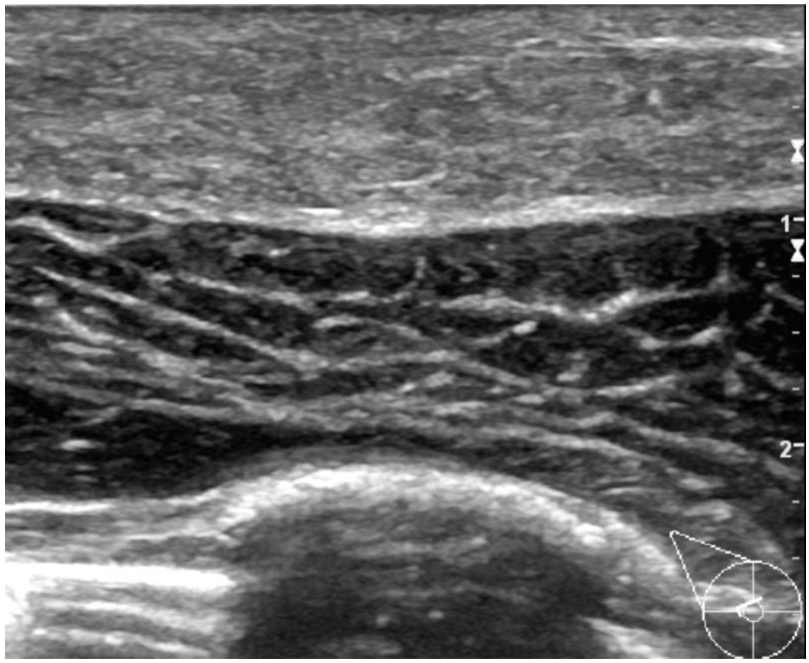

Fig. 2 – Ultrasound of the subareolar region of the right breast in the radial scanning plane, showing increased breast tissue most prominent in the 9:00-12:00 subareolar region.

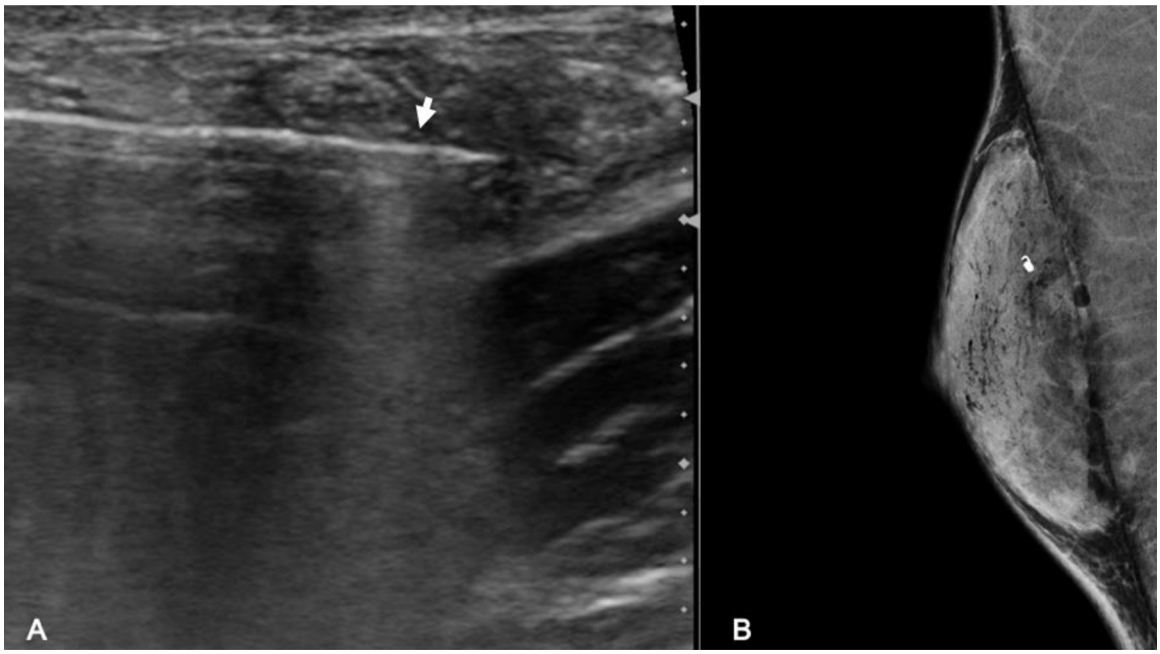

Fig. 3 – Biopsy: (A) Ultrasound-guided biopsy with a 16-gauge Bard automated core biopsy needle (white arrow); and (B) postclip mammogram in the lateromedial projection showing a postbiopsy coil clip.

erogeneous echotexture or irregularly shaped borders [12,16]. On MRI, PASH can have a wide range of presentations, with the most common imaging finding being an area of nonmass enhancement with persistent kinetics (59%). Other less common appearances on MRI include masses with persistent kinetic features or washout (28%), or foci (13%) [12,17].

Conclusion

PASH is a common benign disease process that may rarely result in the formation of a solid tumor of varying sizes. Although primarily affecting premenopausal women or those

on hormonal therapy, cases have also been reported in men with gynecomastia. Careful assessment is required in order to differentiate PASH on imaging from fibroadenoma and histologically from angiosarcoma or phyllodes tumor. Although somewhat nonspecific, the imaging findings of PASH on mammography, sonography, and MRI can serve as important clues in diagnosis.

Patient consent

Informed consent was obtained from the patient involved in this case.

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