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Case Report

Fibromatosis arising from the pectoralis major muscle mimicking breast cancer

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ABSTRACT

Fibromatoses are soft tissue tumors composed of fibroblasts which commonly appear in the muscular aponeurosis of the abdomen. Mammary fibromatoses occur in only 0.2% of breast neoplasms and have been reported in association with prior breast augmentation and Gardner's syndrome. Multiple imaging modalities have been used to characterize the appearance of breast fibromatosis; however, it remains a tissue diagnosis given the variability both within and across modalities. We present the case of a 25-year-old female with a history of palpable breast mass who was evaluated with ultrasound, diagnostic mammography, MRI, and CT. Ultrasound-guided biopsy revealed fibromatosis, and MRI ultimately revealed that the mass was arising from the pectoralis major muscle and extensively involved the chest wall.

Introduction

Fibromatoses, also known as desmoid tumors, are rare, benign but locally aggressive soft tissue tumors arising from fibroblasts. They are commonly known to arise from the muscular aponeurosis in the abdomen and have rarely been reported in the chest wall [1]. Mammary fibromatosis occurs in only 0.2% of breast neoplasms; however, it occurs at a higher rate in patients with prior breast augmentation or Gardner's syndrome, an autosomal dominant condition characterized by colonic polyps and extracolonic soft tissue tumors and osteomas [2–4]. While associations with Gardner's syndrome and prior breast surgery are known, this tumor arises primarily de novo [5]. Fibromatoses have a high propensity for recurrence, particularly in younger women and when the tumor arises from the pectoralis rather than breast tissue [6].

Chest wall and mammary fibromatoses, owing to their suspicious appearance on imaging and presentation as palpable breast masses, may be easily confused for breast carcinoma before a histologic diagnosis has been established [7]. Characteristics of fibromatosis on various imaging modalities—including mammography, ultrasound, and MRI—have been previously reported with significant variability. MRI, however, is particularly useful in evaluation of tumor extent and preoperative planning [6]. This case represents a rare presentation of fibromatosis originating in the pectoralis muscle presenting as a palpable breast mass with clinical and imaging findings suspicious for breast carcinoma.

Declarations of interest: None.

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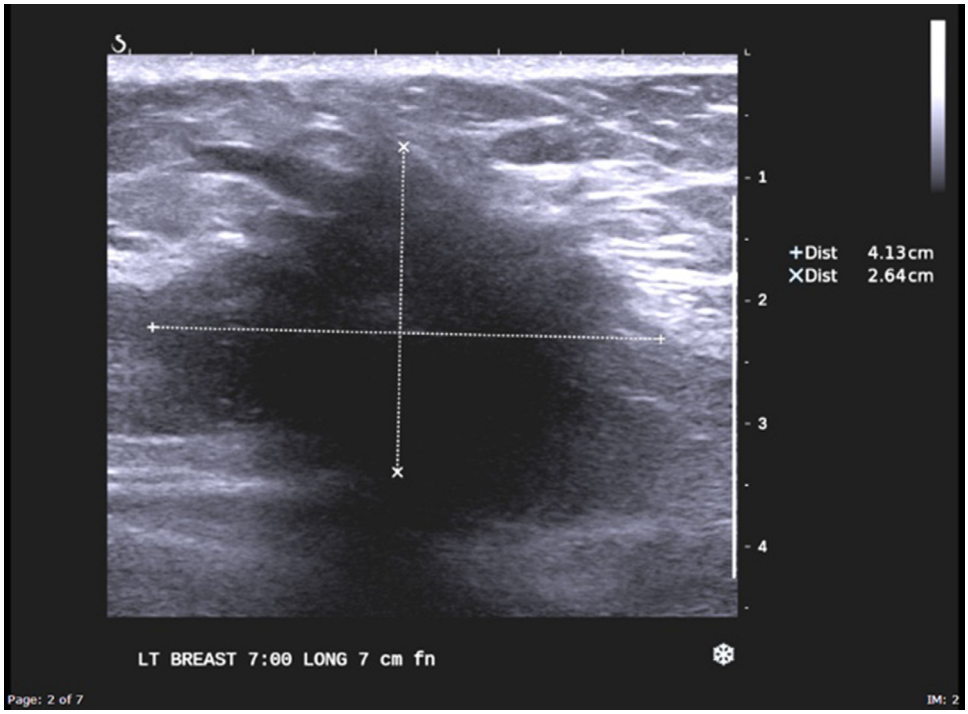

Fig. 1 – Ultrasound – 4.1 x 2.6 cm hypoechoic mass with angular margins in lower inner quadrant of left breast, 7:00 position 7 cm from nipple.

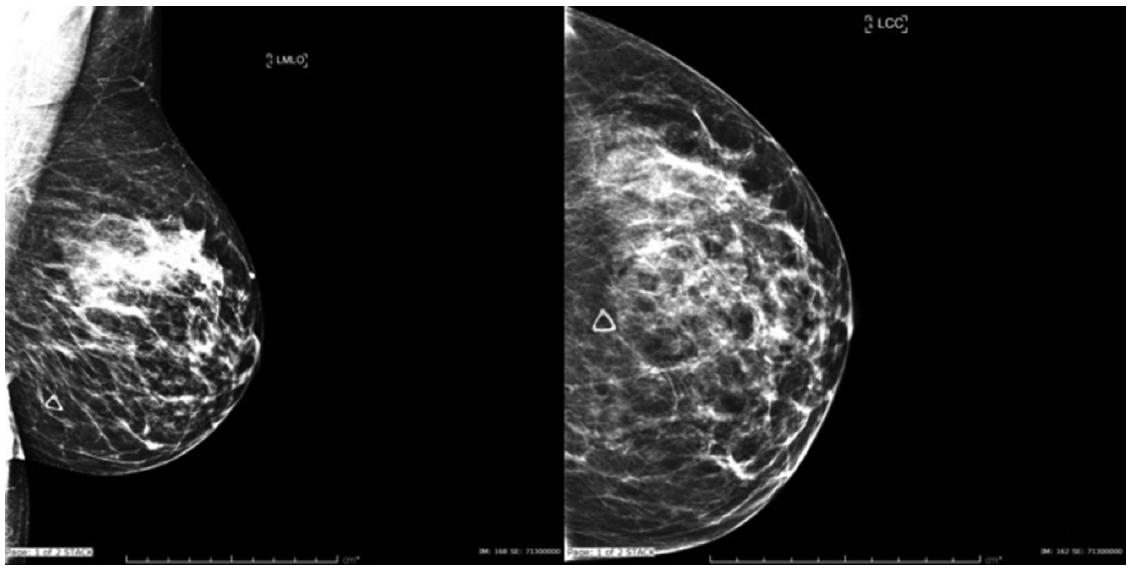

Fig. 2 – Diagnostic mammogram – heterogeneously dense breasts, mass not clearly visualized on standard MLO and CC views; combination CV and LM views were also obtained without clear visualization of the mass.

Case report

A 25-year-old female presented to our institution with several months of indentation in the left inframammary fold and 3 weeks of pain in the same location. Medical history was notable for first menstrual period at age 14, 1 prior pregnancy and full-term birth at 22 years old with subsequent breastfeeding for a short time. She used oral contraceptives for 5 years prior to Nexplanon placement after the birth of her child. Her only other medication was Tylenol PRN for breast pain. Past surgical history was notable for cholecystectomy, C-section, and wisdom teeth extraction. Family history was significant only for an uncle with hepatitis C and liver cancer and another uncle with diverticulitis. She smoked half a pack of cigarettes daily for 6-8 months prior to presentation with rare alcohol

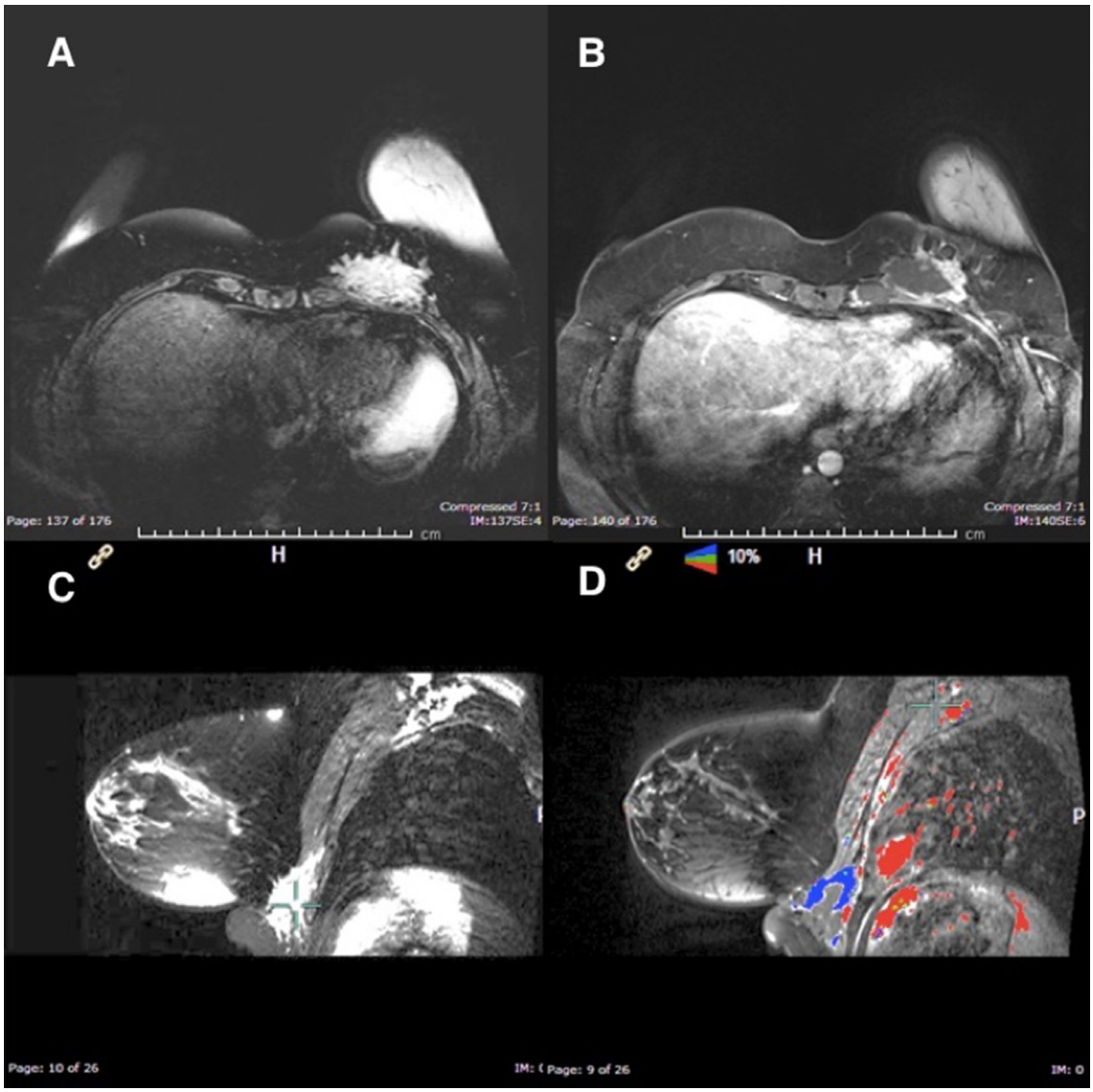

Fig. 3 – A. T2 without contrast, B. T1 fat saturation postcontrast, C. T2 sagittal showing pectoralis invasion, D. Sagittal T1 postcontrast with fat saturation and CAD kinetic enhancement color overlay.

use and no drug use. She worked as a referral coordinator in a primary care office.

On exam, her lower left breast and inframammary skin fold had a firm, relatively palpable mass in the lower inner quadrant of the left breast at the 7:00 position, measuring approximately 3 cm in size. Breast ultrasound revealed a 4.1 × 2.6 cm hypoechoic mass with angular margins in the lower inner quadrant of the left breast, 7:00 position, 7 cm from the nipple (Fig. 1). Subsequent diagnostic mammogram revealed only heterogeneously dense breasts (Fig. 2). No mass was detected with standard mediolateral oblique (MLO) and caudocranial (CC) views or cleavage (CV) and 90 degree lateromedial (LM) views. Ultrasound-guided biopsy revealed a spindle cell proliferation with collagenous background consistent with fibromatosis. MRI was obtained due to suspicion of chest wall involvement based on ultrasound findings and showed an irregular mass arising from the inferior aspect of the left pectoralis major muscle measuring 6.3 × 2.7 × 5.6 cm (Fig. 3). The central portion of the mass demonstrated T1 hypointensity and T2 hyperintensity. CT was obtained shortly before surgery for comparison against MRI and showed the left anterior chest wall mass arising from the pectoralis major with some extension into the subpectoral fat pad (Fig. 4).

While she was initially evaluated by a breast surgeon, our patient was ultimately referred to thoracic surgery based on MRI findings. Thoracic surgery performed a wide resection resulting in an 8 × 7 cm chest wall defect with removal of the fifth, sixth, and seventh ribs as well as partial rectus muscle and distal pectoralis muscle. The final surgical specimen included pleura in the deep aspect. The chest wall was reconstructed by plastic surgery with Goretex mesh. Due to significant postoperative pain, the patient required rescue epidural. CT performed 6 months postoperatively revealed only postsurgical changes with no evidence of recurrence (Fig. 5).

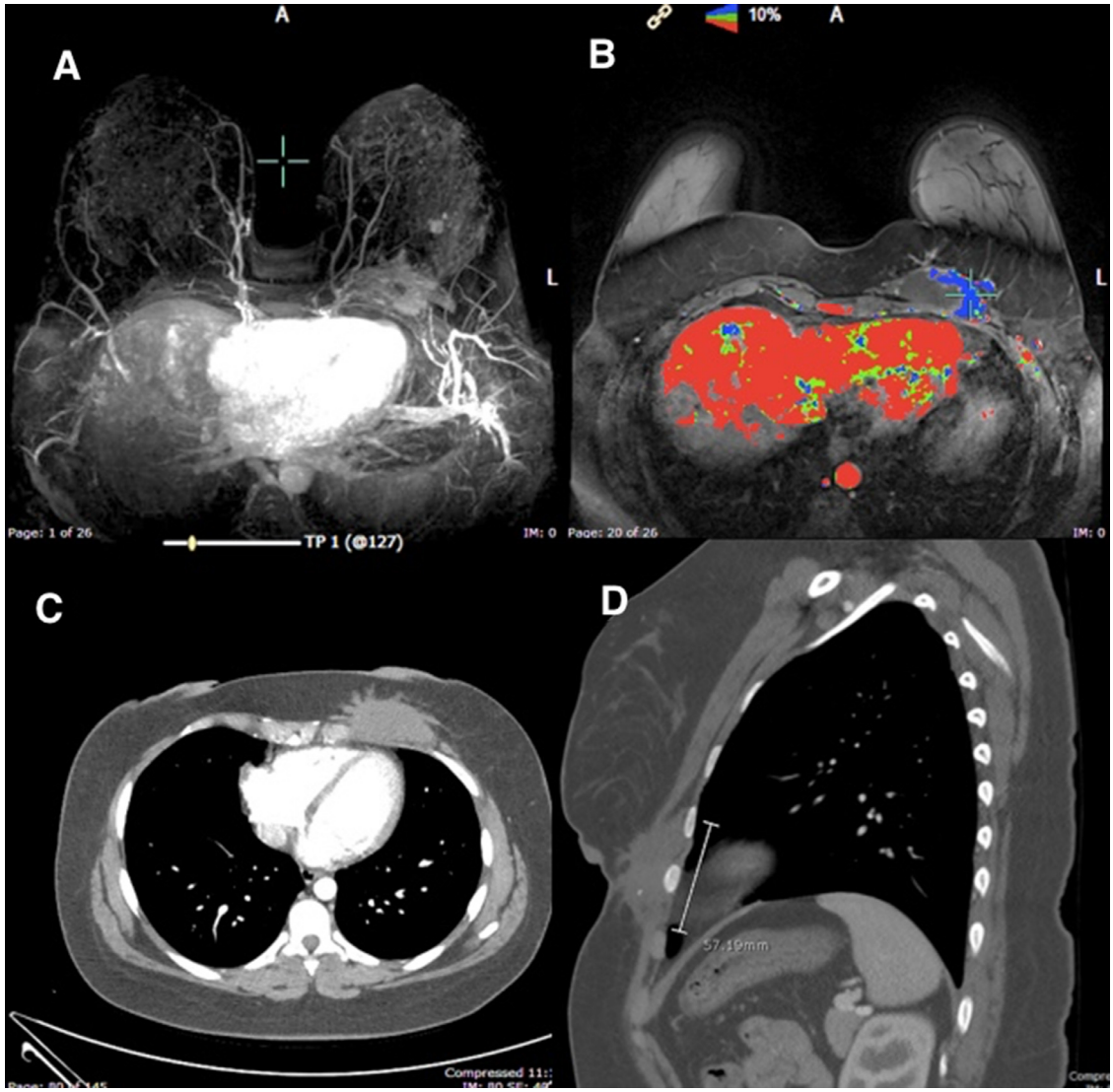

Fig. 4 – A. 3D MIP MR, B. Axial T1 fat saturation postcontrast with CAD kinetic enhancement overlay, C. Axial CT, D. Sagittal CT.

Discussion

Chest wall and mammary fibromatoses are often confused with breast carcinoma on initial imaging due to similar characteristics on conventional breast imaging, most notably ultrasound and mammography. Ultrasonography in breast fibromatosis typically reveals a microlobulated hypoechoic structure with posterior acoustic shadowing, irregular borders, and straightening of Cooper's ligaments [7,8]. One prior case report noted internal blood flow and mixed areas of acoustic enhancement on ultrasound [9]. Our patient's ultrasonography showed a hypoechoic mass with angular margins concerning for malignancy, consistent with prior reports.

On mammography, breast fibromatosis presents as a spiculated hyperdensity without microcalcifications; however, these tumors are visible on this imaging modality in only one-third of cases [2]. When visible, they are typically BI-RADS category 5 due to characteristics concerning for malignancy [8]. In our patient, mammography was unrevealing owing to the posterior location of the tumor along the chest wall. Our young patient also had notably dense breasts making detection of aberrancy more difficult.

MRI is indispensable in the setting of fibromatosis for determination of tumor extent and preoperative planning [6]. It is not, however, a diagnostic tool. While there are no definitive characteristics of breast fibromatosis on MRI, a number of common features have been previously reported. These tumors typically present with isointensity on T1-weighted images, heterogenous intensity on T2-weighted images, and low signal intensity bands on all sequences [10]. The heterogeneity on T2 may be explained by myxoid stromal and collagen variability within portions of the tumor [2,11]. No consistent enhancement pattern has been demonstrated, but at

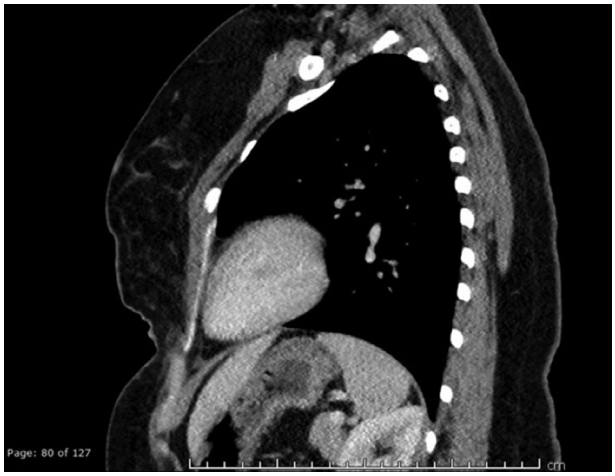

Fig. 5 – Sagittal CT demonstrating intact Goretex mesh with no evidence of tumor recurrence.

least 2 case reports described persistent contrast enhancement in these tumors in contrast to rapid washout of breast malignancies [8,12,13]. One report also suggests that the dynamic kinetic pattern of enhancement on MRI may correlate with cellular aggressiveness of breast fibromatosis [12]. Our patient's tumor demonstrated persistent contrast enhancement and hyperintensity on T2 as expected, but showed hypointensity on T1. One prior report also demonstrated low signal intensity on T1, consistent with our case [14]. This variability in appearance underlines that fibromatosis of the breast and chest wall is not a radiologic diagnosis.

The characteristics of mammary fibromatosis on a number of other imaging modalities have been reported. Fibromatoses are generally not visible on plain radiographs [2]. They may be detected by molecular breast imaging using ^{99m}Tc sestamibi, but share similar characteristics with breast malignancy, so the utility of this imaging modality is only in defining tumor extent [13]. Fluorodeoxyglucose (FDG)-positron emission tomography (PET)/CT has demonstrated mild FDG tracer uptake in these tumors suggestive of an indolent or benign process [15]. Ultrasound elastrography, described in a prior case report, relies on variability in soft tissue stiffness to differentiate between normal fat, normal glandular tissue, fibrous breast tissue, and breast carcinoma. Given the high collagen content of fibromatoses, they have a similar stiffness to breast carcinoma, which can lead to a false positive diagnosis of malignancy when ultrasound elastrography is used. For this reason, the investigators recommended against using this imaging modality to distinguish between mammary fibromatosis and breast malignancy [16].

Given the wide variability in appearance of breast fibromatosis across imaging modalities, it remains a tissue diagnosis. Our patient's presentation highlights the inconsistency of imaging results in breast fibromatosis, but the value of MRI in operative planning. It was this imaging modality which revealed the extent of our patient's chest wall involvement and precipitated a thoracic surgery consult.

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REFERENCES

[1] Ong Q, Wong J, Sinha S, Kejriwal N. Desmoid fibromatosis of the chest wall. Respirol Case Rep 2018;6. doi:10.1002/rcr2.310.
[2] Taylor TV, Sosa J. Bilateral breast fibromatosis: case report and review of the literature. J Surg Educ 2011;68:320–5. doi:10.1016/j.jsurg.2011.02.001.
[3] Seo YN, Park YM, Yoon HK, Lee SJ, Choo HJ, Ryu JH. Breast fibromatosis associated with breast implants. Jpn J Radiol 2015;33:591–7. doi:10.1007/s11604-015-0461-y.
[4] Agrawal D, Newaskar V, Shrivastava S, Nayak PA. External manifestations of Gardner's syndrome as the presenting clinical entity. Case Rep 2014;2014(Aug 19). doi:10.1136/bcr-2013-200293.
[5] Gabriela Kuba M, Lester SC, Giess CS, Bertagnolli MM, Wieczorek TJ, Brock JE. Fibromatosis of the breast, diagnostic accuracy of core needle biopsy. Am J Clin Pathol 2017;148:243–50. doi:10.1093/AJCP/AQXD65.
[6] Ebrahim L, Parry J, Taylor D. Fibromatosis of the breast: a pictorial review of the imaging and histopathology findings. Clin Radiol 2014;69:1077–83. doi:10.1016/j.crad.2014.05.105.
[7] Lee SM, Lee JY, Lee BH, Kim SY, Joo M, Kim JI. Fibromatosis of the breast mimicking an abscess: case report of unusual sonographic features. Clin Imaging 2015;39:685–8. doi:10.1016/j.clinimag.2015.03.002.
[8] Glazebrook KN, Reynolds CA. Mammary fibromatosis. Am J Roentgenol 2009;193:856–60. doi:10.2214/ajr.08.1892.
[9] Xu Y, Liu P, Lu H, Zhang S, Zhu Y. Imaging manifestation of mammary fibromatosis. Breast J 2013;19:673–5. doi:10.1111/tbj.12188.
[10] Shim HS, Kim S, Kim OH, Jung HK, Kim SJ, Kim W, et al. Fibromatosis associated with silicone breast implant: ultrasonography and MR imaging findings. Breast J 2014;20:645–9. doi:10.1111/tbj.12340.
[11] Alanis L, Roth R, Lerman N, Barroeta JE, Germaine P. Radiologic images of an aggressive implant-associated fibromatosis of the breast and chest wall: case report and review of the literature. Radiol Case Rep 2017;12:431–8. doi:10.1016/j.radcr.2017.04.012.
[12] Kim MJ, Wapnir IL, Ikeda DM, Chisholm KM, Do Y, Daniel BL. MRI enhancement correlates with high grade desmoid tumor of breast. Breast J 2012;18:374–6. doi:10.1111/j.1524-4741.2012.01255.x.
[13] Brodt JK, Rhodes DJ, Glazebrook KN, Hruska C, O'Connor M, Boughey JC. Radiologic and pathologic images of mammary fibromatosis. Breast J 2011;17:207–9. doi:10.1111/j.1524-4741.2010.01061.x.
[14] Anna L, Viviana L, Massimo B, Chiara Z. Desmoid tumor of the breast: radiologic appearance with a focus on its magnetic resonance features. Breast J 2008;14:106–7. doi:10.1111/j.1524-4741.2007.00531.x.
[15] Souza FF, Fennessy FM, Yang Q, Abbeele AD. PET/CT appearance of desmoid tumour of the chest wall. Br J Radiol 2010;83. doi:10.1259/bjr/18648939.
[16] He P, Cui L, Lei Y, Liu J, Wang J. Ultrasound elastographic findings of mammary fibromatosis. Case Rep Radiol 2015;2015:1–4. doi:10.1155/2015/829468.