Hong Kong J Radiol. 2023;26:53-7 | https://doi.org/10.12809/hkjr2317491

CASE REPORT

Breast-Implant-Related Fibromatosis in a Patient with Free Silicone Injection: a Case Report

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CASE REPORT

A 36-year-old woman, gravida 4 and parity 1 with three previous miscarriages, with good past health and no family history of malignancy, was referred to our institution. She had been prescribed oral contraceptives for the last 13 years but had stopped taking them prior to presentation. She had a history of bilateral breast augmentation at age 23 years. The material injected was unknown.

At the age of 36, she presented to an outside institution with a 6-month history of self-detected left breast lump, increasing in size and associated with mastalgia. A lesion at left 5 o'clock (L5H) position was detected and subsequent biopsy revealed focal fat necrosis with scarring.

Physical examination at our institution revealed an immobile, hard left breast mass at L5H position with no palpable lymphadenopathy. The overall clinical picture warranted a repeated core biopsy due to suspicion of a malignant disease process.

Review of her previous mammogram showed multiple densities diffusely over both breasts suggestive of free silicone injection (Figure 1). Ultrasound revealed a snowstorm appearance in both breasts, also in keeping with the presence of free silicone (Figure 2a). The presenting lump was not well visualised, likely due to the heavy shadowing of injected silicone. Ultrasound-guided core biopsy was performed assisted by palpation of the mass with an 18-gauge biopsy needle and two cores of tissue obtained (Figure 2b). Histology showed benign breast tissue with fat necrosis and inflammation. She was offered a lumpectomy but was indecisive.

Unfortunately, 4 months later the patient presented again with rapid increase in size and pain that was not relieved by analgesics. She expressed her wish for resection in view of the worsening symptoms. Due to the rapid disease progression, the surgical team requested magnetic resonance imaging (MRI) for further evaluation and a core biopsy was repeated to exclude the possibility of malignancy. An enhancing mass at L5H position was evident with chest wall invasion

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Submitted: 20 Oct 2021; Accepted: 14 Jan 2022.

Contributors: YSC and CT designed the study. YSC and HLC acquired and analysed the data. YSC drafted the manuscript. YSC, HYH, WCWC and HLC critically revised the manuscript for important intellectual content. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of Interest: As an editor of the journal, WCWC was not involved in the peer review process. Other authors have disclosed no conflicts of interest.

Funding/Support: This study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data Availability: All data generated or analysed during the present study are available from the corresponding author on reasonable request.

Ethics Approval: This study was conducted in accordance with the Declaration of Helsinki. The patient provided consent for all tests and procedures.

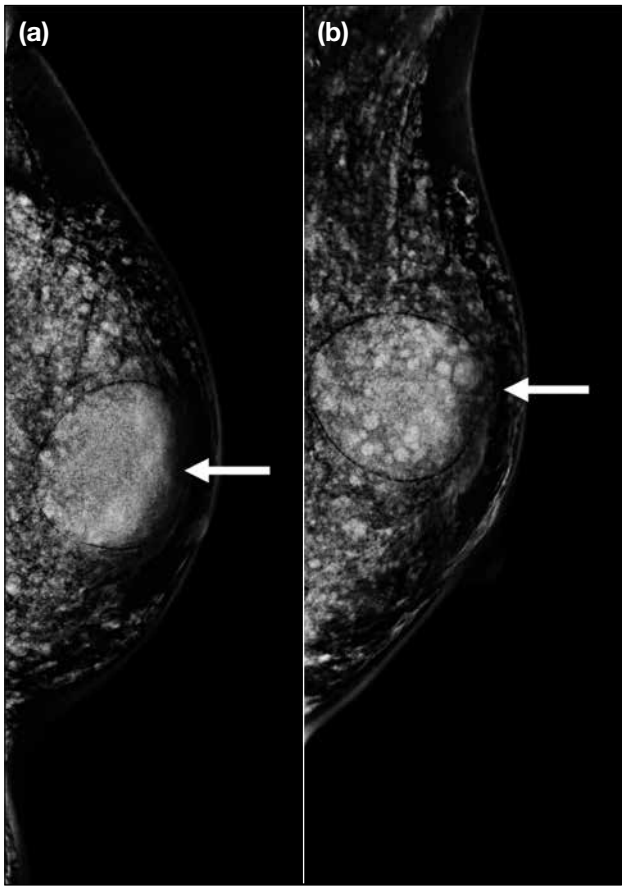

Figure 1. (a) Craniocaudal and (b) mediolateral oblique views of the mammogram showing multiple densities diffusely over both breasts with extension to the bilateral axillary fossa, in keeping with free silicone injection. There is a circumscribed medium density mass at the left upper breast (arrows) corresponding to loculated silicone.

(Figure 3). Dynamic post-contrast images showed a type I kinetic curve. Imaging features remained suspicious of malignancy. Core biopsy was repeated with a 14-gauge biopsy needle under ultrasound guidance and palpation, with three cores of tissue obtained. Histology confirmed fibromatosis. In view of this unusual diagnosis, the case was taken to our multidisciplinary meeting for further discussion of management.

The multidisciplinary meeting consensus was a trial of systemic treatment before consideration of surgery since the chest wall invasion of the fibromatosis would necessitate radical surgery rather than a simple lumpectomy, and the extent of surgical resection may be scaled down if there was a good response to systemic treatment. Due to the significant length of time between the last MRI and the meeting, a repeated MRI was performed to review the progress of the disease and provide a new baseline prior to starting treatment, which showed an increased size of the ill-defined enhancing mass (Figure 4). The lesion invaded the pectoralis muscle and directly abutted the underlying rib. It again showed a type I kinetic curve on dynamic contrast images. The patient was prescribed sulindac and tamoxifen and reported static pain and size of lesion after 3 months. A follow-up MRI has been arranged.

DISCUSSION

Fibromatosis is a rare soft tissue tumour that is considered of 'intermediate nature' due to its local aggressiveness.[1]

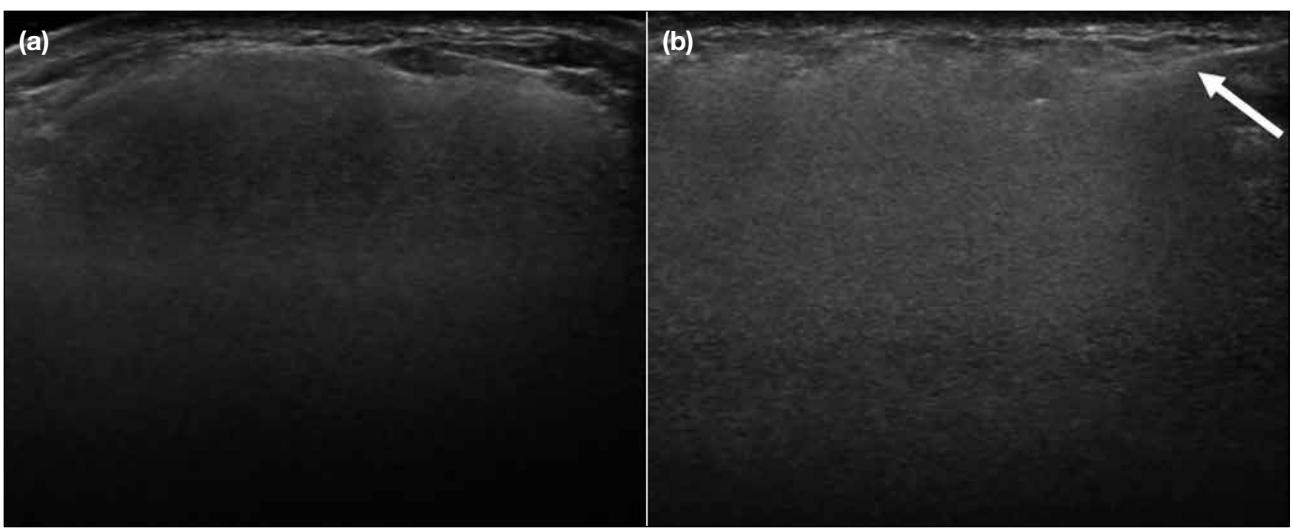

Figure 2. (a) Ultrasound at left 5 o'clock (L5H) position with snowstorm appearance caused by free silicone injection. (b) Ultrasound-guided biopsy at L5H position with limited visualisation of the biopsy needle (arrow).

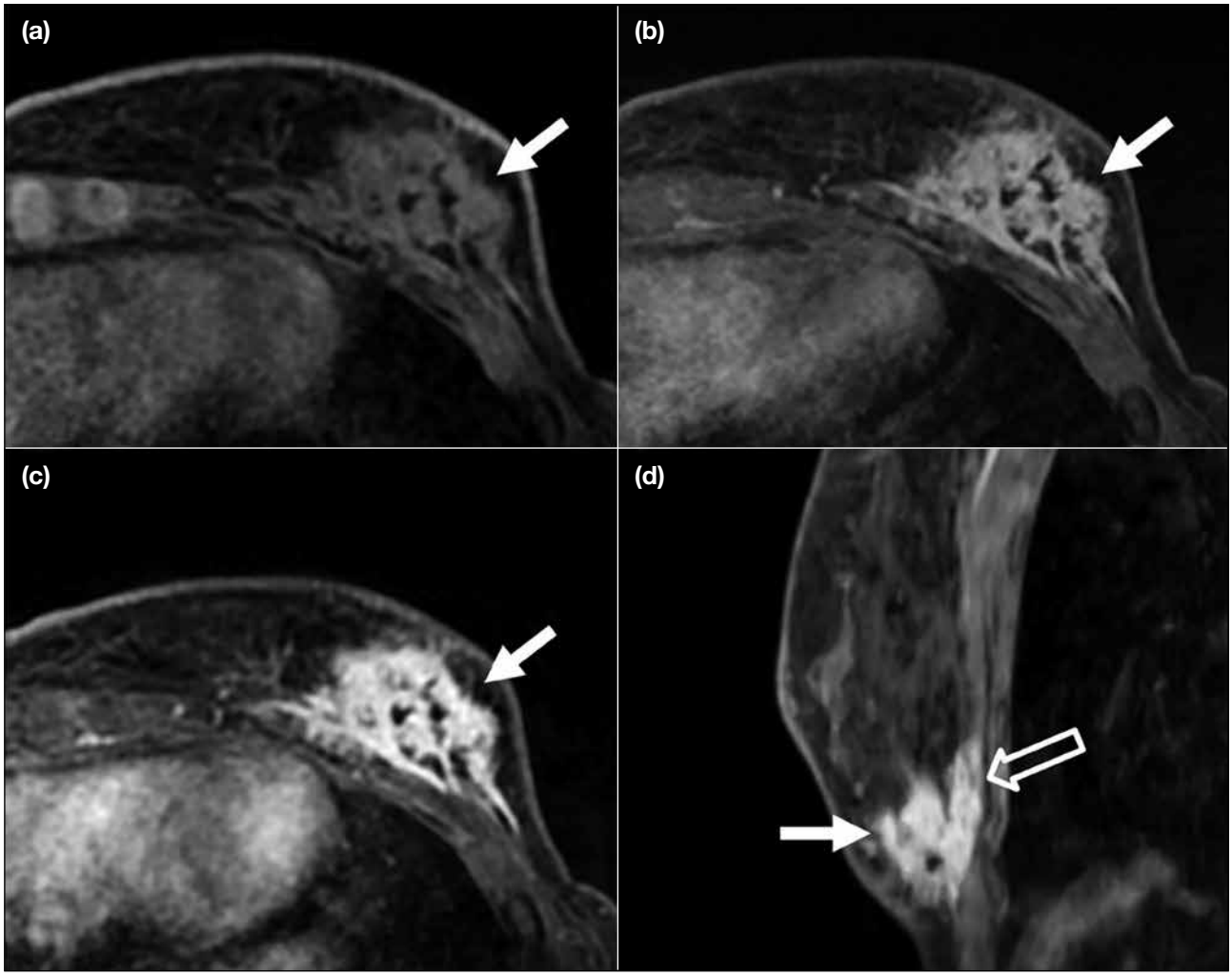

Figure 3. Magnetic resonance images. (a) Axial fat-saturated T1-weighted images showing an isointense lesion (arrow) at left 5 o'clock position, hyperintense on (b) axial fat-saturated water sensitive images (arrow). (c) Axial fat-saturated T1-weighted post-contrast image showing enhancement of the irregular lesion (arrow). (d) Sagittal T1-weighted fat-saturated post-contrast image showing the enhancing lesion (arrow) with underlying pectoralis muscle invasion (open arrow).

It is not metastasising but has a high risk of recurrence.[1-4] It accounts for up to 4% of extra-abdominal fibromatosis cases, and constitutes only 0.2% of breast tumours.[1,4,5] It has been reported to be associated with trauma, prior surgery, pregnancy, increased oestrogen level, implant, and familial adenomatous polyposis (particularly Gardner syndrome).[2,4,6,7]

To date, fewer than 50 cases of implant-related breast fibromatosis have been reported.[2-4,6-13] Reported cases are seen more often with silicone implants than saline implants, possibly due to the higher prevalence of the former.[6] Fibromatoses are usually reported to develop within 2 to 3 years of implant surgery.[2,6] The exact causal relationship between implants and fibromatosis is nonetheless unclear.[6,7,10] The implant material and trauma related to the surgery may both play a role in the development of fibromatoses in patients with breast implants; fibromatoses arising close to or adjacent to the fibrous capsule of a breast implant have been reported.[6,10,13]

Our literature search revealed one case with silicone implant and intracapsular rupture.[7] To the best of our knowledge, there has been no reported case of breast fibromatosis associated with free silicone injection. Free silicone injection as a means of breast augmentation is an outdated practice and uncommon in Asia and South America. It was introduced in the 1940s but has fallen out of favour in view of safety issues and poor cosmetic

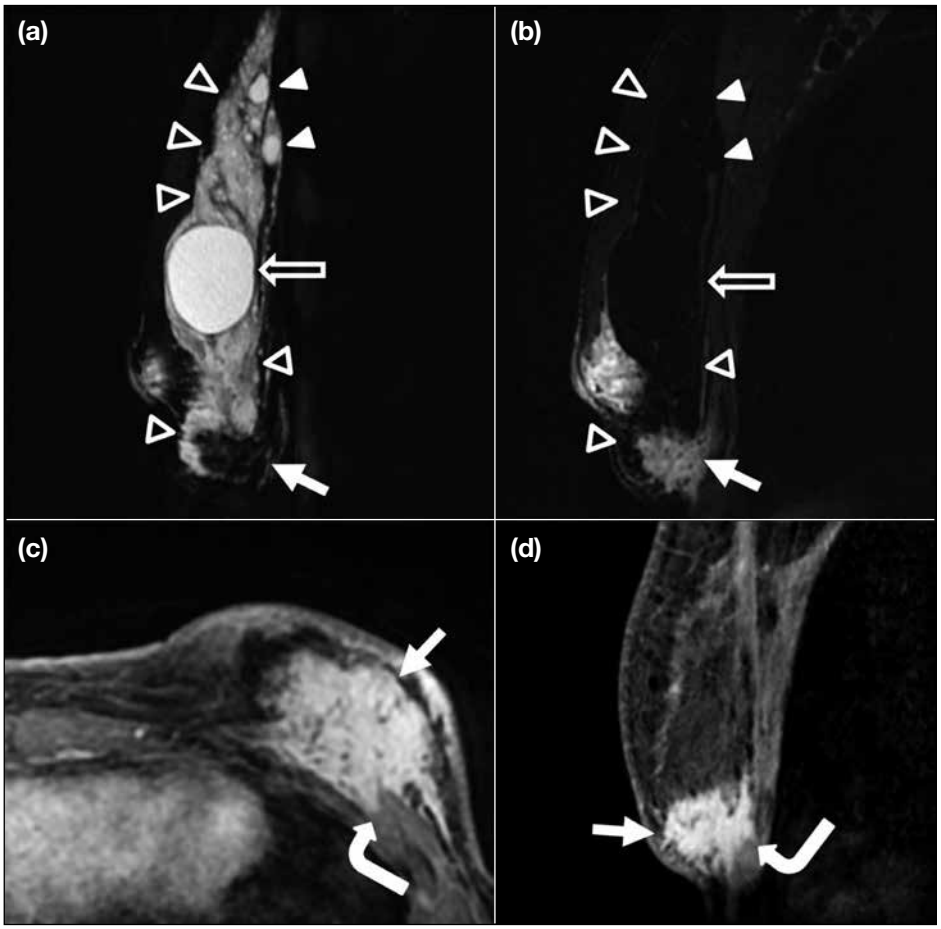

Figure 4. (a) Sagittal silicone-only T2-weighted fat- and water-saturated sequence and (b) sagittal silicone suppressed T2-weighted fat- and water-saturated sequence in the same plane confirm presence of free silicone (open arrowheads), some as tiny locules (arrowheads), and one larger locule (open arrows) corresponding to prior mammogram-detected circumscribed mass at left upper breast. The index mass at left 5 o'clock (arrows) position is also visualised. (c) Axial and (d) sagittal T1-weighted fat-saturated contrast-enhanced images showing the enlarged irregular enhancing mass lesion (arrows) with chest wall invasion through the pectoralis major muscle, abutting the underlying rib (curved arrows).

outcomes although patients with such a clinical history are still occasionally encountered.

Our case is consistent with the literature wherein breast fibromatosis is described as a mimicker of malignancy, both clinically and radiologically.[5]

Clinically, similar to our case, patients with breast fibromatosis are commonly reported to present with a unilateral solitary mass, but bilateral or even multicentric disease has been reported.[6,14] Non-palpable disease has also been detected on screening mammogram.[4] The mass is usually firm or hard and can be mobile or fixed to the chest wall.[6,14] Nipple retraction and skin changes have also been reported, which are features that raise a suspicion of malignancy.[4,6,14] It can be slow or rapidly growing. Since it is not metastasising, lymphadenopathy is not a feature.

On mammogram, breast fibromatosis has a variable appearance ranging from normal (especially for small lesions), architectural distortion, or a circumscribed lesion, to a high-density irregular mass with spiculated margins. Calcifications are rare.[4-6,12,14] On ultrasound, features likewise vary, ranging from a circumscribed parallel mass to a non-parallel hypoechoic mass with obscured, irregular or spiculated borders. More common features include hypoechogenicity, irregular border and posterior acoustic shadowing.[4-6,14] Similar to its clinical presentation, these radiological features show a lot of overlap with breast cancer and commonly point towards malignancy after completion of triple assessment. Unique to our patient, mammogram and ultrasound played a very limited role in assessment of the lesion as the presence of free silicone largely obscured the index lesion, but these modalities clarified the nature of the previously unknown injected material.

MRI is reported to be useful when determining the local extent of the disease since chest wall invasion is

not uncommon. It is also superior to ultrasound and mammogram in the detection and evaluation of a mass in the absence of breast implants or injected materials. On MRI, breast fibromatosis has been reported to be T1-weighted hypo- or iso-intense and T2-weighted–hypointense, but is heterogeneously hyperintense on fat-saturated T2-weighted images.[4-6,14] It shows heterogeneous contrast enhancement and all three types of kinetic curves (types I, II and III) have been reported. The most common pattern is a progressive enhancement curve (type I) that may point away from the usual presumptive diagnosis of breast cancer while not excluding the possibility.[4,5] The MRI findings in our patient were consistent with the literature. We documented additionally the progression of the lesion on serial MRI, which was not reported previously. MRI was also useful in determination of the nature of injected material by silicone- and water-sensitive and suppressed sequences.

Since breast fibromatosis commonly presents as a malignancy mimicker, core biopsy is usually performed for histological diagnosis. These cancer-mimicking features of the lesion also prompted the repeated core biopsies in our patient. The histology findings are beyond the scope of discussion of this text.

The treatment of breast fibromatoses is evolving and remains controversial, but there had been discussion of surgery (most commonly described is wide local excision with clear margins), and systemic therapy with nonsteroidal anti-inflammatory drugs such as sulindac, hormone therapy with tamoxifen, and tyrosine kinase inhibitors have been used.[4-8,10,12,14] Radiotherapy is suggested to also play a role in management.[5-8,12] It should be kept in mind that local recurrence is not uncommon despite treatment, and follow-up is required.[4,5] In view of the complexity of diagnosis and management, these cases should be presented at multidisciplinary meetings to reach a conjoint decision.

In conclusion, radiologists should be aware of the presence of this malignancy-mimicking entity, and the limitations of mammogram and ultrasound in patients with a history of free silicone injection. MRI is the imaging modality of choice for evaluation of extent of involvement of breast fibromatosis, particularly to determine the presence and degree of chest wall invasion. Finally, the complex diagnosis, clinically and radiologically, warrants a multidisciplinary team discussion to facilitate optimal management of the patient.

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