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Case Report

Complicated breast augmentation via self-injection of ultrasound gel and shoe glue: A case report ☆,☆☆

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ABSTRACT

Various types of dermal fillers have been developing for soft tissue augmentation. Even though many fillers have been approved and strictly regulated by authorities, homemade products for body contouring procedures are widely available and easily purchased on websites without prescriptions. It is challenging for radiologists to interpret radiological findings of complicated breast augmentation of unknown origin. While ultrasound is the modality of choice for initial work-up, magnetic resonance imaging (MRI) plays a role as the gold standard in evaluating the integrity of prosthetic implants. Using silicone or water-only MRI sequences may also be able to distinguish them. We report a rare case of breast abscess of a young female patient after self-injection of the mixture of ultrasound gel and shoe glue. The clinical and imaging aspect, especially MRI imaging, will be discussed.

Introduction

Cosmetic breast augmentation prevalence is gradually increasing worldwide, including in Asian countries [1,2]. Dermal fillers have widely used, gel-like substances injected beneath the skin to build up lost volume and soften creases. In developing countries, regulation for practice is still weak for filler injection in breast augmentation. Several cases of filler self-injection causing significant consequences were reported [3,4]. Many patients use off-label fillers sold online without verification and injected by themselves. These filters have high risks of severe and unpredictable complications [3], such as inflammation infection at injection sites [4]. Magnetic reso-

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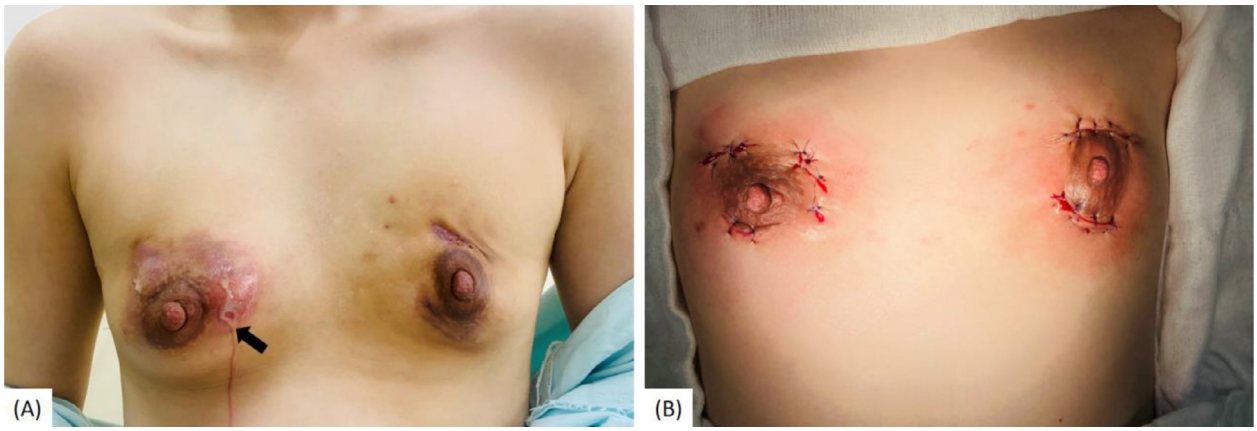

Fig. 1 – Preoperative photograph (A) showed inflammation of both breasts with fistulizations. Postoperative photograph (B) after drainage and removal of necrotic tissue and foreign substances.

nance imaging (MRI) with appropriate protocol is the optimal imaging tool for the diagnostic and detection of these complications.

Our case report presents a case of a breast abscess in a young female patient after the self-injection of a mixture of ultrasound (US) gel and shoe glue. The patient underwent a breast US and MRI for evaluation of the complications.

Case report

A 22-year-old female presented to the department of Trauma, Orthopedic and Thoracic surgery for bilateral breast pain following a self-injection of an unknown filler origin 35 days ago.

According to the patient, she bought this filler of liquid silicone rubber online and self-injected 100 mL of this mixture into each breast using a needle and syringe. The product's composition was not indicated clearly on the package.

Physical examination revealed deformity, swelling, ulceration, and pus discharge from both breasts (Fig. 1). The patient had mild fever of 38°C. White blood cells, C-reactive protein, and procalcitonin were within normal limits. *Staphylococcus aureus* was identified 3 days after the culture of pus from breast discharge. Breast US was indicated initially (Fig. 2). US showed some hyperechoic masses with posterior acoustic shadowing and indistinct margin, surrounded by infiltrated and inflamed fat tissue, scattered in multiple collections of 10-20 mm in size (Fig. 2). Subsequently, a breast MRI was performed for further evaluation. A typical MRI protocol for silicone-filled breast includes a 3D T1-weighted sequence with 2 mm slice thickness, T2-weighted and fat-suppressed T2-weighted sequences, and silicone-suppressed T2-weighted, 3 mm for slice thickness, 10% slice gap (Figs. 4-6). MRI images showed a mass of indistinct margin and heterogeneous signal intensity, which is high on T2-weighted sequence, high on fat-suppressed T2-weighted, and low on T1-weighted sequence (Figs. 4 and 5). Initially, the filler was misinterpreted as silicone. Upon further questioning, the patient revealed that the main ingredients advertised were US gel and shoe glue.

Two consecutive surgeries were carried out to evacuate the abscesses, drain the pus and remove necrotic tissue and foreign substances. After 2 weeks of treatment, the patient recovered well without further complications.

Discussion

Off-label fillers can be purchased easily online and can be used at home with a simple procedure. This led to its common use in many developing countries. However, these dermal fillers have relatively high risks of side effects. The use of these substances without professional supervision can lead to dangerous complications.

US is available in many clinics and hospitals. High-frequency probes (>7.5 Mhz) can detect numerous breast lesions. Therefore, US is widely used as the initial work-up for many breast conditions. As in our case, US was also first prescribed. But for further evaluation and surgical planning, MRI was indicated.

Using different pulse sequences, MRI can detect subtle tissue abnormalities [5]. MRI has the ability to distinguish between fat, muscle, fluid and implant materials with high spatial and soft-tissue resolution [6]. Pre-surgical planning such as implant removal is conveniently facilitated from the MRI, where the presence and extent of implant-related complications can be described [7].

Various techniques of fat suppression offer flexibility for breast MRI to characterize abnormalities with correlation to anatomy. These methods also have unique characteristics depending on the altered signal types of added materials. In breast MRI images of adding filters, a schematic spectrum of water, fat and silicone or saline is shown with their characteristic array while applying several fat suppression sequences. In silicone-added, the fat-water frequency difference is about 220 Hz, and silicone-fat resonance frequencies are close to

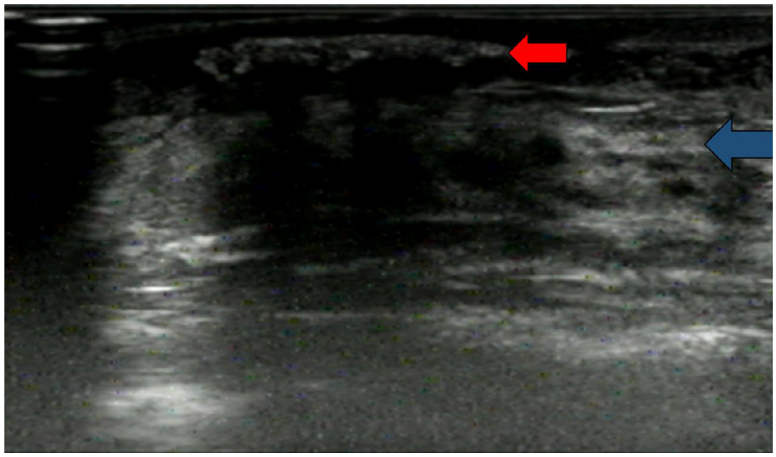

Fig. 2 – Right breast ultrasound showed hyperechoic structures (red arrow) with posterior acoustic shadowing in the subcutaneous tissue and ill-defined hyperechoic breast tissue (blue arrow) representing infiltrated and inflamed fat lobules.

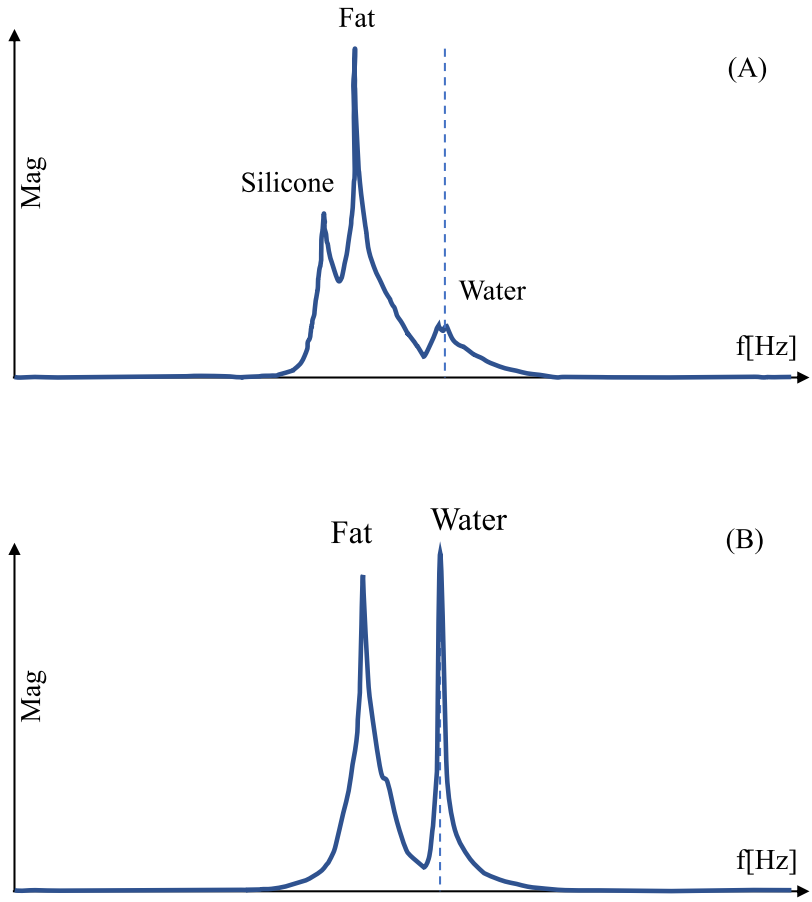

Fig. 3 – The schematic spectrum of breast fat suppression on 1.5T MRI shows water, fat and silicone peaks of silicone-filled implant (A) and saline-filled implant (B). In our case, the similar diagram to (B) was presented and the absence of a silicone peak in the frequency selection graph suggested the impure substance injected by patient.

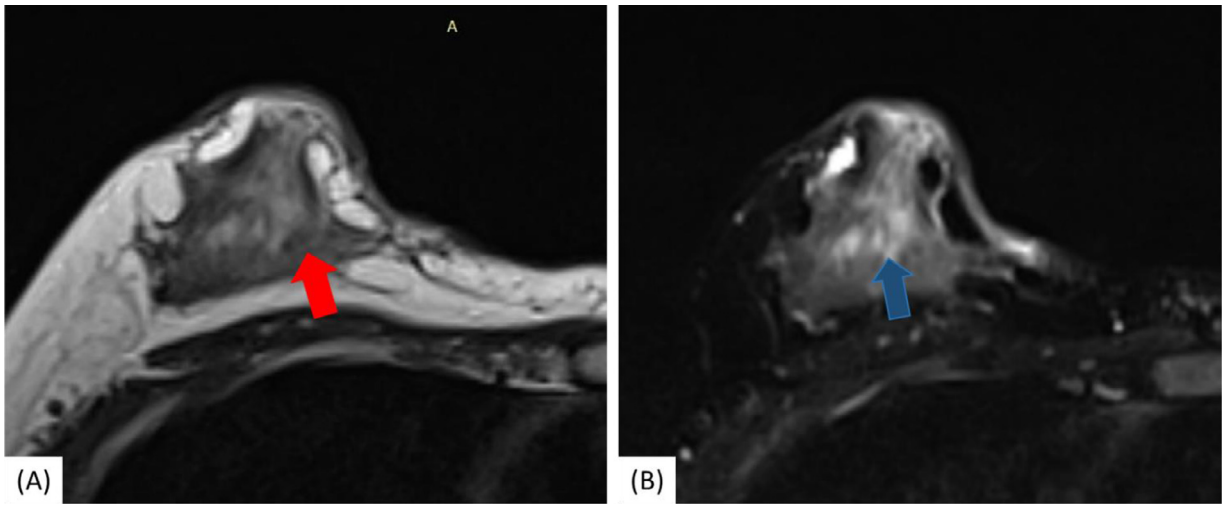

Fig. 4 – Axial T2-weighted MR image (A) and axial fat-suppressed T2-weighted (B) of the right breast with DIY silicone rubber blend. The injected material showed an unclear limit and heterogeneous distributed area: hypointense on T2-weighted (red arrow) and hyperintense on fat-suppressed T2-weighted image (blue arrow).

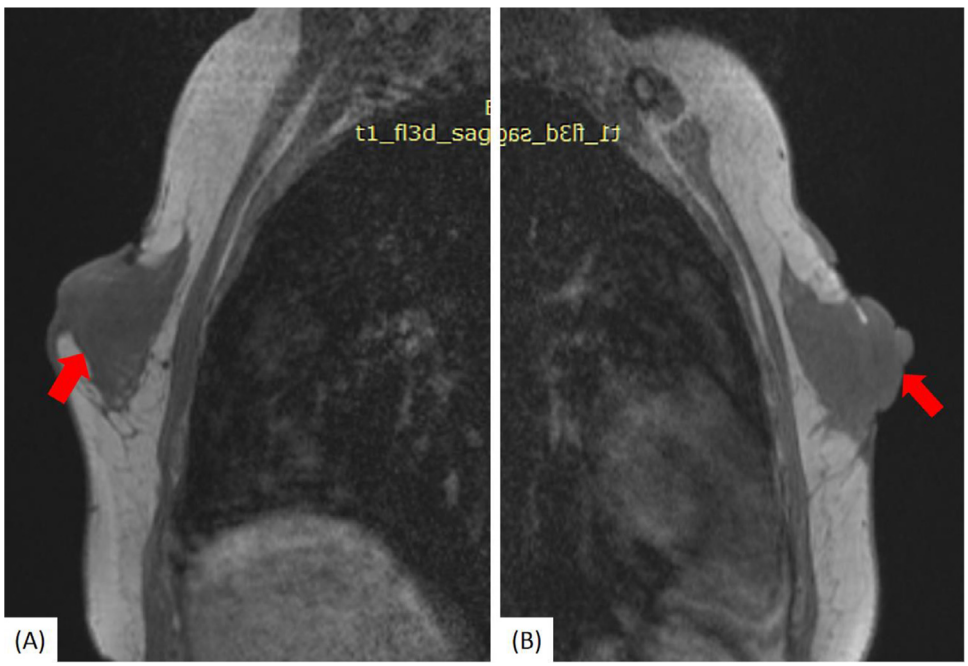

Fig. 5 – Sagittal T1-weighted images of the right (A) and left (B) breast demonstrate low-signal intensity area (arrows) of the injected mixture indistinguishable from breast tissue.

100 Hz at 1.5T. Moreover, the highest peak is fat, silicone is half the height's fat, and the smallest has water in magnitude. Meanwhile, the saline filter has double peaks as water and fat, roughly equal to their magnitude; however, it's different in normal breasts. This spectrum evaluation determines the filter based on the number of peaks and the magnitude. The appearance or disappearance of the silicone peak would indicate whether it is the silicone filter. Then the magnificent correlation of the water and fat peaks reveals the saline confirmation or none (Fig. 3). In addition, incomplete fat and/or silicone saturation can occur in regions with large static magnetic field inhomogeneities, particularly breast areas. Consequently, the frequency difference between fat and water is 200 Hz using auto-tuning, the absence of the silicone peak caused signal suppression of water instead of silicone as the original target, resulting in incomplete chemical shift saturation when applying STIR water-saturation and fat-saturated T2-weighted sequences (Fig. 3).

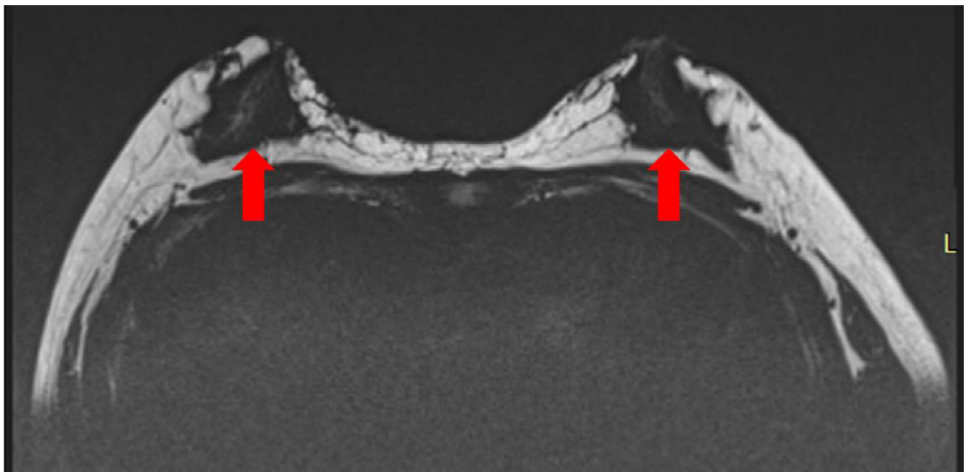

Fig. 6 – Axial silicone-suppressed T2-weighted image of both breasts showed failure to remove silicone signal. Water was suppressed instead of silicone because of the absence of silicone peak.

A variety of possible complications related to silicone procedures have been reported in the literature including infection and inflammation, edema or lymphadenopathy, embolization, scarring, chronic ulcers, implant rupture/contracture, gel migration, and hypercalcemia in granulomatous disease [8–11].

Reviewing the history of the use of pseudo-silicone injection combined with interpreting MRI and US imaging can prevent misdiagnosis and assist the surgeon in directing the appropriate treatment of these DIY silicone complications. It is also important that clinicians recognize the considerable and diverse morbidity such patients can experience, as well as understand the importance of treating this unique patient group with sensitivity and empathy to ensure optimal outcomes.

Conclusion

Our case demonstrated the unsafe use of untested fillers for breast augmentation in a young woman, which resulted in complications that necessitated surgical intervention. Magnetic resonance is an extremely useful tool in detecting complications caused by filler injection.

Patient consent

Written informed consent was obtained from a legally authorized representative(s) for anonymized patient information to be published in this article.

REFERENCES

[1] American Society of Plastic Surgeons (2018). National plastic surgery statistics. [Internet]. [cited December 14, 2021]. Available at: https://www.plasticsurgery.org/documents/News/Statistics/2018/plastic-surgery-statistics-report-2018.pdf Accessed September 1, 2022.

[2] International Society of Aesthetic Plastic Surgery. (2018). ISAPS International Survey on Aesthetic/Cosmetic Procedures performed in 2018. [Internet]. [cited December 14, 2021]. Available at: https://www.isaps.org/wp-content/uploads/2019/12/ISAPS-Global-Survey-Results-2018-new.pdf Accessed September 1, 2022.

[3] Allepot K, Mojallal A, Gerenton B. Self-injection: inescapable DIY and real danger? A case study and literature review. Ann Chir Plast Esthet 2021;66(1):93–9.

[4] McCleave MJ, Grover R, Jones BM. Breast enhancement using Macrolane™: a report of complications in three patients and a review of this new product. J Plast Reconstr Aesthet Surg 2010;63(12):2108–11.

[5] Juanpere S, Perez E, Huc O, Motos N, Pont J, Pedraza S. Imaging of breast implants—a pictorial review. Insights Imaging 2011;2(6):653–70.

[6] Amano Y, Aoki R, Kumita S, Kumazaki T. Silicone-selective multishot echo-planar imaging for rapid MRI survey of breast implants. Eur Radiol 2007;17(7):1875–8.

[7] Wong T, Lo LW, Fung PYE, Lai HYM, She HLH, Ng WKC, et al. Magnetic resonance imaging of breast augmentation: a pictorial review. Insights Imaging 2016;7(3):399–410.

[8] Nasseri E. Gluteal augmentation with liquid silicone of unknown purity causes granulomas in an adult female: case report and review of the literature. J Cutan Med Surg 2016;20(1):72–9.

[9] Paul S, Goyal A, Duncan LM, Smith GP. Granulomatous reaction to liquid injectable silicone for gluteal enhancement: review of management options and success of doxycycline. Dermatol Ther 2015;28(2):98–101.

[10] Pasternack FR, Fox LP, Engler DE. Silicone granulomas treated with etanercept. Arch Dermatol 2005;141(1):13–15.

[11] Zheng C, Quentzel J, Brust JCM. Complications of silicone cosmetic procedures among medical tourists from the Bronx, New York: a retrospective analysis. J Clin Aesthet Dermatol 2019;12(10):24–8.