Case Report

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Silicone Granuloma Associated with Pectoral Muscle Involvement after Ruptured Breast Implant: a Novel case report

Türkan İkizceli[1], Gökçe Gülşen[2], İlker Akın[3]

[1]Department of Radiology, İstanbul Health Sciences University, Haseki Training and Research Hospital, İstanbul, Turkey
[2]Department of Radiology, Haseki Training and Research Hospital, İstanbul, Turkey
[3]Department of Pathology, Haseki Training and Research Hospital, İstanbul, Turkey

ABSTRACT

In this study, an unusual case of a patient who was previously operated on a ruptured breast implant following silicone granuloma associated with pectoral muscle involvement is reported. A 72-year-old woman had undergone breast augmentation surgery when she was 52-year-old and silicone implant rupture 10 years later. After 10 years of ruptured silicone implant, her mammography showed diffuse, multiple high-density nodules in the left breast. The pectoral muscle was significantly hypertrophic. The magnetic resonance imaging showed that the pectoral muscle was quite hypertrophic and had heterogeneous enhancement. In clinical consideration and the presence of the suspected malignancy, a biopsy was performed. The histological analysis identified pectoral muscle and breast tissue, which had been mainly replaced by giant cells, along with an apparent foreign body response. Silicone granuloma can present itself as a soft tissue mass. Malignancy is the most important differential diagnosis. Meticulous follow-up is recommended for these patients.

Keywords: Breast implant, pectoral muscle, silicone granuloma

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Introduction

Silicone has rapidly become one of the most commonly used prosthetic for breast implants over the last 30 years. Therefore, we have been witnessing more silicone-related disease. Silicone implant rupture, one of the most common silicone-related diseases, occurs more frequently with the implant's age. After implant rupture, silicone leakage can remain within the breast parenchyma or spread to regional lymph nodes first (1). Case studies report silicone migration to distal parts of the body, such as the arm, subcutaneous soft tissues of the abdominal wall and the inguinal area and even to the liver, where silicone causes foreign body inflammation and sometimes mimics malignancy (1). Silicone granuloma associated with pectoral muscle involvement has not been published before.

In this study, an unusual case of a patient who was previously operated on a ruptured breast implant following silicone granuloma associated with pectoral muscle involvement is reported, and all imaging modality pattern are shown.

Case Presentation

A 72-year-old woman was referred to breast radiology department with a pain and hardness in her left breast. The patient had undergone bilateral subglandular breast augmentation surgery when she was 52-year-old. Ten years later, she had silicone implant rupture of left breast, required breast revision surgery and the breast implant and free silicone is removed without replacement. Her right breast was normal. After 10 years of ruptured silicone implant, she complained of pain, hardness, and swelling on her left breast. First of all, to determination of breast cancer and evaluation of the breast parenchyma changes after open removal surgery, a mammography (MG) and breast ultrasonography (US) were performed (IMS Giotto MD digital radiography and Tomosynthesis, Bologna, Italy). The MG showed; diffuse, multiple high-density nodules in the left breast, some with a thin rim of calcifications (Figure 1). The pectoral muscle was signifi-

Address for Correspondence :
Türkan İkizceli, e-mail: ikizceli@yahoo.com

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cantly hypertrophic, including the same diffuse multiple high-density rim-calcified nodules, and was extended into the left breast. High-frequency grey scale US of the breast using a linear probe (6–13 MHz) (Hitachi Medco's Digital Ultra Sound Examination Device, HI VISION Avius, Tokyo, Japan) revealed several multiple cystic lesions that have well-defined borders and posterior acoustic shadows, a so-called 'snowstorm' appearance with no visible pectoral muscle (Figure 2).

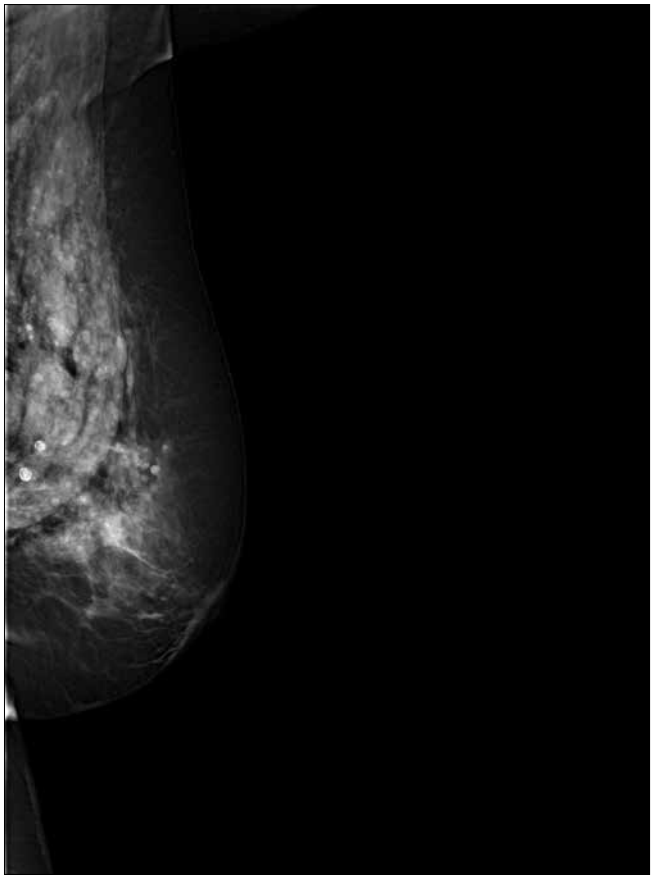

Figure 1. Left MLO mammography shows diffuse, multiple high-density nodules (siliconomas) in the left breast, some with a thin rim of calcifications. Pectoral muscle was significantly hypertrophic, including the same diffuse multiple high-density rim-calcified nodules and was extended into the left breast

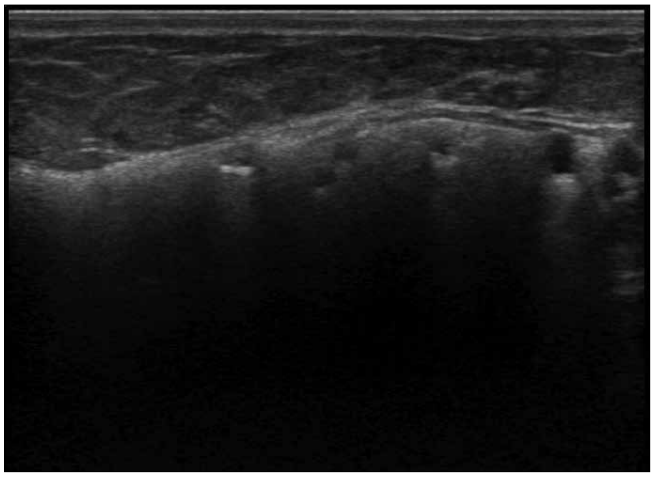

Figure 2. Ultrasound image shows multiple globules of silicone appearing as small anechoic cystic lesions that have ill-defined borders and posterior acoustic shadowing; so-called 'snowstorm' pattern

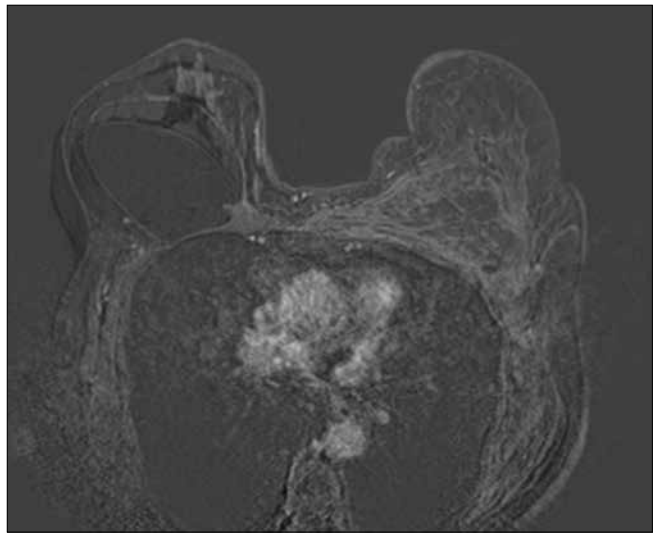

Figure 3. Axial post-contrast subtracted MRI image shows that the pectoral muscle and surrounding breast tissue showed heterogeneous early and delayed enhancement

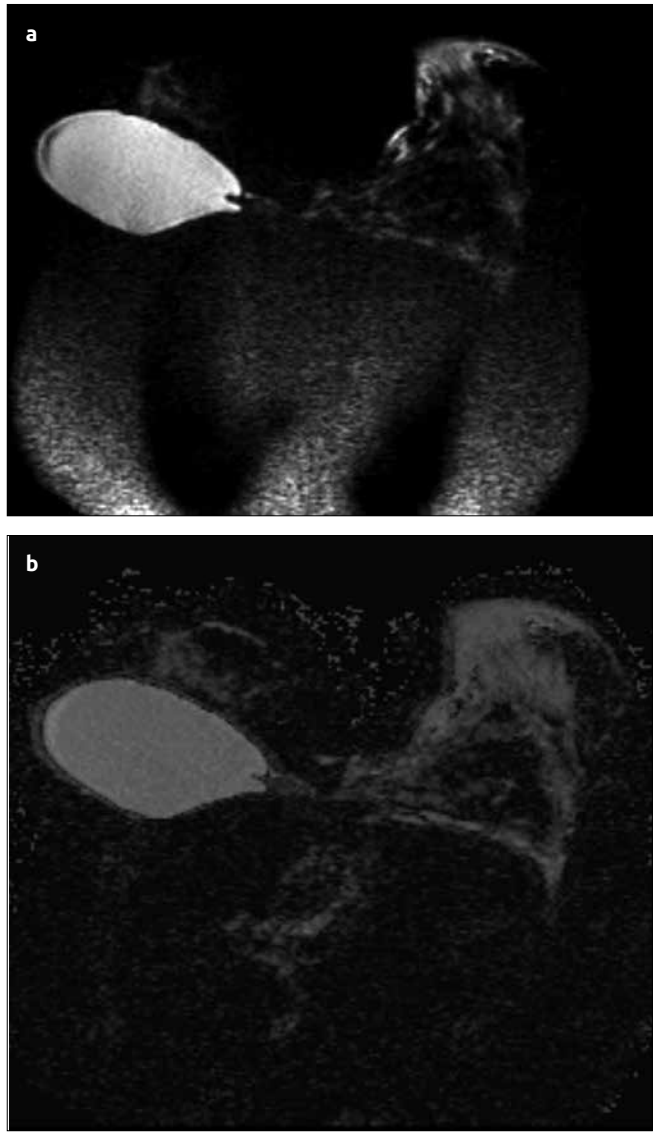

Figure 4. a, b. DWI (a) and ADC (b) showed that the left breast and pectoral muscle exhibited high SI due to the unrestricted diffusion

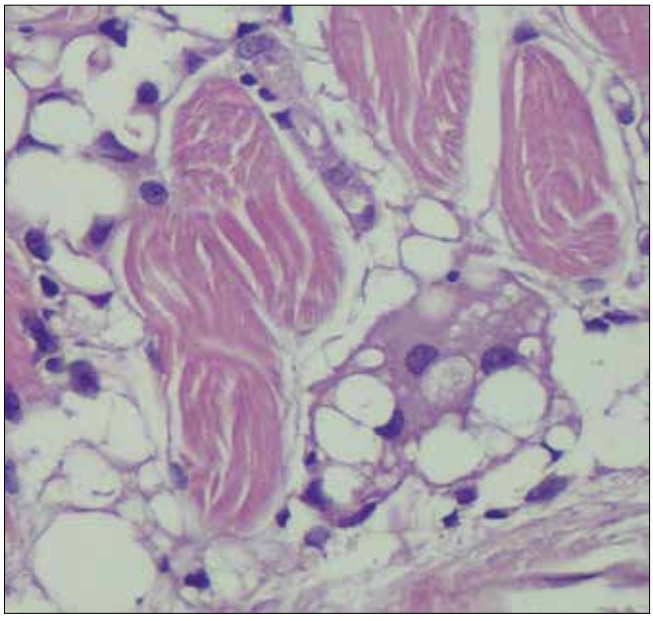

Figure 5. Pathological specimen identified infiltration giant cells with vacuoles, consistent with silicone granuloma

Dynamic contrast-enhanced magnetic resonance imaging (MRI) was then performed (1.5T MR system, Achieva Philips, The Netherlands). T1-weighted images showed low signal intensity and T2-weighted images showed heterogeneous-hyperintensity. Pectoral muscle was quite hypertrophic and had heterogeneous, non-mass like parenchymal enhancement (Figure 3). The kinetic curve not observed.

In diffusion-weighted images (Figure 4a, b), neither pectoral muscle nor breast tissue exhibited high SI, which means unrestricted diffusion.

In clinical consideration and the presence of the suspected malignancy, a biopsy was performed to upper outer quadrant of left breast and pectoral muscle under sonographic guidance using 16-gauge automatic core-needle biopsy (GEOTEK, Ankara, Turkey). Histological analysis identified pectoral muscle and breast tissue, which had been mainly replaced by giant cells and along with an apparent foreign body response (Figure 5). No evidence of malignancy within the breast and pectoral muscle was seen. We diagnosed the patient with silicone granuloma associated with pectoral muscle involvement.

An informed consent was obtained from the patient for the publication of this manuscript.

Discussion and Conclusion

Silicone granuloma (SG) or siliconoma, by definition, is a type of tissue reaction from silicone. SG was first described in 1964 by Winer et al. (2) after an injection of free silicone used for breast augmentation, SG which occurred after ruptured implants were first described in the 1980s. The use of implants for breast augmentation has been increasing in recent years. However, in many cases, we have to take into consideration the risk from unknown foreign body reactions and complications. The major complications involve hematoma, infection, asymmetry in the early postoperative period, capsule contracture, rupture, and SG in long-term period (2).

Silicone leaking from a ruptured implant increases the risk for silicone to transmigrate to different areas. The well-timed removal of an extracapsular silicone is the best treatment because delayed surgery may increase silicone leakage and migration, therefore making complete removal of silicone very difficult or sometimes impossible. When silicone leaks out from an implant, the silicone particles spread to local areas, such as to the ipsilateral chest wall, axillary regions and lymph nodes (3). Moreover, silicone can spread to the whole body, sometimes mimicking malignancy (2). In our case, the SG seemed a granulomatous reaction within the breast, but the appearance of pectoral muscle was quite different, and malignancy could not be excluded.

Detection of silicone by imaging methods is challenging for radiologists because presence of silicone implant may cause difficulties for breast cancer diagnosis. In addition, breast implant complications can mimic breast cancer.

Mammography demonstrates free or residual silicone in the breast parenchyma. Silicone from incomplete removal surgery of a ruptured implant can be seen as well-circumscribed or ill-defined densities (3). Calcification, architectural distortion, lipid-cyst formation such as fat necrosis, and the thickening and calcification of the skin can be seen as well (4). If MG is suspected or the result is inconclusive, further evaluation may be needed.

The classic appearance of silicone on sonography is a high echogenic pattern which shows posterior echoes with a well-defined anterior margin and a loss of detail posterior margin. This pattern has been described as “echo-dense noise” or “snowstorm” (5).

Magnetic resonance imaging provides a great overview of the breast implant and surrounding anatomic areas. MRI findings of free silicone include separated foci of low signal intensity on fat-suppressed T1-weighted images and high signal intensity on the water-suppressed T2-weighted images.

Diffusion weighted imaging (DWI) and ADC maps are opening up new screening possibilities for the identification of malignant breast lesions and help exclude malignancy in women with suspicious MG (3).

Breast carcinoma rarely occurs in the form of a foreign body granuloma following liquid silicone injection. This concern has not been substantiated yet. But breast carcinoma originating from a silicone granuloma has been reported (6). Considering so many women that have breast implants every year; the compiled data show that there is a very small risk of developing non-Hodgkin’s lymphoma and anaplastic large cell lymphoma (7). Moreover, the relationship between breast augmentation and angiosarcoma of the breast remains unclear, but a few cases has been reported in the literature. T-cell mediated autoimmune reactions may have some relationship with the silicone implants. But clinical case reports still have been unable to establish a correlation (8). In our case, biopsy was required because of the appearance of the pectoral muscle and suspected malignancy.

In conclusion, SG can present itself as a soft tissue mass. Malignancy is the most important differential diagnosis. Meticulous follow-up is recommended for these patients.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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