Axillary silicone lymphadenopathy caused by gel bleeding with intact silicone breast implants: a case report

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INTRODUCTION

Silicone breast implants (SBIs) have been extensively studied for their potential complications; however, little attention has been given to the fate of silicone gel that escapes from the implant shell, a phenomenon known as “gel bleeding.” Gel bleeding can occur from both ruptured and intact SBIs, whereby microscopic silicone droplets diffuse through the implant surface, potentially resulting in complications such as capsular contracture and immune responses related to breast implant illness. Prompt and reliable diagnostic measures are crucial, as the presentation of gel bleeding can resemble cancer, making an accurate diagnosis challenging. This report discusses a rare case of axillary silicone lymphadenopathy caused by gel bleeding in a 48-year-old woman with intact SBIs. Silicone lymphadenopathy can be suspected based on mammography, ultrasonography, and magnetic resonance imaging in patients with a history of SBI insertion, and confirmation can be obtained through a pathological examination. Excisional biopsy is generally recommended for symptomatic patients, while treatment may not be necessary for asymptomatic patients; however, removal can be considered if the patient indicates a preference for it. Patients with silicone lymphadenopathy require replacement of SBIs to examine the breast capsule and verify the integrity of the implant. This case highlights the importance of considering gel bleeding as a potential cause of silicone lymphadenopathy, even in patients with intact SBIs.

Keywords Silicones / Prostheses and implants / Lymphadenopathy / Case reports

Gel bleeding following breast augmentation using silicone breast implants (SBIs) occurs when microscopic silicone droplets diffuse through the implant surface, potentially resulting in complications such as capsular contracture and immune responses related to breast implant illness. Prompt and reliable diagnostic measures are crucial, as the presentation of gel bleeding can resemble cancer, making an accurate diagnosis challenging. This report discusses a rare case of axillary silicone lymphadenopathy caused by gel bleeding in a 48-year-old woman with intact SBIs. Silicone lymphadenopathy can be suspected based on mammography, ultrasonography, and magnetic resonance imaging in patients with a history of SBI insertion, and confirmation can be obtained through a pathological examination. Excisional biopsy is generally recommended for symptomatic patients, while treatment may not be necessary for asymptomatic patients; however, removal can be considered if the patient indicates a preference for it. Patients with silicone lymphadenopathy require replacement of SBIs to examine the breast capsule and verify the integrity of the implant. This case highlights the importance of considering gel bleeding as a potential cause of silicone lymphadenopathy, even in patients with intact SBIs.
CASE REPORT

A 48-year-old woman with a history of hypertension underwent breast augmentation with SBIs 10 years ago. During a routine examination, a dense area was identified in the left axillary region on mammography. Subsequent ultrasound did not reveal any evidence of implant rupture or leakage, but showed a nodule with mixed echogenicity and posterior shadowing in the left axillary area. Further evaluation with magnetic resonance imaging (MRI) revealed a radiographic finding known as the “keyhole sign” in the left implant, indicating the presence of implant wrinkles and gel bleeding, as well as an enlarged lymph node with silicone deposition in the left axillary region (Fig. 1). The patient did not report any specific complaints, but physical examination revealed Baker grade III capsular contracture in both breasts with no palpable mass in both axillary regions (Fig. 2). To confirm the diagnosis of left axillary lymph node enlargement and address the capsular contracture, an excisional biopsy of the lymph node was planned, along with replacement of both SBIs. During surgery, the inserted SBIs (Mentor Siltex, 175 cc Microtextured Round Moderate Profile) were found to be intact with no visible signs of silicone leakage (Fig. 3). The SBIs were replaced with new SBIs (Mentor, MemoryGel, 130 cc Smooth Round Moderate Profile). The breast capsule was also thin and whitish, with no abnormal findings. Ultrasonography performed during surgery identified a mass of approximately 2 × 2 cm with the characteristic appearance associated with the presence of silicone, known as the “snowstorm.” An excisional biopsy was per-

![Fig. 1. Magnetic resonance imaging. (A) The “keyhole” sign in the left implant, indicating the presence of implant wrinkles and gel bleeding, (B) as well as an enlarged lymph node with silicone deposition within the left axillary region.](image1)

![Fig. 2. Photographs of the patient’s breasts before surgery.](image2)

![Fig. 3. Photograph of the left implant during surgery. The implant was without rupture, and no leakage was observed visually.](image3)

![Fig. 4. Intraoperative ultrasonography, demonstrating a typical “snowstorm” appearance. (A) Intraoperative sonographic findings. (B) Confirmation of enlarged lymph nodes containing silicone. (C) Magnified photograph of the specimen.](image4)
formed, and enlarged, elongated gray lymph nodes were identified (Fig. 4). The patient was discharged one day after surgery with no complications. A histopathological examination revealed the presence of lymph nodes containing large droplets of silicone (Fig. 5). At the 6-month follow-up, she remained in good condition without any specific findings.

DISCUSSION

Silicone lymphadenopathy is a rare complication that can occur following breast augmentation using SBIs, and it can be challenging to differentiate it from granulomatous lymphadenitis, lipogranuloma, fat necrosis, metastatic carcinomas, and signet ring cell lymphomas [7]. Polydimethylsiloxanes (PDMS) are typically used in SBIs, which are composed of straight chains. PDMS fluids are hydrophobic, or insoluble in water, and are available in a range of viscosities, from thin liquids to thick, non-pourable fluids. These fluids constitute a mixture of different-sized polymer compounds, some of which are smaller than the pores in the implant shell, leading to gel bleeding. Even the latest generation of SBIs, which contain a highly cohesive gel and multiple layers of implant shell, are not immune to gel bleeding. The risk of bleeding increases over time because of the biodegradation of the cohesive gel and the implant shell [8]. These silicone particles can disseminate through lymphatic or hematogenous routes, and may take them several years (typically 6–10 years) to accumulate in the lymph nodes, leading to the development of silicone lymphadenopathy; this explains the latency period between implantation and symptom onset or incidental image findings [7]. In our case, gel bleeding was discovered incidentally during a breast cancer screening 10 years after implantation. Silicone lymphadenopathy has been reported to occur even in cases of unruptured SBIs. However, previous papers and case reports have predominantly focused on ruptured cases, and confirmation was often not obtained in instances where imaging suggested an intact SBI. In our case, breast implant replacement and capsulotomy were performed to address associated capsular contracture, and there was no apparent gross rupture of the breast implant. These findings highlight the possibility of silicone lymphadenopathy resulting from leakage in the absence of implant rupture. We hypothesize that the small pores of the inserted SBIs may have been responsible for the gel bleeding not being visible to the naked eye [9].

Silicone lymphadenopathy can be suspected based on mammography, ultrasonography, and MRI in patients with a history of SBI insertion, and confirmation can be obtained through a pathological examination, such as core needle biopsy, fine needle aspiration, or excisional biopsy. Radiologic imaging is particularly useful in detecting, monitoring, and tracking the disease. The “snowstorm” pattern, first described in the 1990s, remains the most sensitive and specific ultrasonographic indicator of free silicone, which manifests as increased echogenicity, despite the varying appearance of extracapsular silicone on ultrasound [10]. Moreover, mammography can depict silicone granulomas in various forms, such as the presence of dense calcified nodules surrounding the implant [11], and MRI utilizing a silicone-sensitive sequence is the preferred and optimal imaging modality for detecting silicone in both the SBIs and extracapsular areas due to its high sensitivity in detecting silicone [12]. The “keyhole” sign, characterized by invagination of the implant shell and non-contact of the surrounding membranes, can be readily detected on MRI and is a hallmark finding in cases of gel bleeding [13]. In the current case report, imaging studies demonstrated characteristic features of silicone lymphadenopathy, including a “snowstorm” pattern on ultrasound, dense calcification on mammography, and the “keyhole” sign on MRI. Furthermore, MRI revealed rippling of the implant shell in our case. An association has been found between rippling and gel bleeding, and as microtextured implants are known to carry a higher risk of rippling compared to macrotextured implants, it is possible that rippling may have also increased the risk of gel bleeding in our case [14].

The treatment for axillary silicone lymphadenopathy with intact SBIs caused by gel bleeding depends on the patient’s symptoms. In asymptomatic patients, the excision of lymph nodes containing silicone may not be necessary, whereas it may be recommended for symptomatic patients. SBIs should be examined, as there is a possibility of rupture even if it is not suspected based on imaging [6]. In the case presented herein, bilateral replacement of SBIs and excisional biopsy of the axillary lymph node were performed.

In conclusion, this case serves as a reminder of the importance of regular follow-up examinations for patients with breast implants. For SBIs placed for any reason, the U.S. Food and Drug Administration advises that patients undergo breast MRI screening at 3 years post-implantation, followed by biennial scans, to detect and manage potential complications early [15]. As demonstrated by
this rare case, asymptomatic silicone lymphadenopathy caused by invisible gel bleeding in intact SBIs without rupture can occur. Early detection and prompt management of these complications can prevent further progression and ensure good outcomes for patients. Therefore, it is crucial for patients to understand the importance of regular follow-up examinations and to maintain open communication with their healthcare providers to ensure long-term safety and success following breast augmentation surgery.

NOTES

Conflict of interest
No potential conflict of interest relevant to this article was reported.

Ethical approval
The report was approved by the Institutional Review Board of Soonchunhyang University Hospital (IRB No. 2023-03-008).

Patient consent
The patient provided written informed consent for the publication and use of her images.

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