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Radiological Case Report / Caso Clínico

Breast Implant Rupture with Lymphatic Silicone Migration: Case Report

Rotura Protésica Mamária com Migração Linfática de Silicone: Relato de Caso

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Abstract

Silicone breast implant rupture is a recognised late complication, generally diagnosed by imaging modalities. Silicone lymphadenopathy is uncommon, and involvement of the internal mammary nodal chain is rare. We report the case of a 74-year-old woman, asymptomatic and previously treated for invasive ductal carcinoma, in whom routine ultrasound demonstrated features of intra- and extracapsular implant rupture. Magnetic resonance imaging confirmed intracapsular rupture, demonstrating the teardrop sign and the presence of silicone between the implant and the fibrous capsule (subcapsular line). It also revealed extracapsular rupture, with silicone in the adjacent breast parenchyma and in axillary and internal mammary lymph nodes. The patient underwent implant replacement and axillary lymphadenectomy, with a favourable outcome. This case highlights the rare involvement of internal mammary lymph nodes and underscores the importance of imaging in asymptomatic patients.

Keywords

Breast implant; Silicone; Rupture; Lymphadenopathy; Case report.

Resumo

A rotura de implante mamário de silicone é uma complicação de aparecimento tardio, geralmente diagnosticada por métodos de imagem. A presença de adenopatias por silicone é incomum, sendo raro o envolvimento da cadeia ganglionar mamária interna. Apresentamos o caso de uma mulher de 74 anos, assintomática e previamente tratada por carcinoma ductal invasivo, que apresentou sinais de rotura intra e extracapsular de implante mamário numa ecografia de rotina. A ressonância magnética confirmou a rotura intracapsular, evidenciando o sinal da lágrima e a presença de silicone entre o implante e a cápsula fibrosa (linha subcapsular). Demonstrou ainda rotura extracapsular, com presença de silicone no parênquima mamário adjacente e em gânglios linfáticos axilares e mamários internos. A paciente foi submetida a substituição do implante e linfadenectomia axilar, com evolução favorável. Este caso destaca o raro envolvimento dos gânglios linfáticos mamários internos e realça a importância dos exames de imagem em doentes assintomáticos.

Palavras-chave

Implante mamário; Silicone; Rotura; Linfadenopatia; Caso clínico.

Case Report

We present the case of a 74-year-old asymptomatic woman with a past history of invasive ductal carcinoma of the right breast. During routine oncologic surveillance, breast ultrasound revealed findings suspicious for intra- and extracapsular rupture of the eight-year-old right silicone implant. The findings (Figure 1) included heterogeneous prosthetic internal content and a marked hyperechoic "snowstorm" appearance in the surrounding tissues and ipsilateral axillary lymph nodes, suggestive of silicone gel migration.

Subsequent breast MRI confirmed the suspicion of implant rupture. The examination demonstrated (Figure 2) invagination of the implant shell with silicone signal within it (the teardrop sign), silicone between the implant shell and the fibrous capsule (subcapsular line), and small droplets with water signal inside the implant lumen (the water-droplet sign). Together, these findings were consistent with intracapsular rupture. In addition, multiple foci of

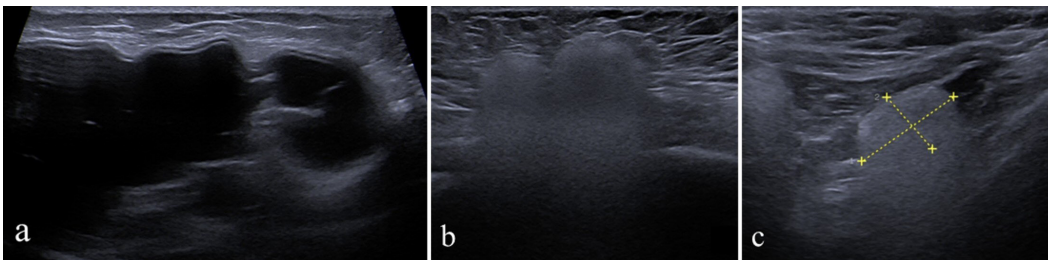

Figure 1 – Ultrasound assessment of the silicone breast implant. Image a: heterogeneous prosthetic content along the inner aspect of the implant. Image b: hyperechoic pseudonodular lesion adjacent to the external surface of the implant, demonstrating a snowstorm sign, suggestive of a siliconoma versus an intramammary lymph node containing silicone. Image c: axillary lymph node with silicone deposition, also demonstrating a snowstorm appearance.

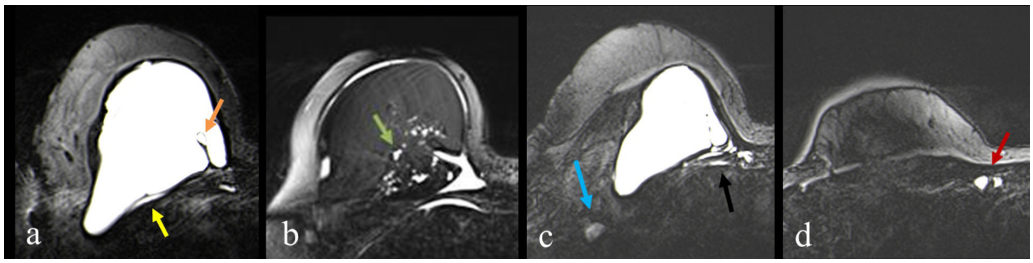

Figure 2 – Breast MRI was performed using axial inversion-recovery sequences optimized for implant assessment. A silicone-sensitive sequence with suppression of fat and water signal highlighted silicone (a, c and d), while a complementary water-selective sequence with suppression of silicone and fat signal was acquired (b). A focal invagination of the silicone implant containing a small amount of silicone signal—the teardrop sign (orange arrow)—was observed. A small amount of silicone signal between the prosthesis and the fibrous capsule—the subcapsular line (yellow arrow)—as well as focal water signal within the prosthesis—the water-droplet sign (green arrow)—were also identified. These findings are highly suggestive of intracapsular rupture. Extracapsular rupture was additionally demonstrated, with silicone signal detected outside the fibrous capsule, adjacent to the inner aspect of the implant (black arrow), in the ipsilateral axillary lymph nodes (blue arrow), and along the internal mammary lymph node chain (red arrow).

silicone-compatible signal intensity were observed outside the implant, supporting concomitant extracapsular rupture. Similar signal intensity was identified in internal mammary and axillary lymph nodes, highly suggestive of lymphatic silicone gel migration.

The patient denied breast pain, swelling, systemic symptoms, or prior breast trauma. Physical examination revealed no palpable breast masses or skin changes, with the only notable finding being a small, mobile, painless lymph node in the right axilla. Medical history was otherwise unremarkable, except for right breast cancer treated eight years earlier with neoadjuvant chemotherapy followed by skin-sparing mastectomy (without nipple–areola complex preservation) and axillary lymph node dissection. Immediate breast reconstruction was performed using a tissue expander, which was subsequently exchanged for a textured retropectoral silicone implant.

Following the diagnosis of implant rupture, the patient underwent surgical explantation of the ruptured implant. Subsequently, excision of the silicone-containing axillary lymph nodes was performed, followed by breast reconstruction with a silicone gel implant through an inframammary fold approach. Breast reconstruction was intentionally delayed for four months due to patient preference and to allow resolution of local inflammatory changes. Conservative management of the internal mammary lymph nodes was chosen because of the greater technical complexity and surgical risks associated with their excision. Given the absence of symptoms and the imaging findings consistent with silicone migration, clinical and imaging surveillance was considered appropriate.

The surgical pathology report confirmed implant rupture with extracapsular silicone and involvement of the axillary lymph nodes. Postoperative recovery was uneventful, with no reported complications or persistent symptoms during the 12-month follow-up period. (Table 1)

Table 1 – Timeline of the patient's clinical course.

Date	Clinical Event
November 2015	Skin-sparing mastectomy (without nipple–areola complex preservation) and axillary lymph node dissection, followed by immediate breast reconstruction with a tissue expander.
November 2016	Exchange of the tissue expander for a permanent breast implant.
July 2024	Ultrasound examination raised suspicion of implant rupture and silicone lymphadenopathy.
August 2024	Breast MRI confirmed intracapsular and extracapsular implant rupture, with axillary and internal mammary silicone lymphadenopathy.
September 2024	Surgical removal of the ruptured breast implant.
January 2025	Excision of affected axillary lymph nodes and breast reconstruction with a silicone gel implant via an inframammary fold approach.

Discussion

Breast implant rupture is a well-recognized complication, increasing in frequency with implant age.[1] Reported rupture rates for reconstructive implants at 10 years are as high as 35.4 %.[2] Ruptures are broadly classified as intracapsular or extracapsular, depending on whether the silicone remains confined within the fibrous capsule formed by the host tissue.[3] Intracapsular rupture accounts for approximately three-quarters of cases, while extracapsular rupture represents up to one-quarter.[1] Textured implants have been reported to show a higher rate of rupture.[4,5]

Silicone gel migration may occur following rupture, resulting in local or distant spread of silicone particles, most commonly into adjacent breast tissue and regional lymph nodes.[1,4] Even in the absence of prosthetic rupture, silicone particles may migrate into surrounding tissues and the body, a process known as gel bleeding.[1] Silicone lymphadenopathy is relatively uncommon, with a recent study reporting a prevalence of only 5.8%.[6] Involvement of the internal mammary chain is even rarer than axillary involvement; one study reported rates of approximately 21% among silicone lymphadenopathy cases.[7]

Although many patients remain asymptomatic,[8] the clinical significance of implant rupture should not be underestimated. Some authors suggest that both extracapsular rupture and silicone gel migration may have under-recognized systemic effects.[1,4] When silicone gel escapes beyond the fibrous capsule, it can trigger local inflammatory reactions, granuloma formation (siliconomas), and painful masses.[4] Silicone deposition in axillary lymph nodes may produce lymphadenopathy, pruritus, and localized pain.[1,4] In oncologic patients, lymph node enlargement may also raise concern for disease recurrence, complicating the diagnostic process.[9]

Additionally, the identification of silicone outside the capsule gains relevance in the context of Breast Implant Illness, a proposed immunologically mediated condition characterized by symptoms such as profound fatigue, myalgia, arthralgia, morning stiffness, night sweats, cognitive impairment, and local manifestations including breast pain or pruritus.[1,10]

Although still debated, several studies report improvement in symptoms following implant removal, suggesting a potential inflammatory role for silicone gel migration.[1,10]

Diagnosing implant rupture can be challenging, particularly with silicone implants and in cases of intracapsular rupture.[8] Both ultrasound and MRI are valuable modalities.[8,11] Ultrasound is frequently used as a first-line examination.[8] Features suggestive of rupture include severe contour irregularities or herniations of the implant shell.[3] The classic stepladder sign, consisting of multiple parallel linear echoes within the implant lumen, is a reliable indicator of intracapsular rupture.[3] Extracapsular silicone causes an acoustic shadow and typically appears as a characteristic hyperechoic pattern with well-defined anterior margins and blurred posterior borders, known as the "snowstorm" sign.[3] MRI, however, is widely regarded as the gold standard due to its superior sensitivity and specificity.[1] Multiple MRI signs of intracapsular rupture have been described, all reflecting varying degrees of implant shell collapse while the fibrous capsule remains intact.[3] The linguine sign, representing a markedly collapsed shell floating within the gel, is highly specific.[3,11,12] More subtle findings include the subcapsular line, keyhole/noose, and teardrop signs.[3,11,12] The water-droplet sign (also known as the salad oil sign), which corresponds to small fluid inclusions within the silicone gel, can indicate degeneration.[3] However, it is nonspecific and cannot be used alone to diagnose intracapsular rupture, as it may occasionally appear in intact implants—particularly if steroids or antibiotics were installed into the lumen preoperatively, or if small water droplets diffused through an intact elastomer shell.[13,14]

In extracapsular rupture, the fibrous capsule fails to contain the leaked silicone, and free silicone collections appear within adjacent tissues or lymph nodes.[3] These are best depicted on inversion-recovery T2-weighted sequences with water and fat suppression, highlighting silicone.[3,12] The use of intravenous gadolinium is not necessary for the evaluation of breast implants.[3,12]

Several conditions may mimic or be mistaken for breast implant rupture on clinical and imaging evaluation. Folding of the implant shell is a normal finding and should not be mistaken for rupture.[3]

Periprosthetic fluid collections occurring shortly after surgery may be seen in seroma, hematoma, and infection, making clinical history and presentation essential for differentiation[3]. Late-onset unilateral peri-implant effusion, particularly in patients with textured implants, should raise suspicion for Breast Implant-Associated Anaplastic Large Cell Lymphoma, which typically presents with delayed seroma, breast swelling, pain, or a peri-implant mass.[3,11] Imaging findings may include capsular thickening, circumferential peri-implant fluid, or an irregular enhancing mass.[11]

Capsular contracture is another important late complication and may manifest as pain and implant deformity, resulting in a spherical configuration on imaging.[3,11,15] Implant malposition is characterized by displacement of the implant from its expected anatomical position and can usually be readily identified on imaging.[15]

In oncologic patients, extracapsular silicone migration may also mimic breast cancer recurrence.[9,11] However, silicone-containing lymph nodes and siliconomas typically demonstrate a snowstorm appearance on ultrasound, helping distinguish them from metastatic disease.[11] In the present case, the combination of the snowstorm sign on ultrasound and characteristic MRI findings including signs of intracapsular rupture and silicone deposition within axillary and internal mammary lymph nodes, strongly favored silicone gel migration over locoregional recurrence.

Most authors recommend surgical removal of ruptured implants and excision of silicone granulomas or affected lymph nodes to prevent further inflammatory reactions and long-term complications.[15] Internal mammary lymph node involvement is less accessible surgically due to its deep parasternal location, and management should be individualised based on symptoms, imaging findings, and clinical context.[7]

This case highlights the uncommon involvement of internal mammary lymph nodes due to silicone migration and underscores the important role of imaging in detecting clinically occult disease in asymptomatic patients. However, its interpretation is limited by the single-case design and the absence of long-term follow-up data.

Conclusion

Breast implant rupture can remain clinically silent for years and requires a high index of suspicion, particularly in oncologic follow-up. Accurate imaging assessment is essential to distinguish intra- from extracapsular rupture and to identify silicone gel migration, which may have local or systemic implications. MRI remains the most sensitive modality for characterization. Early recognition and appropriate multidisciplinary management help prevent complications and enable timely reconstruction, ensuring optimal patient outcomes.

Ethical Disclosures / Divulgações Éticas

Conflicts of interest: The authors have no conflicts of interest to declare.

Conflitos de interesse: Os autores declaram não possuir conflitos de interesse.

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Confidentiality of data: The authors declare that they have followed the protocols of their work center on the publication of data from patients.

Confidencialidade dos dados: Os autores declaram ter seguido os protocolos do seu centro de trabalho acerca da publicação dos dados de doentes.

Protection of human and animal subjects: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Protecção de pessoas e animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pelos responsáveis da Comissão de Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia da Associação Médica Mundial.

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