Silicone Adenopathy and Intractable Axillary Pain after Breast Implant Augmentation - Case Report

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Rezumat
Adenopatiile cu silicon sunt o complicatie rară, secundară chirurgiei de augmentare mamă sau intervențiilor de reconstrucție mamă care utilizează implanturi de silicon. Etiologia acestor adenopatii este de cele mai multe ori multifactorială. Există însă o corelație strânsă între incidența de apariție a siliconoamelor și vechimea implantului mamă. Prezentăm cazul unei paciente cu multiple adenopatii cu silicon extinse la nivel axilar, în scopul în care experiența noastră poate sensibiliza și poate fi de ajutor pentru stabilirea algoritmului de diagnostic și tratament al unor cazuri similare.

Prezentăm cazul unei femei în vârstă de 41 de ani cu durere intensă în axila dreaptă, dezvoltată la un interval de aproximativ 20 de ani după intervenția de augmentare bilaterală cu implanturi de silicon. În evoluția bolii tratamentul medicamentos analgezic a devenit ineficient iar durerea din ce în ce mai debilitantă. În urma examinării clinice amănunte și a investigațiilor imagistice s-au decelat trei ganglioni limfatici axilari centrali cu aspect sugestiv pentru adenopatiile cu silicon (prezența ecografică a semnului "snowstorm"). S-a practicat excizia chirurgicală a leziunilor din axila dreaptă cu remisa completă a durerii. Analiza histologică ulterioră a demonstrat prezența ganglioni limfatici cu reacție granulomatoasă și care conțin particule de silicon.

Concluzie: Atât chirurgul generalist cât și chirurgul plastician...
Introduction

Because of its proprieties, silicone remains the most utilized material for the manufacture of breast implants. Even though silicone biocompatibility is well known, with minimal tissue response and physical stability over time, side effects associated with its use are described in numerous cases (1,2,3). Silicone breast implants are placed behind the mammary gland, behind the pectoralis muscles or subcutaneously for breast augmentation and breast reconstruction surgeries. The number of these procedures has increased during the last decades. Nowadays, breast reconstruction operations following mastectomy utilize more and more breast implants compared to autologous reconstruction, because it is an easier procedure with good aesthetic results (4). Patient satisfaction after implant breast reconstruction remains high despite the increased possibility for local complications and reoperation (5,6).

Migration of silicone particles into the surrounding tissues, frequently caused by implant rupture, may occur as a result of a phenomenon known as silicone bleed or leak (7,8). Leakage can also occur in intact implants (7,9).

Implant rupture is a well-known complication of silicone implants (10,11). After breast augmentation or breast reconstruction procedures, a fibrous capsule forms around the implant. The mechanism correlated with implant envelope failure over time is capsular contracture. Implant ruptures are mainly...
intracapsular, while extracapsular ruptures are less common. Ruptures usually do not produce a visible change and are not clinically evident (12). Dissemination of silicone particles through lymphatic vessels and macrophage cells is responsible for a granulomatous reaction known as silicone granuloma which may occur in breast parenchyma as well as axillary, chest or neck lymph nodes (6). Silicone lymphadenopathy (siliconoma) is defined as the presence of silicone in a lymph node. To the best of our knowledge, only 180 cases of siliconoma have been described so far, most of them case reports (13).

The majority of silicone lymphadenopathy cases remain silent. They can be identified incidentally on routine control exams with radiologic signs only, or presenting as a palpable nodule in the axilla which can mimic malignant lymphadenopathy (13-15). Surgical excision of lymph nodes containing silicone is not necessary because this condition does not represent a health threat (13).

However, removal is recommended for symptomatic patients or if there are signs suggesting malignant lymphadenopathy (14). A positive silicone lymphadenopathy diagnosis can be established by ultrasound or through biopsy.

If not initially considered as a differential diagnosis, siliconoma is an uncommon and elusive pathological entity. Herein, we report a case of siliconoma from our experience, in the hope that will contribute to further clinical decisions.

Case Report

A 41-year-old woman presented to our clinic complaining of a painful lump located in the right axilla. Despite having been aware of this lesion for 4 months, she had not sought immediate medical treatment, until she began to notice intense pain in her right axilla and a sensation of foreign body. She had undergone bilateral breast augmentation 20 years ago. In 2015 both implants were replaced, using submuscular silicone-gel implants of textured shell surface (Allergan Natrelle Inspira TSF 520 g), due to a right implant capsular contracture and consecutive rupture.

Physical examination revealed multiple mobile, enlarged, well defined nodular masses, of firm consistency, located in the right axilla. The largest nodule measured approximately 2-3 cm in diameter and was extremely painful on palpation and mobilization of the arm. The principal complaint of the patient was debilitating pain over the past month which altered her day to day activities. Despite adequate analgesic treatment, the medication had a limited effect. There were no asymmetries or palpable masses at the level of the breasts or left axila.

Axillary ultrasound described three central lymph nodes with a "snowstorm" appearance, suggestive of silicone lymphadenopathy (Fig. 1), one of them in intimate contact with the implant capsule. No pathological elements were seen in the breast parenchyma or at the level of the implants.

Given the results, after informed consent, the patient decided to undergo surgery in order to remove the affected lymph nodes. At the time of the procedure all sonographically described lymph nodes were identified and completely excised (Figs. 2, 3, 4). One adenopathy was in contact with the intercostobrachial nerve and another with the breast implant capsule. Before wound closure a 12 Ch drainage was placed to prevent seroma formation and it was removed the day after the intervention. The
The patient was discharged on postoperative day one, on minor analgesics. The final result of the histopathological examination revealed follicular hyperplasia, sinus histiocytosis and numerous vacuoles (silicone) diffusely arranged and accompanied by multinucleated giant cells without exceeding the lymph node capsule (Fig. 3). On follow-up, two months later, the patient presents with complete resolution of symptoms.

**Discussions**

Silicone based breast implants are widely used for cosmetic reasons or for breast reconstruction surgery. Polydimethylsiloxane is the chemical formula for medical silicone and its form and density are highly dependent on the number of chains that this polymer has in its structure. In other words, low-molecular-weight silicone polymers tend to have a more fluid state, whereas higher-molecular-weight silicone has a viscous structure. In terms of basic design, silicone breast implants are
made up of a silicone envelope filled with silicone gel. Over time, the producers developed multiple types of breast implants varying the composition of silicone polymers (13).

Until now, five generations of breast implants have been manufactured. With each generation producers attempted to improve the natural feel of the implant and reduce the risk of rupture or other complications (6,13). Latest generation implants contain a more cohesive gel that is less likely to disseminate beyond the capsule and a more resistant envelope designed to give little inflammatory reaction and minimal fibrosis. Even though constant efforts were directed to raise the quality and biocompatibility properties of breast implants, an important percentage of implant ruptures and implant related complications are reported in literature (10-12). It is essential to mention that most implant ruptures are clinically undetectable. It is well known that implant rupture risk is correlated with the age of the implant. The overall 10-year rupture rate is estimated to be between 6-10% (12,13). MRI is the most useful investigation for detecting implant rupture (11).

Silicone lymphadenopathy is a rare complication which may arise after breast implant use. Its prevalence and incidence remain unknown, with less than 180 cases described (6,13). Most of the cases are linked with implant rupture and seems to appear at 6 to 10 years after breast augmentation or reconstruction surgeries. Even so, silicone adenopathy can be attributed to the diffusion of silicone particles through an intact implant shell (7). A positive diagnosis can be established using ultrasound or MRI (9,16). Core needle biopsy, fine needle aspiration, or open biopsy also represent important diagnostic tools (17).

The majority of siliconomas remain clinically silent for long periods of time and they may be identified incidentally on routine control exams. On physical examination they may present as well limited, enlarged nodular masses, of firm consistency. According to data

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**Figure 5.** Histologic analysis showing lymph nodes containing large droplets of silicone material.
from Klang et al., ultrasound “snowstorm” sign in diagnosing silicone lymphadenopathy has a high sensitivity and specificity (9). Despite these characteristics, caution is needed when this pathological situation is encountered as silicone lymphadenopathy and malignancy can coexist (13,17).

Migration of silicone particles into the surrounding tissues will cause a foreign body reaction leading to a granulomatous scarring formation. This is a normal biological response to foreign materials but can be responsible for various symptoms such as pain, local discomfort, unesthetic appearance and high mental stress in relation with a possible malignancy. In our case, the intense pain is potentially caused by compression or contact scarring of the adjacent intercostobrachial nerve. A local anesthetic sensitive nerve block should be considered, with the inconvenience of being a temporary solution. If asymptomatic, the removal of lymph nodes containing silicone is not considered necessary (6). However, open excisional biopsy is recommended for symptomatic patients and in situations that indicate malignant adenopathy (6,13,14).

**Conclusions**

Silicone based breast implants are the predominant cause of silicone lymphadenopathy. General and plastic surgeons must remain aware of this condition as it can be causative of anxiety and local symptoms among patients and can mimic malignant disease. Thorough investigations are required in order to exclude malignancies and provide an optimal treatment strategy.

This case study is demonstrative for a situation of intractable axillary pain due to silicone lymphadenopathy.

**Conflict of Interest**

The authors declare no conflicts of interests.

**References**