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

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Rezumat

Adenopatii cu silicon și durere axilară recurentă după chirurgia de augmentare mamară cu implant - studiu de caz

Introducere: Adenopatiile cu silicon (siliconoamele) sunt o complicație rară, secundară chirurgiei de augmentare mamară sau intervențiilor de reconstrucție mamară 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 mamar. Vom prezenta 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.

Expunerea cazului clinic: 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 mamară bilaterală cu implanturi de silicon. În evoluția bolii tratamentul medicamentos analgezic a devenit inefficient iar durerea din ce în ce mai debilitantă. În urma examinării clinice amănunțite și a investigațiilor imagistice s-au decelat trei ganglioni limfatici axilari centrali cu aspect sugestiv pentru adenopatii cu silicon (prezența ecografică a semnelor "snowstorm"). S-a practicat excizia chirurgicală a leziunilor din axila dreaptă cu remisiune completă a durerii. Analiza histologică ulterioară a demonstrat prezența ganglionilor limfatici cu reacție granulomatoasă și care conțin particule de silicon.

Concluzie: Atât chirurgul generalist cât și chirurgul plastician

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trebuie să rămână atenți la această posibilitate diagnostică - siliconomul. Deși rară, adenopatia cu silicon poate fi cauzatoare de stres major și anxietate în rândul pacienților sau poate genera simptome locale cu impact semnificativ asupra stării de sănătate și a calității vieții. Întotdeauna sunt necesare investigații amănunțite pentru a putea exclude o etiologie malignă și pentru a putea oferi o strategie optimă de tratament.

Cuvinte cheie: adenopatie cu silicon, durere axilară, implant mamar, ruptura implantului mamar, reacție granulomatoasă

Abstract

Introduction: Silicone lymphadenopathy (siliconoma) is a rare complication secondary to breast implant augmentation or breast reconstruction surgery. Although it is usually linked to the age of the implant, the predominant etiology is multifactorial. Herein, we report a case of extensive siliconoma in the axilla in the hope that our experience will contribute to clinical decision making.

Case presentation: We report the case of a 41-year-old woman with intense pain in her right axilla 20 years after breast augmentation surgery. Analgesics were of limited use and the pain became debilitating over time. After a thorough physical examination, imaging studies found three central axillary lymph nodes with a "snowstorm" appearance, suggestive of silicone lymphadenopathy. A complete excision of the lesions was performed with resolution of pain on follow-up. Subsequent histological analysis showed lymph nodes containing large droplets of silicone.

Conclusions: General and plastic surgeons must remain aware as silicone adenopathy can be causative of anxiety and significant local symptoms among patients. Thorough investigations are needed in order to exclude malignancies and provide an optimal treatment strategy.

Key words: silicone lymphadenopathy, axillary pain, breast implant, implant rupture, granulomatous reaction

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 sub-muscular silicone-gel implants of textured shell surface (Allergan Natrelle Inspira

Figure 1. Silicone lymphadenopathy with "snowstorm" sign on right axillary ultrasonography

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 axilla.

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

Figure 2. Intraoperative aspect of silicone adenopathies

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. 5*).

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

Figure 3. Silicone adenopathies after surgical excision

Figure 4. Final aspect after wound closure

Figure 5. Histologic analysis showing lymph nodes containing large droplets of silicone material

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

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, unaesthetic 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

1. Bondurant S, Ernster V, Herdman R. Safety of silicone breast implants. Washington: National Academies; 2005. p 1–559.
2. Dragoumis DM, Assimaki AS, Vrizas TI, Tsiftoglou AP. Axillary silicone lymphadenopathy secondary to augmentation mammoplasty. *Indian J Plast Surg.* 2010;43(2):206–9.
3. Kolios L, Hirche C, Spiethoff A, Daigeler A, Lehnhardt M. Complications of Poly Implant Prothèse breast implants: the current discussion. *Expert Rev Med Devices.* 2013;10(2):167–70.
4. Albornoz CR, Bach PB, Mehrara BJ, Disa JJ, Pusic AL, McCarthy CM, et al. A paradigm shift in U.S. Breast reconstruction: Increasing implant rates. *Plast Reconstr Surg.* 2013;131(1):15–23.
5. Quinn TT, Miller GS, Rostek M, Cabalag MS, Rozen WM, Hunter-Smith DJ. Prosthetic breast reconstruction: indications and update. *Gland Surg.* 2016;5(2):174–86.
6. Kreitzberg SA, Sherbert D, DeSano J 2nd. Becker implant intracapsular rupture with contralateral axillary silicone lymphadenopathy in an asymptomatic patient: A case report and literature review. *Cureus.* 2020;12(4):e7638.
7. Lykissa ED, Kala SV, Hurley JB, Lebovitz RM. Release of low molecular weight silicones and platinum from silicone breast implants. *Anal Chem.* 1997;69(23):4912–6.
8. Kulber DA, Mackenzie D, Steiner JH, Glassman H, Hopp D, Hiatt JR, et al. Monitoring the axilla in patients with silicone gel implants. *Ann Plast Surg.* 1995;35(6):580–4.
9. Klang E, Yosepovich A, Krosser A, Soffer S, Halshtok Neiman O, Shalmon A, et al. Detection of pathologically proven silicone lymphadenopathy: Ultrasonography versus magnetic resonance imaging. *J Ultrasound Med.* 2018;37(4):969–75.
10. Collis N, Litherland J, Enion D, Sharpe DT. Magnetic resonance imaging and explantation investigation of long-term silicone gel implant integrity. *Plast Reconstr Surg.* 2007;120(5):1401–6.
11. Hölmich LR, Fryzek JP, Kjølter K, Breiting VB, Jørgensen A, Krag C, et al. The diagnosis of silicone breast-implant rupture: Clinical findings compared with findings at magnetic resonance imaging. *Ann Plast Surg.* 2005;54(6):583–9.
12. Hillard C, Fowler JD, Barta R, Cunningham B. Silicone breast implant rupture: a review. *Gland Surg.* 2017;6(2):163–8.
13. Zambacos GJ, Molnar C, Mandrekas AD. Silicone lymphadenopathy after breast augmentation: case reports, review of the literature, and current thoughts. *Aesthetic Plast Surg.* 2013;37(2):278–89.
14. Grubstein A, Cohen M, Steinmetz A, Cohen D. Siliconomas mimicking cancer. *Clin Imaging.* 2011;35(3):228–31.
15. Gundeslioglu AO, Hakverdi S, Erdem O, Ozen EC, Inan I, Emlik D. Axillary lipogranuloma mimicking carcinoma metastasis after silicone breast implant rupture: a case report. *J Plast Reconstr Aesthet Surg.* 2013;66(3):e72–5.
16. Klang E, Amitai MM, Raskin S, Rozendorn N, Keddel N, Pickovsky J, Sklair-Levy M. Association between Enlarged Axillary Lymph Nodes and Silicone Breast Implant Ruptures seen on Magnetic Resonance Imaging. *Isr Med Assoc J.* 2016;18(12):719–724.
17. Santos-Briz A Jr, López-Ríos F, Santos-Briz A, De Agustín PP. Granulomatous reaction to silicone in axillary lymph nodes. A case report with cytologic findings. *Acta Cytol.* 1999;43(6):1163–5.