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LATE COMPLICATIONS OF INDUSTRIAL SILICONE IN THE BREASTS: MUSCULAR INVOLVEMENT OF THE STERNOCLEIDOMASTOID AND LYMPH NODES IN THE CERVICAL REGION UP TO LEVEL V AFTER 35 YEARS

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ABSTRACT: Introduction: The injection of liquid silicone into the breasts, a popular cosmetic practice since the 1940s, has been discouraged due to its serious complications, including difficult-to-manage infections, embolisms, and cosmetic deformities. Chronic complications include the formation of siliconomas, granulomas, and migration of silicone to adjacent tissues and lymph nodes, which can result in significant changes in the anatomy and functionality of the affected regions. **Case Report:** We report the case of a 61-year-old female patient who received liquid silicone injections in her breasts 35 years ago, administered by unqualified professionals. In February 2024, the patient was admitted with complaints of progressive nodules in the breasts, armpits, and cervical region, accompanied by severe pain and limited movement in the neck and upper limbs. y physical examination revealed irregular, hardened nodules adhered to deep planes, covering the upper quadrant of the breasts, converging in the midline, and extending to the anterior cervical region. Imaging tests, including ultrasound and magnetic resonance imaging, demonstrated the presence of siliconomas in several locations, including axillary and cervical lymph nodes, sternocleidomastoid muscles, and soft tissues of the chest. Computed tomography revealed extension of the lesions to the cervical soft tissues and muscles, involving the sternocleidomastoid muscles and cervical lymph nodes up to level V. **Treatment and Evolution:** A multidisciplinary team decided on conservative treatment due to the extent of the lesions and the risks associated with surgery. Amitriptyline was started for pain control, and the patient was referred for follow-up with the pain, rheumatology, and physical therapy teams. The choice of conservative treatment was intended to avoid the significant complications that could result from extensive and potentially debilitating surgery. **Discussion:** The pathophysiology of complications related to silicone injection includes granuloma formation, silicone migration through the lymphatic system, and chronic inflammatory reactions. The absence of a gold standard treatment for siliconomas makes the conservative approach a valid option for extensive and symptomatic cases. This case is particularly noteworthy due to the migration of silicone to level V of the cervical lymph nodes and involvement of the sternocleidomastoid muscles, a rare occurrence in the literature. The discussion emphasizes the importance of educating the population about the risks associated with the use of industrial silicone and the need to seek qualified professionals for cosmetic procedures. **Conclusion:** This case report contributes to the medical literature by providing a detailed description of late complications associated with industrial silicone injection, including significant involvement of muscle and lymph node structures. It highlights the importance of prevention and awareness of the risks associated with unregulated cosmetic procedures. **Consent:** The patient signed the Informed Consent Form (ICF) for the publication of this case report.

KEYWORDS: Industrial Silicone; Siliconomas; Late Complications

INTRODUCTION

The injection of industrial silicone into the breasts has been a common cosmetic practice since the 1940s, as a lower-cost and technically simpler alternative to breast augmentation. In addition, it left no scars and, shortly after injection, had

a consistency similar to adipose tissue. [1,2] . However, due to several associated complications, including chronic inflammation, severe infections, embolisms, and cosmetic deformities, this procedure has been banned in modern medicine. In addition, the formation of siliconomas, granulomas, and the migration of silicone to other areas, such as lymph nodes and adjacent tissues, represents a significant problem. The presence of a foreign body, such as silicone, can induce immune reactions that result in the formation of granulomas, known as siliconomas. These granulomas, if not properly diagnosed and treated, can cause considerable aesthetic and functional damage, in addition to being easily confused with malignant neoplasms or autoimmune diseases. [3,4,5,6]

In this context, we present the case of a patient with extensive migration of industrial silicone, evolving with the formation of multiple siliconomas in the breast, cervical, and axillary regions, illustrating the potential late complications of this practice.

CASE REPORT

A 61-year-old female patient with a history of liquid silicone application to the breasts 35 years ago for cosmetic reasons by an unregulated professional. She was admitted to our service in February 2024 with complaints of progressive nodules in the breasts, armpits, and cervical region, associated with severe pain and limited movement of the neck and upper limbs for 10 years with progressive worsening. The patient has personal history of osteoarthritis and uses pregabalin, with no other relevant history.

Physical examination revealed multiple irregular, hardened, and mobile nodules in the breasts, occupying the upper quadrants, converging at the midline and extending to the anterior cervical region, where there was also a fixed mass of approximately 15 cm (Figure 1).

Multiple bilateral images of anechoic content, oval and circumscribed, were visualized on ultrasound and magnetic resonance imaging, the largest of which was 1.1 cm, located at the junction of the upper quadrants of the breasts. These images were interpreted as siliconomas, affecting the retromammary fat and adjacent to the sternum, with close contact with the pectoral muscles. Axillary lymph nodes showed hyperechogenicity and posterior acoustic shadowing, suggesting silicone infiltration (Figure 2). The patient was unable to undergo mammography due to limiting pain during local compression.

CT scans of the neck and chest revealed material compatible with siliconomas in superficial and deep cervical soft tissues, mainly in the infrahyoid segment, affecting the anterior and posterior cervical spaces, carotid and visceral areas, with a significant pretracheal component. There was involvement of the sternocleidomastoid muscles, which showed thickening and heterogeneity. In addition, diffuse reactive densification of the cervical fat planes and inferior extension of the changes to the supraclavicular soft tissues, upper mediastinum, and anterior chest wall were observed. Enlarged cervical lymph nodes, some with significant dimensions, were identified at levels II, III, IV, and V on the right, with a reactive appearance. Thickening of the lateral walls of the oropharynx was also noted, with reduction of the local air column (Figures 3 and 4).

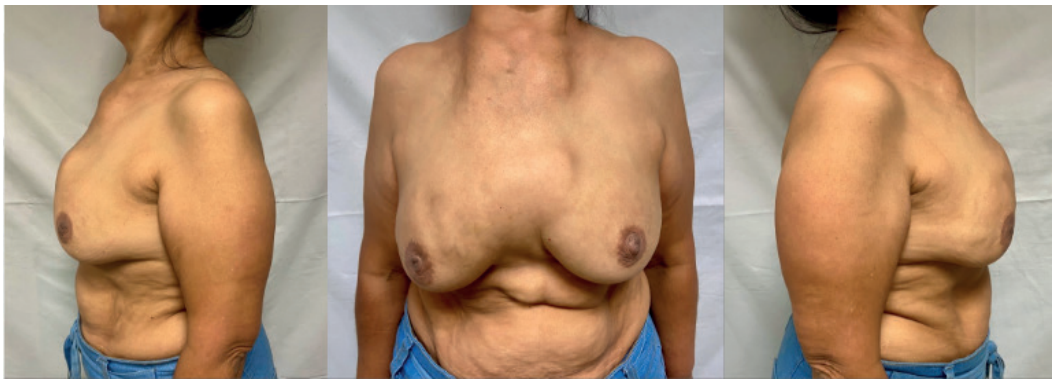

FIGURE 1: Profile and lateral images of the patient showing: nodules in the breasts, suprasternal and cervical regions with hardened consistency.

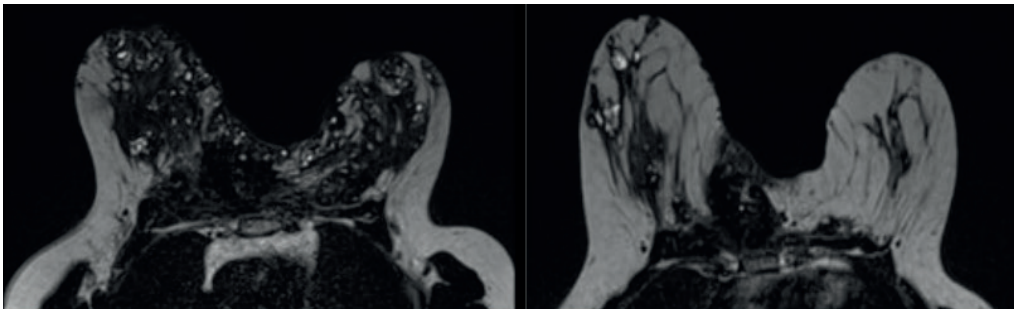

FIGURE 2: Breast MRI: multiple diffuse snowstorm images occupying all quadrants of both breasts.

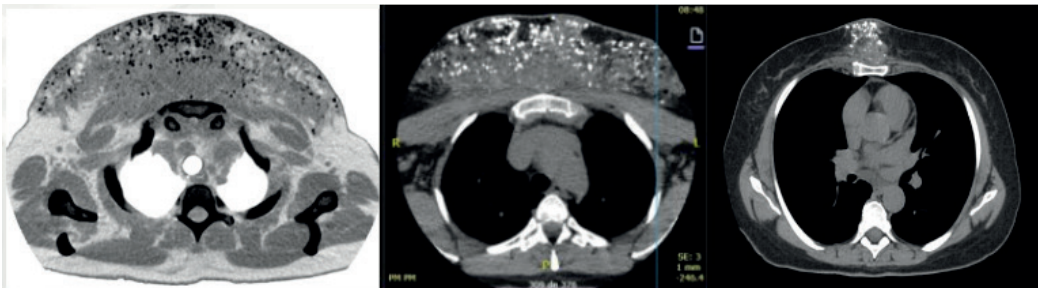

FIGURE 3: Chest CT scan: diffuse densification of the subcutaneous tissue of the anterior chest wall bilaterally with multiple hyperdense foci interspersed.

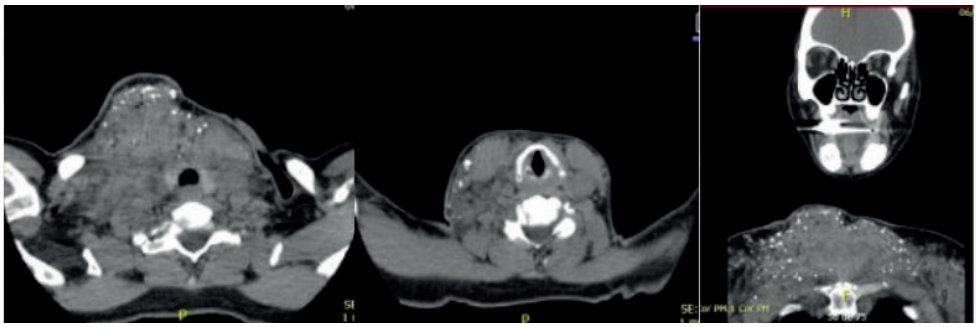

FIGURE 4: Neck tomography: multiple siliconomas up to the level of the sternocleidomastoid muscle, carotid space, and pretracheal space with significant associated inflammatory component.

TREATMENT AND EVOLUTION

After a comprehensive clinical and imaging evaluation, a multidisciplinary meeting decided on conservative treatment, with symptom control and periodic clinical reassessment. Amitriptyline administration was then started at the initial consultation, which resulted in a significant improvement in pain control. The patient was referred for follow-up with the pain, rheumatology, and physical therapy teams with the goal of functional recovery and improved quality of life. Surgical intervention was considered unfeasible due to the extent of the affected area and the risk of significant morbidity, with symptom control and clinical follow-up being more beneficial.

DISCUSSION

Silicones are synthetic polymers containing silicon in combination with methane and oxygen and can be found as liquids, solids, and gels, with viscosity depending on cross-linking and polymerization. Liquid silicone has ideal characteristics for implantation, considering ease of sterilization, durability, reduced antigenic potential, and minimal carcinogenic risk. However, its use is limited by the unpredictability of results, indiscriminate use of impure formulas, application by untrained individuals, and the absence of protocols regarding volumes and application intervals. Currently, the use of industrial silicone is not approved by the FDA (U.S. Food and Drug Administration). [7]

Complications are more frequent and severe in cases of administration of large volumes with unknown composition.[7] In the study by Zappi et al., which included 25 patients who underwent liquid silicone injection to correct small scars on the face, between 1 and 23 years after the procedure, 100% retained significant amounts of silicone on skin biopsy microscopy, without significant local adverse reactions - thus considered an adequate option for filling in this context[8] . However, the use of industrial silicone for breast augmentation, as described in this case, is contraindicated, considering the risk of migration associated with the administration of large volumes [13,14,15] .

The pathophysiology of complications resulting from industrial silicone injection is multifactorial. Studies show that silicone injection can lead to the formation of granulomas and siliconomas, with migration of silicone to lymph nodes and other tissues, leading to chronic inflammation and fibrosis. [4,5,6,9] The migration of silicone to the cervical lymph node chain and sternocleidomastoid muscles, as observed in this case, is a rare and serious complication. The existing literature on silicone migration suggests that its presence in sites such as cervical lymph nodes and muscles can lead to significant complications, requiring conservative management to avoid morbidities associated with extensive surgical procedures. [10, 11,12]

There is no evidence of an increased risk of breast cancer due to industrial silicone, but there is a limitation in the sensitivity of imaging findings due to the parenchyma being obscured by multiple hyperdense nodular images, a homogeneous hyperdense appearance, and local fibrosis [16, 17, 18]. Thus, ultrasound or mammography are not adequate methods for breast evaluation, with MRI being the method of choice, with high sensitivity for tissue characterization [17]. The

detection of silicone deposits by magnetic resonance imaging is possible by differentiating the T1 and T2 relaxation times and the resonance frequencies between fat, water, and silicone. For silicone, the relaxation time in T2 is longer, with greater signal intensity in the T2-weighted sequence, when compared to adipose tissue. If a biopsy is indicated, contrast mammography is an alternative to MRI to guide the procedure.

Siliconomas, in histological evaluation, present as deposits of extracellular material without hematoxylin-eosin impregnation, with variable diameter, refractive edges, with histiocytic granulomatous reaction, with or without cytoplasmic vacuoles also with refractive content. Multinucleated giant cells are commonly present, in association with fibrosis [19].

There is [no]gold standard treatment for siliconomas, and the approach should be individualized. Most asymptomatic cases are managed with observation and regular follow-up. However, for symptomatic cases or [those] with significant cosmetic complications, surgical removal may be considered, although with a potentially high risk of complications. Conservative treatment was the appropriate choice in this case due to the complexity and extent of the lesions. The patient was referred for follow-up with the pain, rheumatology, and physical therapy teams, with the goal of functional recovery and improved quality of life. Clinical reassessment will be performed periodically, and imaging tests will be performed only if there is a change in the clinical picture or the appearance of new symptoms.

This case contributes to the literature by documenting the migration of silicone to advanced lymph node levels and muscle involvement, highlighting the importance of prevention, education, and early diagnosis. Furthermore, the report shows us the need to raise awareness about the risks associated with unregulated cosmetic procedures, such as the injection of industrial silicone. The prevention of serious complications requires that both health professionals and the general population have an adequate understanding of the consequences of these practices. Disseminating information about the dangers involved and promoting safe and regulated alternatives can reduce damage to public health.

CONCLUSION

This case report provides a significant contribution to the literature by documenting late complications of industrial silicone, including significant muscle and lymph node involvement. It emphasizes the need for preventive and educational measures regarding the risks associated with unregulated cosmetic procedures and the importance of appropriate diagnosis and management for extensive cases.

CONSENT

The patient signed the Free and Informed Consent Form (FICF) for the publication of this case report.

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