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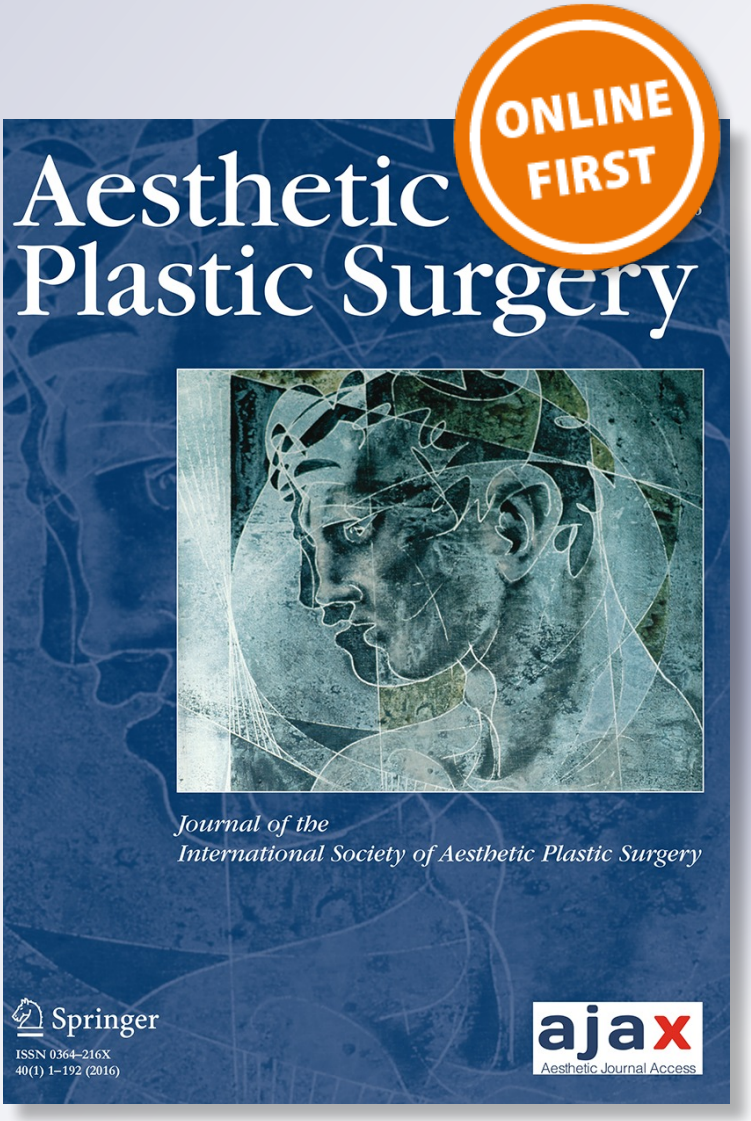


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CASE REPORT NON-SURGICAL AESTHETIC

# Siliconoma: Report of Two Cases

**Bruna Souza Felix Bravo[1] · Laila Klotz Almeida de Balassiano[2] · Julien Totti de Bastos[3] · Camila Roos Mariano da Rocha[3] · Matheus Bruno Costa[4] · Flavia de Freire Cassia[5] · Leonardo Bravo[4]**


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**Abstract** Injectable silicone has been used illegally for more than 60 years. Siliconoma is the term used to describe a foreign body reaction in the human body caused by the presence of silicone. The aim of this study is to report two cases of patients who underwent application of large volumes of injectable silicone with non-medical and unqualified professionals, which led to serious complications sometime after the procedure.

*Level of Evidence V* This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

**Keywords** Injectable silicone · Siliconoma · Complications

## Introduction

The quest for the perfect body can have serious consequences when aesthetic procedures are performed by untrained professionals. Although prohibited, injectable silicone has been used illegally for more than 60 years, and often as a not sterile product and injected in excessive volumes for tissue fills and body contouring. Various complications have been described, ranging from localized inflammatory processes, siliconoma formation, and migration of the material to severe systemic inflammation, associated or not with infection. Siliconoma is the term used to describe a foreign body reaction in the human body caused by the presence of silicone. The aim of this study is to report two cases of patients who underwent application of large volumes of injectable silicone with non-medical and unqualified professionals, which led to serious complications sometime after the procedure.

## Case Report 1

Five years ago, a previously healthy 31-year-old female underwent 5 years before two applications of liquid material of unknown origin to increase the gluteal region and for body contouring performed by a nursing technician. Although initially satisfied with the aesthetic result, 1 year and 8 months later, the patient began to show changes in color and consistency of the skin, edema, erythema, hardened nodules, and pain localized in the gluteal region. In 2 months it worsened, evolving with abscess formation, fistulas, and spontaneous clearance of the material (Fig. 1). At this time, the patient began a period of sequential hospitalizations. When she was admitted to our hospital, she had hardened tumors that had distorted the entire gluteal

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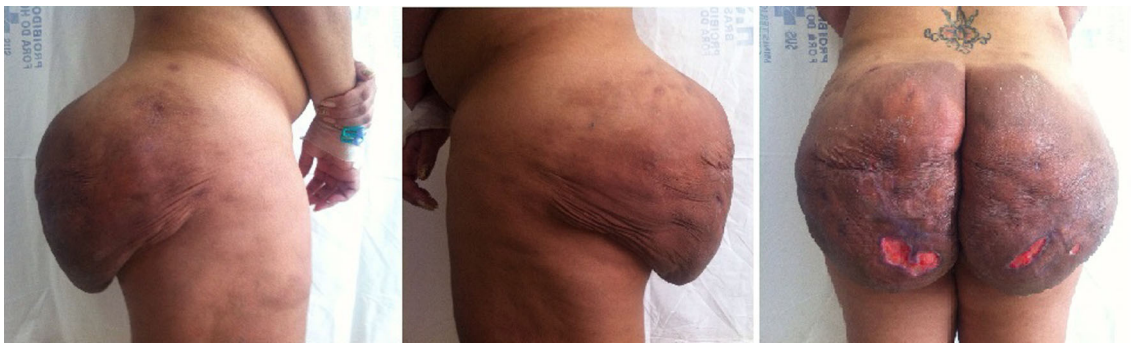

**Fig. 1** Abscess formation, fistulas and spontaneous clearance of the material (*lateral* and *back view*)

region, with areas of obvious tissue necrosis. The drained material was collected with a swab and sent for culture, with growth of MRSA (methicillin-resistant *Staphylococcus aureus*) and *Acinetobacter*. The patient was then isolated for intravenous therapy with ciprofloxacin and teicoplanin before surgery. The surgery consisted of a circumferential incision on the entire discolored and erythematous area, with exposure of whitish material on both gluteal regions and detachment until the muscular plan (Fig. 2). The histopathology of the excised materials showed a chronic granulomatous inflammatory foreign body process, concluding that it was a case of siliconoma.

## Case Report 2

A 33-year-old transsexual underwent industrial injectable silicone application on thighs and buttocks bilaterally 4 years before by a non-medical professional. Two and a half years after the injection of the product he reported nodules located in the application sites associated with pain and edema, which regressed partially with irregular use of oral corticosteroids. And 6 months after, he presented another episode of hard edema with nodules around the leg and buttocks, associated with intense pain, heat, redness, hyperemia, and fever (Fig. 3). Admitted for investigation, the diagnosis was cellulite due to the foreign body. Computed tomography showed fluid collections in both legs and buttocks and Doppler ultrasound of lower limbs showed no evidence of thrombosis. Swabs of the drained material were collected and sent for culture. It showed the presence of *Staphylococcus haemolyticus*, considered as contamination by the infectious diseases team. At admission the patient was treated with intravenous antibiotics (amoxicillin + clavulanate) for 21 days and oral corticosteroids (prednisone 40 mg/day) for 10 days with significant improvement, but persistent bumps without local inflammatory signs. On this occasion, the patient was assessed by the plastic surgery team, who decided there was no indication for a surgical approach, justified by the risk of recurrence of the infection and fistulas. After discharge, he continued the use of oral amoxicillin-

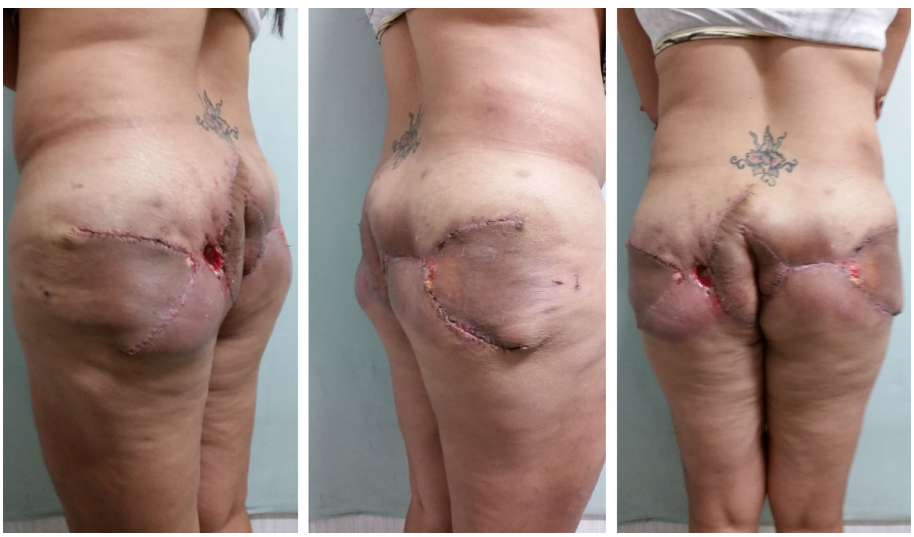

**Fig. 2** After surgery (*lateral* and *back view*)

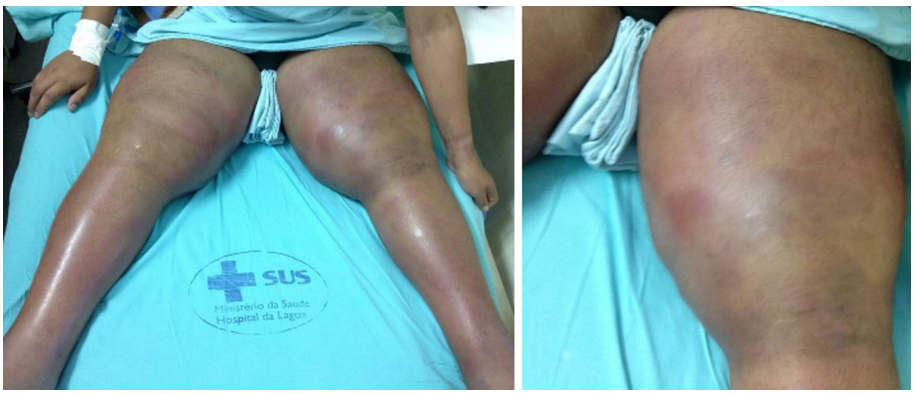


**Fig. 3** Edema with nodules around the leg and buttocks, associated with intense pain, heat, and redness

clavulanate for 10 weeks and started taking allopurinol 300 mg/day. At the 2-year follow-up the patient remained clinically stable, with persistent nodules and sporadic pain in the local application of injectable silicone but without inflammatory signs and using allopurinol 300 mg/day (Fig. 4).

## Discussion

Injectable silicone is a dimethylsiloxane derivative of silica, oxygen, and methane polymerization. The viscosities found are the result of different degrees of polymerization and the number of crosslinks between molecules. For many years, industrial liquid silicone was used with aesthetic purpose to increase the breasts or for body contouring [1, 2]. However, due to the growing number of complications reported after the use of the substance, the Food and Drug Administration (FDA) in 1994 approved its use only in cases of retinal detachment and banned it for other medical purposes [3].

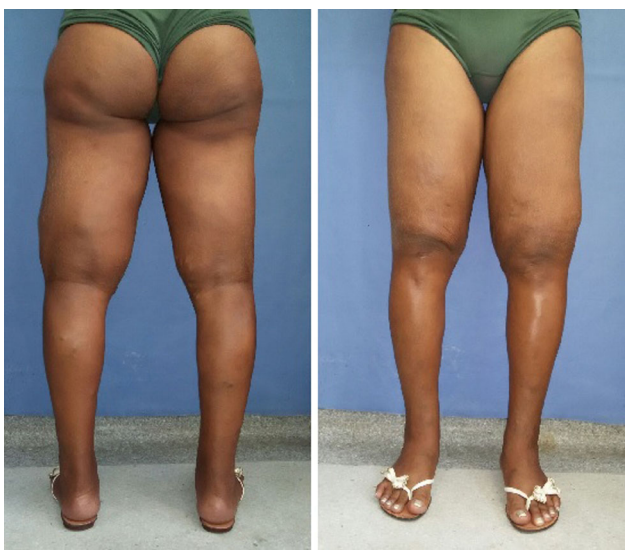

**Fig. 4** At the two-year follow-up the patient remained clinically stable, with persistent nodules in the local application of injectable silicone but without inflammatory signs

Various complications have been described after the use of liquid silicone and range from localized inflammation (abscesses, fistulas, granulomas), siliconoma formation, and migration of the material to severe systemic inflammation, associated or not with infection. In 1965, Sternberg and Winer used the term siliconoma to characterize a foreign body reaction type in the breast tissue and face of patients who had received injectable silicone [3, 4]. And the first concerns about the use of medical-grade silicone were published in 1977 by Wilkie, who reported the appearance of granulomas as a complication of silicone injection [5]. To date, there are no concrete data on the exact incidence of complications after the use of liquid silicone, since most of the procedures are performed by unlicensed practitioners, many non-physicians, and the existing literature includes only case reports or small case series. Thus, there is a lack of consensus and guidelines available for the proper handling of the cases and there are many controversies about it [6, 7].

The appearance of acute inflammation and/or infection as an early manifestation is not common. The frequent late sequelae are infection, inflammation, silicone migration, disfiguration, and painful lumps [8, 9]. Intervals without manifestations range from 3 to 20 years, averaging from 6 to 10 years. Changes in the color and consistency of the skin with the formation of granulomas and nodules to intense inflammation, necrosis and ulcerations, fistulas and abscess formation, elimination of the injected material, retractions, and scar deformities may arise even years after application. In addition, the tissue involvement may occur in locations distant from those in which the product has been injected because of the high migration potential of the material [10]. The likelihood of development of siliconoma is higher with large volumes of injection material in one area promotes migration through the subcutaneous plane due to gravity or by trapping and circulation of silicone

microdroplets via macrophages, lymphatic, and/or blood vessels [11]. Respiratory conditions such as pulmonary edema and pneumonitis are reported as serious complications and may lead to death [1, 6].

There is no evidence that the reactions caused by the presence of liquid silicone are associated with the appearance of cancer or increase the risk of malignant tumors. However, clinical and imaging changes do not always allow differential diagnosis of these lesions. The most important preoperative evaluation is to exclude occult incidental carcinoma [12, 13].

With liquid silicone, fibrillar connective tissue presents diffuse inflammatory infiltrate consisting of macrophages with exclusively cytoplasmic vacuoles of different sizes and irregular hyperchromatic nuclei, often with one aspect "dead-leaf" and appearance similar to Virchow's cells. Extracellular microcysts may be observed with empty cavities surrounded by a thin layer of collagen, generating the so-called "Swiss cheese standard". Alcian blue staining is negative and there is no birefringence in the polarized light [14, 15].

Initially, all cases may require clinical treatment using anti-inflammatory agents, antihistamines, corticosteroids, and systemic antibiotics. In cases of erythema, edema, and cellulite, as demonstrated in our second case, clinical treatment can be sufficient. The use of venous amoxycillin and clavulanate in acute presentation followed by 12 weeks of oral clindamycin proves to be a good option. Small areas of ischemia and necrosis may also be treated conservatively. Some authors indicate the use of intralesional corticosteroids and topical immunomodulators like Imiquimod [16, 17]. Allopurinol at a dose of 300 mg/day has been shown to be effective in the resolution of lesions and relapses. The allopurinol mechanism of action remains unknown, but it is believed that its action is due to inhibition of the formation of granulomas [18, 19]. In a study published by Redondo and colleagues in a patient with nodules resulting from industrial silicone injection in the region of the eyes and perioral, resolution of the picture with the use of allopurinol 300 mg/day was obtained, with disappearance of the nodules in two months without presenting complications one year after treatment [20].

Infectious-located cellulite caused by skin contaminants, such as *Staphylococcus* species and *Streptococcus*, can respond to local intensive care and high doses of oral or parenteral antibiotics [12]. In our first case, the patient had a positive culture for MRSA (methicillin-resistant *Staphylococcus aureus*) and Acinetobacter, and was administered with intravenous antibiotics. However, patients should be aware that curative treatment is often surgical, with excision of the entire affected tissue. Surgery is indicated in the presence of ischemia/or more deep extensive necrosis areas and in the case of abscesses, fistulas, and fasciitis [16]. The aspiration cannula technique is not recommended for the treatment of siliconomas, because tissue fibrosis makes removal by this method difficult and there is risk of injury to adjacent unaffected areas [21]. Usually the surgical defect is not covered in the first approach, given the possible need for secondary debridement or product residues. The coverage options for the bloody areas are the use of skin autograft, patchwork and, in selected cases, primary closure. The latter technique was used in our first patient, because the skin excess permitted closure during surgery. In some cases, removal of all injectable silicone is impossible due to the possible deformations and sequelae that these extensive resections can cause [22].

## Conclusion

The use of industrial liquid silicone for cosmetic purposes is a prohibited and illegal practice and must have its use controlled by the responsible bodies, particularly as regards to its application by non-medical or unlicensed professionals, as the side effects can be severe, unpredictable, and can occur years after the applications and are difficult to treat.

**Compliance with Ethical Standards**

**Conflict of interest** None.

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