

# Free Silicone Injections to the Breast: Delayed Complications and Surgical Management of Sequelae

Priya Bhardwaj, MS\*  
 Ian Greenwalt, MD†  
 Kyungmin Ko, MS, MD‡  
 Sarah R. Sher, MD§  
 Ekaterini Tsiapali, MD, FACS†

**Summary:** This case describes a healthy 37-year-old woman who presented with bilateral breast pain and nodules years after receiving free silicone injections to her breasts. Mammogram revealed extremely dense breasts with innumerable bilateral masses of various sizes. Ultrasound was non-diagnostic due to poor penetration and artifact from silicone. Histologic examination revealed vacuolated histiocytes and innumerable cystic spaces containing material consistent with silicone. Patient underwent bilateral nipple-sparing mastectomy with immediate reconstruction using tissue expanders. This case highlights the potential for serious complications developing years after free silicone injections as well as our team's surgical management of these complications. (*Plast Reconstr Surg Glob Open* 2020;8:e3208; doi: 10.1097/GOX.0000000000003208; Published online 23 November 2020.)

Liquid silicone has been injected for soft tissue augmentation for nearly 6 decades. Several properties make liquid silicone an ideal implantable substance. It is chemically inert, non-carcinogenic, easily malleable, and does not support bacterial overgrowth.<sup>1</sup> Silicone injections are more affordable than its alternatives, which make it an attractive option for individuals who desire soft tissue augmentation. However, this practice of injecting silicone has generated significant controversy due to numerous complications associated with it. This report describes the case of a young woman who developed breast pain and palpable masses decades after having free silicone injections for breast augmentation, as well as our team's surgical management of these complications.

## CASE REPORT

A healthy 37-year-old woman was referred to our clinic with complaints of bilateral breast pain and innumerable breast nodules. Her history was significant for “botox

injections to tighten the skin” to bilateral breasts in 2004. Examination confirmed countless nodules throughout both breasts; bilateral mammogram revealed extremely dense breasts with innumerable masses of various sizes (Fig. 1). The ultrasound was non-diagnostic due to poor penetration and artifact from silicone. The appearance was consistent with soft tissue silicone injections.

Based on the history, examination, and diagnostic imaging, a diagnosis of mastodynia due to free silicone injections was made. In the setting of the patient's worsening chronic pain and our inability to adequately screen for breast cancer, bilateral nipple-sparing mastectomy with immediate reconstruction using tissue expanders was recommended. Intraoperatively, inframammary incisions were used to perform the bilateral nipple-sparing mastectomy. However, we encountered countless vacuoles of liquid silicone, which caused an intense inflammatory reaction in the breast parenchyma (Fig. 2). This obliterated normal tissue planes, creating a difficult and prolonged dissection. Additionally, the checkered silicone pockets were surrounded by fibrotic, highly vascular tissue, causing diffuse oozing, which further impairs visualization and identification of any normal tissue planes. Before placement of tissue expanders, indocyanine green fluoroscopy was performed, which showed perfused skin and nipple–areolar flaps bilaterally. Pathology of bilateral breasts revealed vacuolated histiocytes and innumerable cystic spaces containing material consistent with silicone (Fig. 3). There was no evidence of atypia or malignancy.

The patient's postoperative course was complicated by bleeding, requiring a return to the operating room and evacuation of a right-sided hematoma. Additionally, ischemia of bilateral skin flaps was noted, which progressed to focal full thickness necrosis, resulting in debridement and

From the \*Georgetown University School of Medicine, Washington, D.C.; †Division of Breast Surgery, Department of Surgery, MedStar Georgetown University Hospital, Washington, D.C.; ‡Department of Pathology, MedStar Georgetown University Hospital, Washington, D.C.; and §Department of Plastic and Reconstructive Surgery, MedStar Georgetown University Hospital, Washington, D.C.

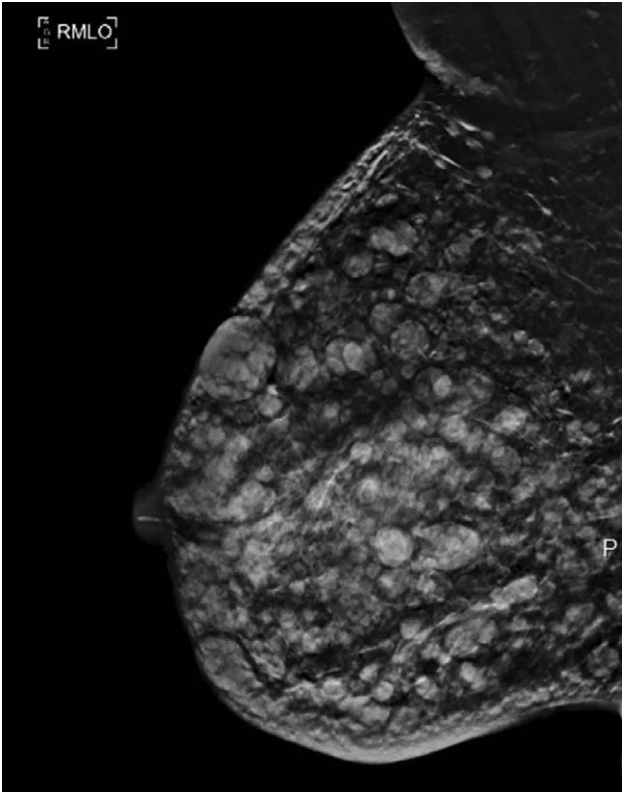
Received for publication May 13, 2020; accepted September 1, 2020.

**Helsinki Declaration:** The study design conforms to the guidelines of the Helsinki Declaration.

Copyright © 2020 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the [Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 \(CCBY-NC-ND\)](https://creativecommons.org/licenses/by-nc-nd/4.0/), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

DOI: 10.1097/GOX.0000000000003208

**Disclosure:** There are no financial disclosures, commercial associations, or any other conditions posing a conflict of interest to report for any of the above authors.



**Fig. 1.** Mediolateral oblique mammography of the right breast demonstrating innumerable breast masses of various sizes.



**Fig. 2.** Left breast tissue following mastectomy showing numerous liquid silicone vacuoles (white arrowheads).

eventual resection of the right nipple–areolar complex. Some hypopigmentation of the mastectomy skin was also evident. After healing of her skin, patient underwent bilateral tissue expander to implant exchange with fat grafting. At the last follow-up, the patient was doing well, without any breast pain (Fig. 4).

## DISCUSSION

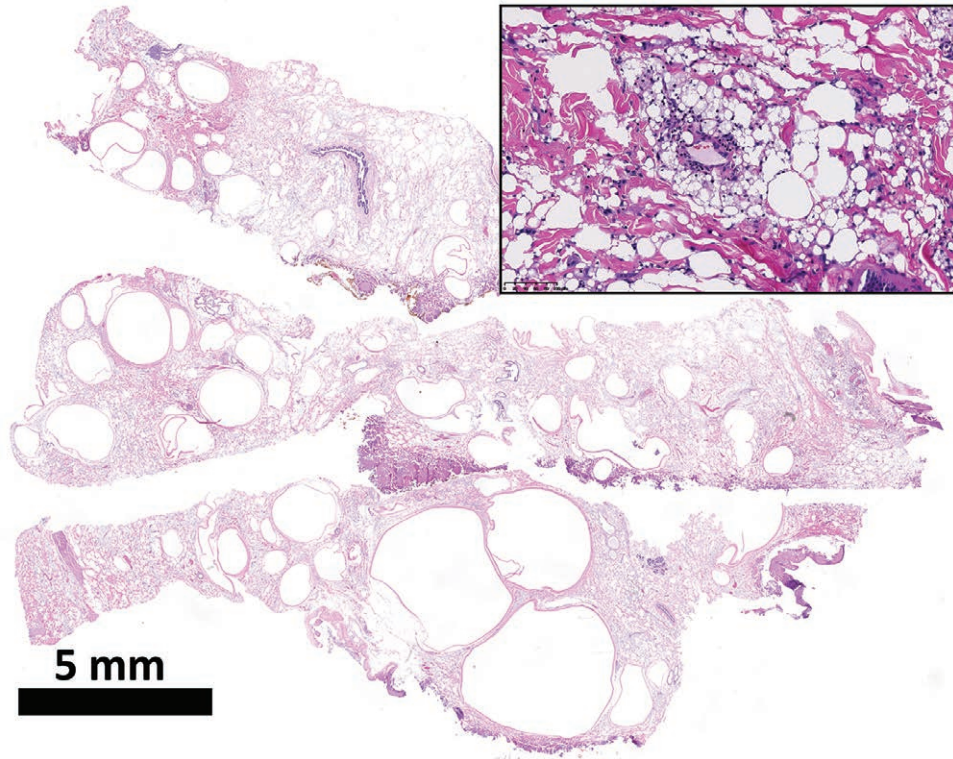
Liquid injectable silicone has generated substantial controversy over the decades. The use of liquid injectable silicone for soft tissue augmentation became popular internationally during the 1940s and spread to the United States by the 1960s.<sup>2</sup> However, due to the rising number of complications, injectable silicone was declared illegal in the 1970s.<sup>2</sup> Currently, injectable silicone is FDA-approved only for ophthalmic use in retinal detachment.<sup>2</sup> However, it is used off-label for lip and nasolabial fold enhancement, as well as treatment of flexible acne scars, HIV-associated lipoatrophy, and certain foot problems.<sup>2,3</sup> Despite absolute contraindication, free-silicone injection continues to be illegally performed for body contouring due to desirable aesthetic outcomes at a low cost.

Complications related to injectable silicone range from minor to serious and are reported to occur 8–10 years (range, 6–36 years) after silicone placement.<sup>2</sup> Minor complications include injection site reactions such as pain, erythema, ecchymosis, and edema.<sup>2,5</sup> Serious complications such as granuloma formation, migration, nodules, cystic lesions, chronic cellulitis, pneumonitis, emboli, and death have also been reported.<sup>4–9</sup> These severe complications can often be attributed to the use of unregulated, intentionally altered, or contaminated silicone injected in large volumes by non-medical personnel in non-clinical settings.<sup>2</sup> When purified, medical grade silicone is injected by experienced and licensed physicians using the microdroplet technique, complications are notably reduced—approximately 3%.<sup>3</sup>

Our patient presented with increasing mastodynia and multiple breast nodules 15 years after free silicone injections to both breasts. Imaging was challenging to interpret due to the extensive distribution of free silicone bilaterally—also rendering future cancer screening inadequate. Due to the patient's significant pain and challenges with breast cancer screening, we proceeded with bilateral mastectomy and immediate reconstruction. In a case series of 28 patients (mean age, 37 years) who developed complications on average 9 years after breast augmentation with liquid silicone injections, subcutaneous nipple-sparing mastectomy with delayed reconstruction was recommended.<sup>10</sup> Reconstruction was generally delayed due to concerns for extensive bleeding. However, if the tissue quality remained satisfactory postoperatively, reconstruction was done within 1 week of the mastectomy.<sup>10</sup> For our patient, intraoperative SPY angiography revealed adequate tissue perfusion of the mastectomy skin flaps and nipple; thus we opted for immediate tissue expander placement. However, the patient experienced a post-operative hematoma and areas of full thickness necrosis of her mastectomy skin flaps requiring debridement. The intraoperative SPY angiography in this setting was misleading.

## CONCLUSIONS

We report the case of a young woman who required bilateral mastectomy after developing pain and nodules following liquid silicone injections to bilateral breasts. This case highlights the potential for serious complications developing years after free silicone injections. Clinicians should



**Fig. 3.** Low-power view of breast tissue sections stained with hematoxylin and eosin. The tissue is distorted by numerous cystic spaces measuring up to 5 mm, with thick fibrous walls. The silicone has dissolved during tissue processing. Inset: High-power photomicrograph showing granulomatous response with multinucleated giant cells and foamy histiocytes with clear cytoplasmic vacuoles. There is fibrosis of the connective tissue between silicone droplets.



**Fig. 4.** Postoperative photograph of our 37-year-old patient following tissue expander to implant exchange and fat grafting.

be cognizant of the spectrum of complications following improper use of liquid injectable silicone as well as the delayed presentation of these complications. While this practice is commonly performed internationally, it is imperative to recognize its prevalence within the United States as well.

Mastectomy and reconstruction following free silicone breast injections is indicated in the setting of chronic pain and inadequate breast cancer screening. However, caution should be taken when applying advanced oncoplastic techniques to these patients, as normal tissue planes are often distorted or obliterated by silicone and parenchymal inflammation. Immediate reconstruction should be delayed if there are any concerns of flap viability. Further,

patients should be educated about the hazards associated with improper use of injectables from non-licensed individuals. Patients must be encouraged to seek out licensed physicians who use FDA-approved products for any medical and cosmetic care.

*Ekaterini Tsiapali, MD, FACS*  
Georgetown School of Medicine  
7501 Surratts Road #303  
Clinton, MD 20735

E-mail: [ekaterini.v.tsiapali@gunet.georgetown.edu](mailto:ekaterini.v.tsiapali@gunet.georgetown.edu)

#### REFERENCES

1. Narins RS, Beer K. Liquid injectable silicone: a review of its history, immunology, technical considerations, complications, and potential. *Plast Reconstr Surg.* 2006;118(3 suppl):77S–84S.
2. Chasan PE. The history of injectable silicone fluids for soft-tissue augmentation. *Plast Reconstr Surg.* 2007;120:2034–2040; discussion 2041.
3. Zappi E, Barnett JG, Zappi M, et al. The long-term host response to liquid silicone injected during soft tissue augmentation procedures: a microscopic appraisal. *Dermatologic Surg.* 2007;33(suppl 2):186–192.
4. Leyva A, Tran T, Cibulas AT, et al. Filler migration and granuloma formation after gluteal augmentation with free-silicone injections. *Cureus.* 2018;10:e3294.
5. Ellis LZ, Cohen JL, High W. Granulomatous reaction to silicone injection. *J Clin Aesthet Dermatol.* 2012;5:44–47.
6. Hilton JD, Steinke K. Extensive migration of injected free liquid silicone for breast augmentation with related major complications. *BJR Case Rep.* 2015;1:20150098.

7. Jeng CJ, Ko ML, Wang TH, et al. Vulvar siliconoma migrating from injected silicone breast augmentation. *BJOG*. 2005;112:1659–1660.
8. Ryu AJ, Glazebrook KN, Samreen N, et al. Spectrum of chronic complications related to silicone leakage and migration. *Am J Med*. 2018;131:1383–1386.
9. Bartsich S, Wu JK. Silicon emboli syndrome: a sequela of clandestine liquid silicone injections. A case report and review of the literature. *J Plast Reconstr Aesthet Surg*. 2010;63:e1–e3.
10. Parsons RW, Thering HR. Management of the silicone-injected breast. *Plast Reconstr Surg*. 1977;60:534–538.