

Case Report

# Postoperative Granulomas at Liposuction Incision Sites

Frederick G. Weniger, MD, MBA, FACS; Peter F. White, MD; and Carlos E. Barrero Castedo

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## Abstract

Since most liposuction incisions heal uneventfully, difficult healing in such incisions must be investigated. In the cases of two gynecomastia liposuction patients in which a water-based lubricating gel was used on the liposuction incisions, the incisions failed to heal. For both patients, workup uncovered palisading granulomas at the lateral inframammary fold incision sites several months after otherwise successful surgeries. These two cases are presented and the previous literature is reviewed, with consideration given to the etiology and prevention of such granulomas.

## Level of Evidence: 5

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Most liposuction incisions heal uneventfully, and as such, cases of difficult healing must be investigated. Two such patients who underwent liposuction to treat gynecomastia developed granulomas at the lateral inframammary fold incision site several months after surgery. These cases are presented and relevant literature is reviewed, with consideration given to the etiology and prevention of such granulomas.

## CASE REPORTS

### Case One

A 66-year-old Caucasian male with a history of recently inactive sarcoidosis, diagnosed 25 years previously, underwent liposuction and a purse-string circumareolar mastopexy for grade II gynecomastia with a loose skin envelope (Figure 1A). Access for the liposuction was through two small #15-blade stab incisions on each breast; one at the 6 o'clock position of the areola, and the other at the lateral end of the inframammary fold. A sterile water-soluble lubricating jelly (K-Y Jelly, Reckitt Benckiser, Berkshire, UK) was used to lubricate the skin edges at the liposuction access sites. Superwet liposuction was performed on both sides, infiltrating approximately 500 cc of Klein's solution on each

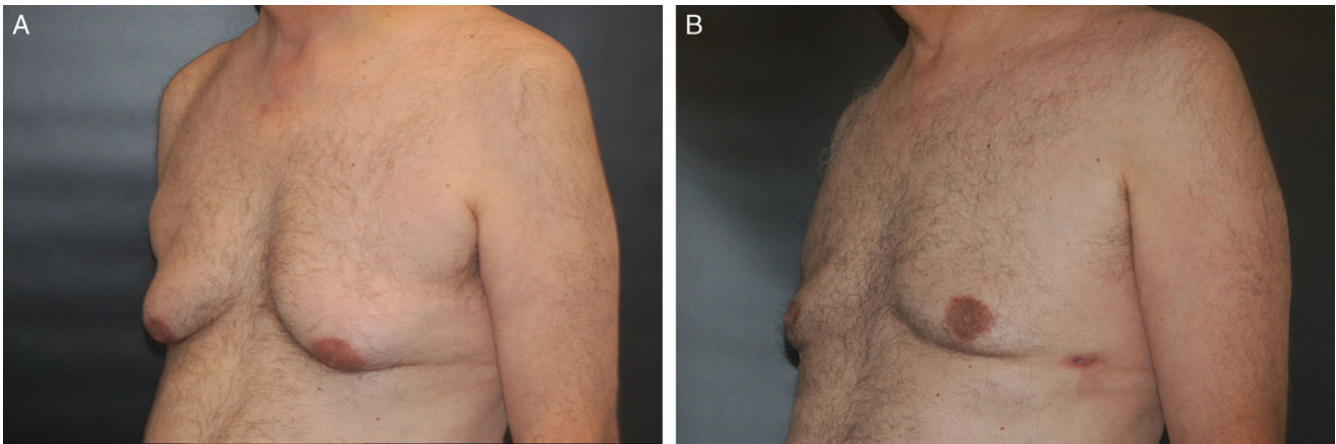
side. Suction-assisted lipectomy (SAL) was completed, removing 300 cc of fat on each side using a 3 mm Mercedes tip cannula and a 4 mm accelerator cannula. The inframammary fold was partially disrupted with a 5 mm cannula without suction. Closure of the access incisions was performed with 5-0 plain gut horizontal mattress sutures.

After the contours were assured to be even by visualization and palpation, eccentric circumareolar deepithelialization was done to address lax skin bilaterally, closing with 4-0 poliglecaprone 25 suture-interrupted deep dermal sutures and 4-0 poliglecaprone 25 running subcuticular sutures, followed by liquid adhesive and Steri-Strips (3M, Saint Paul, MD). Bacitracin ointment was placed over the liposuction incisions, followed by non-adherent 1-inch thick compressive foam over the chest. A 6-inch elastic bandage was then

Dr Weniger is a plastic surgeon in private practice in Bluffton, SC.  
Dr White is a dermatopathologist in private practice in Ridgeland, SC.  
Mr Barrero Castedo is an undergraduate student at Duke University, Durham, NC.

### Corresponding Author:

Dr Frederick G. Weniger, Weniger Plastic Surgery, 350 Fording Island Road, Suite 200, Bluffton, SC 29910, USA.  
E-mail: fred@wenigerplasticsurgery.com



**Figure 1.** (A) Preoperative photograph of a 66-year-old male displaying prominent gynecomastia. (B) Six month postoperative photograph, 5 months after surgery. Granuloma is visible at the left port site of the liposuction, found laterally along the inframammary fold.

placed around the chest. Total operating time was 1 hour, 24 minutes.

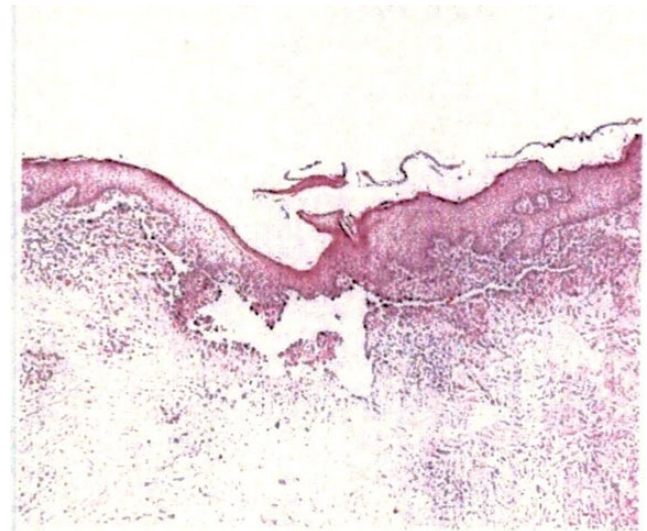
At the patient's visit 3 days postoperatively, the dressing was removed and the patient was instructed to apply bland petroleum ointment to the incisions twice a day. At the patient's 3 week postoperative visit, the incisions appeared to be healing well and he was instructed to use Kelo-Cote (Advanced Biotechnologies, Columbia, MD) ointment twice a day for 6 months.

Five months later, the patient returned to the office because he had developed a mild skin excess and also noted that both lateral inframammary fold incisions had not healed completely (Figure 1B).

The patient was reoperated on for his residual skin laxity and non-healing wounds. Another circumareolar skin resection was performed with the same technique. During this operation, both non-healing wounds were also sent for histologic evaluation and cultures were taken from the bottom of both wounds. The incisions were closed with 4-0 Poliglecaprone 25 suture-interrupted deep dermal sutures and 4-0 poliglecaprone 25 suture-running subcuticular sutures. Liquid adhesive and Steri-Strips were applied. He was placed on oral cephalexin postoperatively. At the patient's 2 week postoperative visit, the Steri-Strips were removed and the incisions were found to be healing well. He was instructed to use Kelo-Cote ointment twice a day for 6 months. His re-excisions went on healed uneventfully, and he expressed pleasure with the outcome in postoperative check-ups.

His cultures did show moderate growth of *Staphylococcus aureus*. Based on sensitivities, his antibiotic was switched to trimethaprim/sulfamethoxazole. No acid-fast bacilli were isolated at 8 weeks.

His pathology report showed palisading granulomatous dermatitis and panniculitis (Figure 2). Special stains for

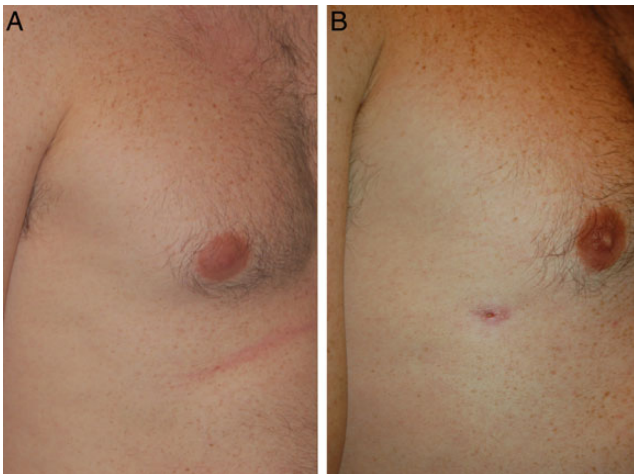


**Figure 2.** Photomicrograph of the left chest of the patient seen in Figure 1. External appearance of granuloma can be appreciated.

fungi and mycobacteria and polarized microscopy for foreign material were all negative for the specimens from both sides.

## Case Two

A 32-year-old healthy Caucasian male underwent liposuction for grade I gynecomastia (Figure 3A). Stab incisions for access were made with a #15 blade at the 6 o'clock position of the areola and the lateral end of the inframammary folds bilaterally. K-Y Jelly was used to lubricate the skin edges at the liposuction access sites. Superwet liposuction was performed on both sides, infiltrating approximately 175 cc of



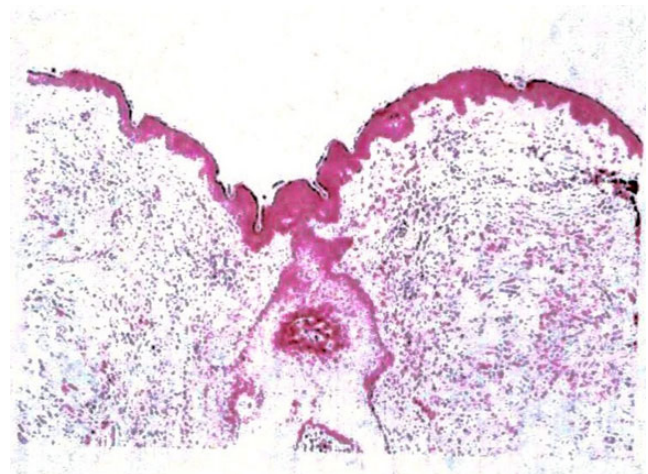
**Figure 3.** (A) Preoperative photograph of a 32-year-old male patient with gynecomastia. (B) Postoperative photograph, 7 months after surgery. Granuloma can be seen at the port site of the liposuction, on the right chest, found laterally along the inframammary fold.

Klein's solution on each side. SAL was completed, removing 100 cc of fat on each side using a 3 mm Mercedes tip cannula and a 4 mm accelerator cannula. Final contouring and feathering was done with a 3 mm spatulated tip cannula. The inframammary fold was partially disrupted with a 5 mm cannula without suction. Closure of the access incisions was performed with 5-0 plain gut horizontal mattress sutures. Bacitracin ointment was placed over the liposuction incisions, followed by non-adherent 1-inch thick compressive foam over the chest. A 6-inch elastic bandage was then placed around the chest. Total operating time was 56 minutes.

At the patient's visit 4 days postoperatively, the dressing was removed and the patient was instructed to apply bland petroleum ointment to the incisions twice a day. At the patient's 2 week postoperative visit, the incisions appeared to be healing well and he was instructed to use Kelo-Cote ointment twice a day for 6 months.

The patient appeared to be healing uneventfully at his 6 week postoperative visit. When the patient was seen for a 6 month postoperative visit, the incision at the lateral end of the right inframammary fold was pitted, slightly hyperemic, and firm (Figure 3B). He had no other signs or symptoms of infection.

This area was excised in the office, and the tissue was sent for histologic evaluation. Closure was performed with 4-0 poliglecaprone 25 interrupted deep dermal sutures, followed by 4-0 poliglecaprone 25 running subcuticular sutures. Liquid adhesive and a Steri-Strip were applied. At the patient's 2 week postoperative visit, the Steri-Strips were removed and the incisions were healing well. He was instructed to use Kelo-Cote ointment twice a day for 6



**Figure 4.** Photomicrograph of the tissue excised from the patient seen in Figure 3, found laterally along the right inframammary fold, clearly displaying a granuloma.

months. His re-excision then healed uneventfully, and he also expressed pleasure with the outcome in postoperative check-ups.

The tissue was found to show caseating granulomatous dermatitis and panniculitis (Figure 4). No bacterial growth was seen in cultures. Additionally, special stains for fungi and mycobacteria and polarization microscopy for foreign material were negative.

## DISCUSSION

Since most liposuction access incisions heal uneventfully, difficulty healing such incisions requires investigation. The authors treated two male patients who had such healing difficulties after liposuction for mild gynecomastia. In both patients, the lateral inframammary fold incisions had not healed completely at 6 months. Cultures showed no growth of microorganisms, but biopsies instead showed granulomas. It is interesting to note that the patients displayed different types of granulomas. The patients in cases one and two developed palisading and caseating granulomas, respectively. The major difference between these types of granulomas is the level of necrosis present. Palisading granulomas present necrobiosis, otherwise defined as a "slight necrosis" of connective tissue, while caseating granulomas are characterized by more significant necrosis at the center of the granuloma, distinguished as a formless mass under microscopy.<sup>1</sup>

Granulomas have not been reported in the literature as having occurred at liposuction sites without the involvement of lubricants. In fact, although we have been unable to find reports of granulomas at the site of liposuction

incisions in the plastic surgery literature, this phenomenon was recently reported in the pathology literature.<sup>2</sup> In nine patients with non-healing wounds after liposuction, palisading granulomas with necrobiosis were seen. These findings were not attributable to other causes and, due to the presence of crystalloid-appearing foreign material, were therefore attributed to the use of a lubricating agent containing a carbon-based copolymer (Carbopol 934) for liposuction.

In the two cases of post-liposuction granulomas presented here, K-Y Jelly and saline were used as lubricants for the liposuction. The product used was expressed from single-use sterile packets. K-Y Jelly consists of glycerin, hydroxyethylcellulose, chlorhexidine gluconate, gluconolactone, and methylparaben, some of which have been shown to be associated with complications. Chlorhexidine gluconate and gluconolactone have both been shown to cause skin irritation, itching, swelling, and redness, while methylparaben has mild estrogen-like effects on the body and has been found within breast tumors. No literature describes the effects of these materials when placed inside the body. The effects of glycerin, however, were studied after injection into human tissues. In this setting, glycerin forms moderately painful raised bumps, with pain increasing with the amount injected.<sup>3</sup> No other studies were available in the analysis of any of these products within the human body.

Granulomas have not been reported at liposuction sites without the involvement of lubricants. In the author's early practice, the use of K-Y Jelly had been part of the standard technique used for liposuction. The use of surgical lubricant during liposuction was then abandoned following the findings documented in the two cases presented. During the time period in the author's practice in which surgical lubricant was utilized during liposuction, 152 liposuction cases were performed. Therefore, granulomas are known to have formed in 1.32% of the cases using surgical lubricant. In contrast, since this technique was abandoned, no granulomas are known to have formed in the following 355 cases.

Douglas et al<sup>4</sup> described foreign bodies as a late cause of postsurgical inflammatory lesions. In situations when new lesions appeared more than 2 weeks after an operation, he suggested that atypical infections with mycobacteria should be suspected, but that if this was not found to be the case, then foreign bodies may be responsible. Although suture and implant material is often considered, it has also been documented that ointment in surgical wounds can cause granulomas when that ointment becomes embedded in tissues.<sup>5</sup> Because such granulomas can be long lived, the authors recommended excisions of such lesions.<sup>4</sup>

Multiple injected agents have also been known to occasionally lead to granulomas. Palisading granulomas have been described as occurring 3 months following injection to the lower eyelids of a "youth lift cream" containing 20% elastin.<sup>6</sup> Although rare, foreign body granulomas can result

from the injection of any of the cosmetic dermal fillers.<sup>7</sup> Different types of granulomas tend to develop depending on the characteristics of the fillers used.<sup>7</sup> Of these types, polyacrylamide gels such as Aquamid and Bio-Alcamid tend to produce inflammatory or edematous granulomas. Hyaluronic acids also seem to produce cystic, or palisading, granulomas.<sup>7</sup>

Most recently, Rohrich et al<sup>8</sup> explained the connection between late granulomas seen as a complication of soft-tissue filler injection and the presence of biofilms around the filler material itself. They describe foreign body granulomas presenting after an uneventful post-injection period ranging from 6 to 24 months, followed by swelling, erythema, or discoloration. Histologic examination can sometimes identify the foreign material in the center of the granuloma. They make the important point that all soft-tissue fillers can stimulate a foreign-body reaction and become encapsulated, but differentiate this from granulomas, which present with ongoing inflammation.

In addition to the possible etiologies for these granulomas suggested by the aforementioned prior literature, other causes must be considered. One possible cause for the formation of late postoperative granulomas is the presence of atypical mycobacteria on surgical equipment thought to be sterile. This possibility was considered and investigated, utilizing stain tests of the excised masses, and deemed not probable, as cultures and stains were negative for mycobacteria or acid-fast bacteria. Another possibility would be the sutures themselves leading to inflammatory responses that triggered the onset of the granulomas. It was noted that the original wound closures were done with 5-0 plain gut sutures, while the revisionary procedures were closed with 4-0 poliglecaprone 25. The wounds healed without difficulty when closed with poliglecaprone. Therefore, the degradation of plain gut through inflammation as opposed to poliglecaprone's degradation by hydrolysis may come into play. Possibly liposuction incision closure with plain gut may increase the risk of granuloma formation due to this suture-related inflammation, as compared to allowing these liposuction incision sites to heal secondarily or closure with another suture method or material. A third possibility that was originally considered was a patient's susceptibility to granuloma formation. This was thought to be a potential cause in case one. This patient did have a history of sarcoidosis, although the condition had been inactive for years preceding the surgery. The presentation of the patient in case two, who did not have sarcoidosis or similar conditions, made this theory less compelling.

As a small case series, this study is limited by the consideration of only two patients. A larger series should better elucidate the etiology of these granulomas at liposuction ports. Despite this limitation, however, the prevalence of literature tying foreign bodies to granulomas gives credence to the idea at hand in this study. Further, the later

uneventful healing of these same areas provides some support to the idea that it was the introduction of lubricant subcutaneously that was the culprit for the formation of granulomas. Excision of the granulomas with the removal of any residual foreign body produced uneventful healing.

The lack of anonymity in appraising the patients' approval of the results is another limitation. Both patients were assessed for approval directly by the operating surgeon, rather than through an anonymous, validated survey, which may bias their reported satisfaction.

## CONCLUSIONS

A possible explanation for the late formation of granulomas at the liposuction incision sites is the use of water-based lubricant. Other etiologies have been considered and appear less likely to be responsible. Review of the pathology literature and the plastic surgery literature support a role of water-based lubricants in the occurrence of granulomas after liposuction. Therefore, granulomas must be considered in the differential diagnosis of nonhealing access incisions after liposuction if a water-based lubricant is used. Additionally, this experience should caution against the use of current water-based lubricants for liposuction.

## Disclosures

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