[LITERATURE REVIEW]

Nonmedical-grade Injections of Permanent Fillers

Medical and Medicolegal Considerations

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ABSTRACT

Silicone injections may result in complications that bring patients to a dermatologist or plastic surgeon. These complications may be due to the use of nonmedical grade products, large volume injections, incorrect placement of the product, or a combination of the above. Frequently, complications result when injections are performed by unlicensed practitioners. Individuals who undergo large volume procedures may develop a variety of life-threatening problems ranging from infections to pulmonary emboli. Once they develop problems, these patients often present to licensed and board-certified physicians for treatment. Based on a review of the literature, this article provides a management algorithm for various complications. In addition, a medicolegal perspective is presented. Finally, the transgender experience as it relates to silicone injections is also reviewed. (*J Clin Aesthet Dermatol.* 2013;6(4):22–29.)

The practice of soft tissue augmentation is more than 100 years old.[1] Whereas the majority of these procedures performed are for facial remodeling using small volumes of temporary fillers approved by the United States Food and Drug Administration (FDA), some procedures involve large-volume injections of nonfacial areas.[2] Of these injections, some will involve permanent materials not always designed for injections into humans. When large-volume injections are performed by medical personnel, autologous fat is the agent of choice. Large volumes of permanent fillers, such as silicone, are not typically performed by medical personnel because of the adverse events associated with their use.[3] There is, however, a growing number of large-volume injections performed by nonmedical personnel. Unfortunately, these injections frequently involve nonmedical grade products and equipment in nonsterile, nonprofessional environments. These injections may lead to potentially chronic and debilitating or life-threatening complications. The spectrum of issues that arises includes arterial occlusion, tissue necrosis, infections, embolization, inflammatory granulomata, nodule formation, pain, ecchymosis, pigmentation, migration of injected materials, and lymphedema.[4–7] These events may be categorized by the time-course of their appearance after injection. For the purpose of this review, they will be divided as follows: immediate complications occur seconds to minutes after an injection while early complications require days to weeks. Late complications occur weeks to years after the procedure. Affected patients may present to dermatologists and plastic surgeons for evaluation and management at any of these intervals and at all they will pose a series of diagnostic and therapeutic dilemmas.

Therapeutic options include tetracycline antibiotics, macrolide antibiotics, intralesional steroids, celexocib, excision, imiquimod, fluorouracil, etanercept, tacrolimus, and allopurinol among others. The management algorithm presented here attempts to create a regimen based on existing evidence and includes a discussion of the pathophysiology. Successful management strategies depend on the specific presentation as well as the avoidance of early steroid use, which may be implicated in the formation of biofilms. The treatment of patients undergoing illegal injections presents several additional issues including those of liability, obligation to treat, and payment. Many physicians are reluctant to treat these patients due to the risk of litigation. Prior to engaging in any corrective treatment, it is important to obtain an

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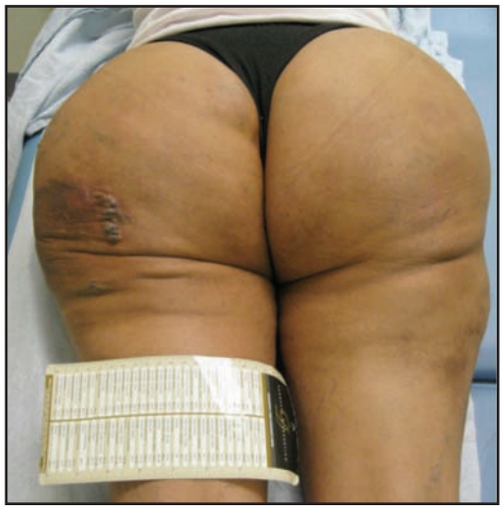
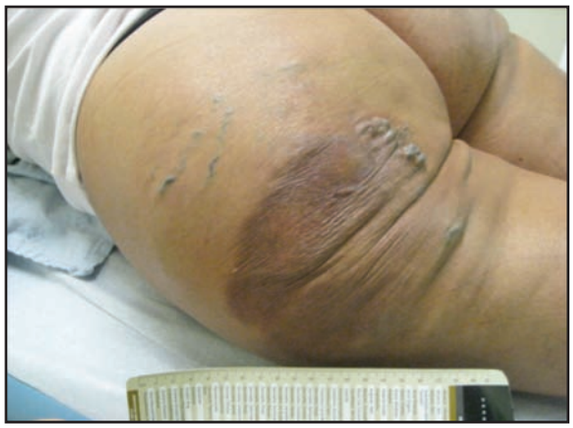




Figures 1A and 1B. Physical exam demonstrated tortuous dilated superficial veins of buttocks and upper legs, firm plate-like tumors scattered across the bilateral buttocks, few atrophic plaques, with two violaceous/erythematous plaques on the left and right buttocks. No pitting edema. No differences in warmth appreciated.

informed consent and to document discussions regarding costs, likely outcomes, duration of treatment, limitations of correction, and any other issues that may arise when treating a complication. As with any cosmetic patient, photographic documentation is imperative.

This article presents one such case of a nonmedical grade silicone injection, considers treatment options available, and considers the medicolegal aspects of caring for patients with this issue.

CASE PRESENTATION

A 55-year-old Cuban-American transgender (male to female) woman presented with a 3- to 4-year history of intermittently warm, swollen, painful nodules in her buttocks. These areas had previously been injected with large volumes (3–4 liters) of silicone of unknown quality and origin seven years prior. The silicone injection was performed by another transgender woman with no medical training or license to practice medicine. The patient had not had a prior biopsy or culture of the affected area. Prior treatment of the areas with intralesional (IL) triamcinolone acetonide injections of unknown concentration had improved the appearance and symptoms.

On review of symptoms, the patient complained of malaise, but denied fevers or chills. Her relevant past medical history included human immunodeficiency virus (HIV [CD4+ 1463, normal range 490–1740]). Her past surgical history included silicone breast implants, with no complications. Her medications included highly active antiretroviral therapy (HAART) for HIV as well as moxifloxacin for bronchitis.

Physical examination of the lower extremities demonstrated tortuous dilated superficial veins of the buttocks and upper legs. Firm nodules were scattered across the buttocks bilaterally. There were also scattered atrophic, violaceous/erythematous plaques on the buttocks. These were tender, but not warm or fluctuant. No pitting edema was noted (Figures 1a and 1b).

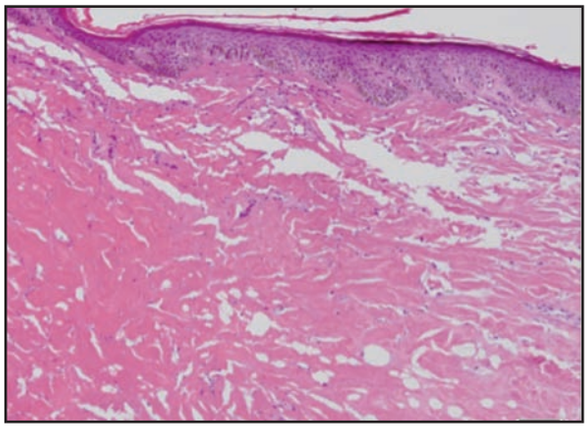
Two 4mm punch biopsies were taken from the left buttock, one for hematoxylin and eosin (H&E) and the other for tissue culture, including aerobic and anaerobic, fungal, and acid-fast bacteria. Culture results were all negative. No fluorescent *in-situ* hybridization (FISH) or other deoxyribonucleic acid (DNA)-based studies were performed.

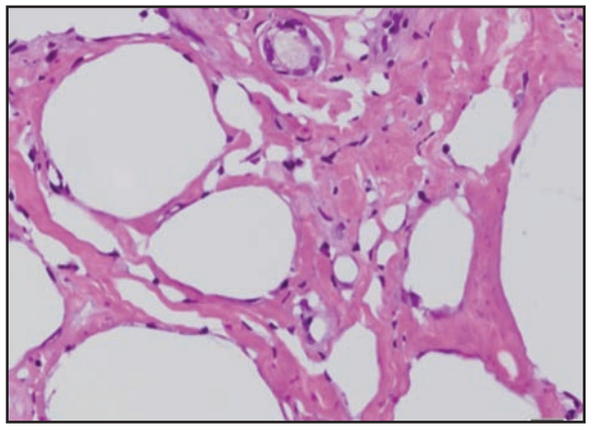
Histopathological evaluation revealed diffuse dermal sclerosis with cystic lesions consistent with silicone cysts. No polarized material was seen (Figures 2A and 2B). Venous duplex ultrasound showed normal compressibility and normal flow.

The patient was empirically prescribed minocycline 100mg at night and trimethoprim-sulfamethoxazole (TMP-SMX) 80/400mg twice a day for possible chronic infection and inflammation. However, the patient was only able to acquire TMP-SMX and had minimal improvement at her follow-up appointment four weeks later. The patient was subsequently prescribed 500mg tetracycline twice a day and celecoxib 200mg twice a day based on previous published experience.[8] There was significant improvement of the erythema and tenderness after one and three months of follow up, and the patient reported decreased firmness of the plaques on the buttocks. She was then switched from tetracycline to doxycycline 100mg twice daily because of tetracycline medication shortages.

DISCUSSION

Body sculpting and the transgender community. News reports repeatedly highlight the dangers of injections of uncontrolled substances. In Miami, Florida, a transgender woman was recently arrested for allegedly





Figures 2A and 2B. A 4mm punch biopsy was taken for H&E and demonstrated sclerotic dermis with cysts consistent with filler. No polarized material was seen.

injecting a "mix of cement, glue, mineral oil, and tire sealant (Fix-a-Flat) into [a] woman's buttocks."[9] While being an extreme example of the dangers of unlicensed individuals practicing medicine, to many in the transgender community, it is an accepted practice.[10] Silicone is an idealized and commonly sought after option for transgender women who desire curvier, more feminine figures rapidly. "Pumping parties" are one format in which the transgender community receives illegal hotel room injections by anonymous "pumpers" who rarely disclose product purity and potential side effects. It is not until some time has passed, after many satisfied clients have already encouraged others, that the adverse consequences begin to develop. In addition to impurities, the injection of liters into the hips and buttocks to attain the desired female figure is contrary to the microaliquot technique used by licensed practicioners.[11]

Convenience and cost are the main appeal of these parties, accompanied by pressure from the transgender community.[12] Because more than 60 percent of transgender individuals begin to transition when they are teenagers, most transgender women cannot afford to see a medical professional. When offered in adulterated forms by nonprofessionals, silicone can be one of the cheapest methods of attaining a feminine shape. For instance, the average physician fee for a buttock implant was $4,283 and for a buttock lift was $4,694 in 2011 versus the reported rates of $500 to $1,600 for injections of impure silicone by nonprofessionals.[13–15]

Medical malpractice and cosmetic fillers. There is no legal imposition of liability for trying to fix or manage a complication of a medical procedure.[16] In practice, however, any physician who has participated in the care of a patient can be named in a lawsuit if a case is brought to court. While a judge should rule that the case against a physician helping to manage the complications of another procedure is without merit and throw it out of court, the physician still has to bear the financial and time burden of hiring counsel and being a witness in the case.

The likelihood of bearing this financial and time burden is magnified by the relative ease of pursuing legal action in the United States, as counsel is often available on a contingency-fee basis. This contrasts with much of Europe, where frivolous lawsuits are discouraged by allowing the prevailing party to recover their attorneys' fees and costs from the losing party.[17]

The potential for incurring significant legal costs have precluded many patients from receiving care by physicians in private practice. Physicians who do treat complications may impose significant costs to assume care for them because they are likely to be the only source of recompense in the event of a lawsuit. The patient illustrated in this report was treated at Jackson Memorial Hospital in Miami, Florida, where an academic umbrella policy provides unique protection. This mitigated the fear of reprisal for assuming the care of patients who might otherwise be abandoned.

In a private care setting, a physician choosing to assume care of these challenging patients should still assess each patient at consultation and set expectations. The motto "underpromise and overdeliver" is particularly relevant. When assuming care of any patient with a cosmetic complication, it is important to trust your intuition and to listen to your staff. In the event that you are not comfortable treating a particular patient, it is acceptable to refuse them care provided they are not in any imminent danger.[18]

When caring for any cosmetic complication patient, one should use the initial exam to document and photograph physical asymmetry and other skin findings, such as telangiectasias and dermatoheliosis. Any and all cutaneous imperfections may be the basis for litigation in the future and if they are not photographed and documented, the treating physician may assume the liability for their formation. It is also important to evaluate the patient for psychological stability including body dysmorphic disorder,

depression, or obsessive-compulsive disorder.[19]

Any unsatisfied patient with numerous "unsuccessful" procedures may not be an ideal candidate to treat as he or she is likely to be displeased with any future result. Thus, before assuming care for a cosmetic complication patient, listen to the descriptions of prior treatments as well as discern the reasons he or she entered into a situation known to be risky and illegal. When correcting treatments, one should utilize temporary fillers to provide immediate correction and determine the suitability of the patient for future injections.[19]

Informed consent is a critical element of establishing the terms of a patient-physician relationship and can greatly influence the outcome of legal proceedings. A good informed consent should explain the treatment proposed, discuss alternatives, and detail the risks of the procedures. Consents deemed overly broad or far reaching may not be a viable defense in court and before undertaking any procedure, it is wise to have an attorney review the consent forms that will be used. Many practitioners recommend a new consent for each visit, added as an addendum to the primary consent signed on the first treatment visit.[18] Despite an adequate consent, any procedure may be the basis for litigation, and procedures intended to treat complications are no exception. If the physician used a medication in an off-label manner, this may need to be documented either in the consent or in the chart.[20] Despite the fact that off-label uses do not mean that one will be found liable in a lawsuit, the costs, both in time and money, of defending oneself in a suit are not insignificant.[20]

Another medicolegal issue to consider is the statute of limitations, which must be filed within a prescribed time period (often 2 to 3 years). Typically, the "clock" starts only when the patient becomes reasonably aware of the harm caused and the statute may include your corrective treatments, but not the one that caused the harm. This is especially important in late complications of silicone injections and other permanent fillers, which may take years before problems develop. In the case presented here, the patient was aware of the adverse events from the injections for several years.

Management of silicone filler complications. Complications that develop from silicone injection are best characterized by the time-course of their appearance after injection: immediate (seconds to minutes), early (days to weeks), and late (weeks to years). This classification drives management as different etiologies and types of complications can occur at these times.

During the immediate period (seconds to minutes) after injection, the following complications may be seen: intradermal bleeding, arterial occlusion, focal necrosis (related to venous occlusion), silicon embolization syndrome, post-injection papules, discoloration of the skin, postinjection pain, redness, ecchymosis, bleeding, and swelling and hypersensitivity reactions.[3–5,7,19,21–28] These have been reviewed previously. Therefore, this article focuses on the early and late periods—when a patient returns or seeks out professional consultation after an otherwise technically uncomplicated session of filler injections. The early period (days to weeks) after injection may demonstrate the following complications:

Early inflammatory nodules. These present as tender, erythematous bumps that may be fluctuant.[21,22] Although nodules may represent an allergic or foreign body reaction, the key concern is infection, including traditional bacterial infections as well as atypical acid-fast mycobacteria (*chelonae*, *fortuitum*, and *abscessus*).[21] If the nodules are fluctuant, incision and drainage with culture and antibiotic coverage is appropriate. If no fluctuance is present, then antibiotics alone may be started.[21] Consensus supports a tetracycline as first-line therapy due to combined antimicrobial and anti-inflammatory activity, with minocycline being a top choice (see late inflammatory nodules section).[8,25] Other regimens include combination therapy of a tetracycline and macrolide (e.g., clarithromycin 500mg twice daily for 2 weeks) for its mycobacterial coverage.[21] If nodules do not improve, perform a punch biopsy for aerobic, anaerobic, and acid-fast mycobacteria tissue culture and observe for at least 10 to 21 days. If signs of infection subside, but the nodules persist, intralesional steroids may be given every 3 to 4 weeks (with a recommended dose of 2.5–10mg/mL).[21,22]

Early noninflammatory nodules. These nodules may reflect persistent immediate period postinjection nodules of localized accumulation of filler and may be fixed, subcutaneous, of varying sizes, and distinct from the surrounding normal skin. There should be no inflammation (i.e., pain, erythema, or edema). Both inflammatory and noninflammatory nodules often cause skin disfigurement or unevenness, and thus are important to manage for cosmetic purposes. Gentle massage, observation to ensure inflammatory or infectious symptoms do not develop, and patient reassurance are appropriate.[22] If inflammatory or infectious symptoms are observed, the patient should be managed via the inflammatory nodule algorithm.

Persistent angioedema. One case series reported persistent angioedema from fillers that was unresponsive to antihistamine therapy but ameliorated with oral and intralesional triamcinolone and oral cyclosporine.[29] Estimated as less than 1 to 5 in 10,000 and thought to be related to protein contaminants present in the material rather than the filler itself, true immune-mediated angioedema is rare.[22] When reported, swelling has been most visible in the lower eyelids and lips.

Pain, ecchymosis, and pigmentation. These symptoms may persist beyond the immediate period. Reassurance is appropriate.

Pruritis. Pruritis was commonly reported in FDA studies with injectable fillers.[30–32] Although there are no published reports of intractable pruritus at an injection site, this may reflect under-reporting of an otherwise common symptom of immune system activation in the skin. While topical therapy might help with some patients, therapy targeting the underlying cause of the pruritus (e.g., granuloma) will offer the patient the best chances for relief.

The late period (weeks to years) after injection can be the most frustrating complication of silicone filler injection, both for the patient and physician. The patient, often having enjoyed benefits for some time, now faces a chronic and sometimes debilitating and life-changing condition. The physician, on the other hand, must manage a sometimes incurable situation, aiming for amelioration of symptoms rather than cure. This timeframe of complications may demonstrate the following complications:

Inflammatory nodules or silicone granulomata (siliconomas). These are among the most commonly reported complications after silicone injection and can present with just about any of the previously described signs and symptoms. Possibilities include painful swelling or bumps that are warm to palpation, ulceration, erythema, lymphadenopathy, and skin induration accompanied by fever, weight loss, nausea, and vomiting.[25,28] These symptoms can be generalized or appear at a location distant from the original injection site. The pain is typically not alleviated by nonsteroidal anti-inflammatory drugs (NSAIDs). Because these findings are nonspecific and because they may present at any location on the body, a malignancy or infection rather than a silicone granuloma is typically suspected.

If biopsy is performed, a foreign body granuloma is seen accompanied by multiple white vacuoles in the dermis or subcutaneous tissue that are a hallmark for siliconoma.[4,6,8,23,33,34] A large number of inflammatory cells surround the vacuoles, including histiocytes, plasma cells, eosinophils, macrophages, foreign body giant cells, and lymphocytes.[25,34–36] Most of the vacuolated spaces are 15 to 30µm in diameter but may vary in size, resembling lipids. This characteristic histology remains even many years after injection and thus is a good method to diagnose a suspected silicone granuloma.[8] Silicone has a tendency to enter circulating macrophages and foreign body giant cells and thus may be seen both as independent vacuoles and within macrophages.[5,6] If the macrophage continues to circulate, it can carry the silicone droplet to regional lymph nodes.[5,6,34]

Multiple hypotheses on the pathophysiology of silicone granulomata exist and implicate material impurities, bacterial contamination introduced by the needle or seeded from active infection elsewhere, or a foreign body reaction to the silicone.[3,28] Those endorsing a foreign body reaction believe that when silicone is injected into the subcutaneous tissue, it is appropriately recognized as foreign material by the body, leading to a natural immune response,[26,37] with neutrophils, monocytes, foreign-body giant cells, fibroblasts, and collagen all appropriately recruited over time.[5,6] Others contend that an additional stimulus or signal is required to form a granuloma—a trigger, such as an infectious process, trauma, adulterants added to the silicone, or denatured host proteins, including fibrinogen adsorbed to the silicone leading to T-cell activation.[23,25] T-cells produce cytokines, such as tumor necrosis factor alpha (TNFα), that promote formation of the granuloma, and elevated levels have been found in siliconomas.[23,25] There is also evidence supporting the presence of bacterial biofilms within granulomas, producing a chronic, low-grade infection.[5,6] Bacteria may seed the silicone during the injection as the needle passes through hair follicles and sebaceous glands where micro-organisms naturally reside or during transient bacteremia from distant infections (e.g., dental or sinus).[5,6,25,26] The latter hypothesis explains clinicians' experience with patients' presenting with symptoms after or during an apparently unrelated infection.

Bacteria present in biofilms are difficult to detect by traditional culture methods; instead, physicians must rely on clinical suspicion or attempt genetic analyses, such as polymerase chain reaction (PCR) or fluorescent *in situ* hybridization (FISH). As it is not always cost effective or practical to perform these analyses on every patient, gram stain and tissue culture on broad-spectrum media under both aerobic and anaerobic conditions for 10 to 21 days is also recommended.[6,22,37] When present in a biofilm, bacteria are enclosed in a protective, circulation-poor polysaccharide matrix, preventing access of both antibiotics and immune defenses.[8,25,37] A further protective factor is the relative metabolic senescence of bacteria in biofilms, such that antibiotics targeting replication phases are rendered ineffective. With the immune system unable to destroy bacterial biofilms, a chronic inflammation develops, ultimately leading to a granuloma. Utilizing the appropriate treatment, as discussed below, is critical, as incorrectly treating with steroids can lead to induction of further biofilm formation.

A granuloma by itself, regardless of biofilm presence, creates an immune-privileged site in the body via fibroplastic reactions that reduce local perfusion.[25] In fact, fibroblasts walling off filler are a marker of a well-tolerated filler, as long as they are able to maintain this filler containment for the rest of the patient's life.[38] However, if the immune system does not perceive that the foreign material is sufficiently isolated, it will continue producing excess collagen around the filler, ultimately leading to what presents clinically as a firm nodule.[36]

Cellulitis with sterile abscesses. These may develop months to years after injection, with pain, erythema, edema, low-grade fever, malaise, induration or fluctuance, ulceration, and local lymphadenopathy.[3,23,25,28] These symptoms are similar to that of inflammatory nodules with the exception of abscess formation and the absence of nodules. Other salient features of cellulitis due to filler reaction include fistula formation with discharge of pus or filler, tissue destruction, and scarring. Silicone is often not suspected as the etiology, and thus patients are typically diagnosed with cellulitis and treated with multiple antibiotic regimens.

As with early inflammatory nodules, a common first choice is to treat delayed inflammatory nodules, silicone granulomas, and cellulitis with sterile abscesses with minocycline or tetracycline. The antimicrobial activity of the tetracycline antibiotics addresses any bacterial biofilms

while the anti-inflammatory activity dampens the granulomatous immune reaction.[25] Minocycline 100mg twice daily and tetracycline at 500mg twice daily have been reported in many cases.[5,8,22,25,39,40] Celecoxib may be added to minocycline treatment to block the inflammatory cascade's inducible production of prostaglandins via cyclooxygenase 2.[8]

While steroids are typically first-line treatments for silicone reactions, they are not optimal in cases of inflammatory nodules due to the potential role of bacteria and biofilms. If a biofilm is present, any relief will be transient as steroids diminish the inflammatory component without fighting the bacterial infection.[6,8,37] In fact, the immune-mediated granuloma is important in keeping the biofilm contained, and thus initial treatment with steroids alone can allow expansion of the biofilm.[6,37] Even when used in combination with antibiotics, panniculitis with antibiotic resistance may develop.[6,37] Intralesional steroids should be used only after antibiotics have been used for 4 to 6 weeks and have treated the inflammatory symptoms.[22] Alternatively, if there has been no response to antibiotics in 7 to 10 days, NSAIDs may be attempted at that point, as these will not induce biofilm proliferation. Additional side effects of prolonged use of intralesional steroids are dermal atrophy, fibrosis, and scarring.

Excision is another option to treat silicone complications.[5] It is best used when there are well-circumscribed nodules with clear margins to ensure successful removal.[25] Although numerous reports document successful resolution after excision, subclinical silicone migration may still cause symptom recurrence at distant locations.[23,25] Because of the potential for disfigurement from excision and uncertain successful cure, this option is best reserved for patients who have failed exhaustive nonsurgical interventions.[41]

There is a growing interest in using novel treatment modalities to treat siliconomas. Some novel treatments of silicone granulomas include imiquimod, etanercept, tacrolimus, and allopurinol. If the patient has failed to respond to the aforementioned treatment options, these medications should be considered as a next step.[38]

Imiquimod is a toll-like receptor immune activator that enhances release of interferons and interleukins that also has antiproliferative effects.[28,42] There has been one case in the literature reporting imiquimod's success in the treatment of a siliconoma.[28]

Etanercept, a dimeric fusion protein of soluble TNF receptor and Fc portion of immunoglobulin G1 (IgG1), is another potential option for treating silicone granulomas because of its success with other granulomatous diseases.[23,43] TNFα is a potent proinflammatory cytokine that has shown to be required for granuloma formation and maintenance.[8] There have been several reported cases of successful use of etanercept after failure of multiple other treatment regimens.[23] Symptoms may recur upon discontinuation, but prescribing another course should again control symptoms. Thus, it has been recommended that etanercept be prescribed for both the initial treatment and for symptom flare-ups.[23] Regimens of 50mg twice weekly or 25mg subcutaneously twice weekly have been reported to be successful.[23] However, one patient treated with etanercept for a different indication actually formed siliconomas many years after silicone injection.[44] In this case, the authors postulated that entanercept may have eliminated the granulomas previously formed against the silicone and enabled free access of the immune system to the silicone particles.[44] Further study into the role of etanercept in treating silicone granuolmas is needed.

Tacrolimus, a macrolide immunosuppressant, blocks T-cell signal transduction, interleukin 2 (IL2) transcription, and IL2 cell signaling via the inhibition of calcineurin and has shown success in other granulomatous diseases.[45] T-cells are an important part of granuloma formation and inflammation due to their release of TNFα and other proinflammatory cytokines.[46] In one case series of seven patients, tacrolimus 0.8 to 1.0mg/kg twice daily was given, sometimes combined with prednisone 2.5 to 5mg/day, with complete success in three cases and mild symptom recurrence in the remainder.[45] The authors speculated that higher doses of tacrolimus may have prevented these mild recurrences.[45] Of note, patient response occurred within two weeks of use.[45] Topical tacrolimus has also been reported to be beneficial.[21]

Allopurinol has been reported to treat injection complications of polymethylmethacrylate suspension with bovine collagen.[38] Allopurinol inhibits xanthine oxidase, which catalyzes the formation of superoxide, inhibiting granuloma formation.[38] One successful case with silicone has been reported at a dose of 300mg daily.[47]

Other anecdotal successes have been reported with methotrexate combined with oral corticosteroids, lasers (because they raise the temperature of the granuloma), taxol and carboplatin (via blocking antigen presenting cells from stimulating T-cell activation), topical cortisone combined with locally injected heparin, and 5 fluorouracil (5-FU).[26,46,48]

Finally, there are also numerous cases reported of silicone granulomas resolving spontaneously. Withholding medical therapy in hopes of a spontaneous resolution is not advised when there are systemic symptoms present indicative of an extensive inflammatory or infectious process.

Delayed-onset noninflammatory nodules. Delayed-onset noninflammatory nodules not associated with inflammatory symptoms are similar to immediate postinjection lumps and early noninflammatory nodules (i.e., localized filler accumulation) and tend to develop in mobile areas of the body, such as the lips.[6] Appropriate management includes vigorous massage along with intralesional corticosteroids. If corticosteroids do not cause improvement, the nodules may be treated as inflammatory.[6] Appropriate injection technique best avoids this complication.

Secondary lymphedema. Secondary lymphedema of the bilateral lower extremities has been described following large-volume silicone injection, likely due to

compression of the lymphatic system from the development of numerous foreign-body granulomas, and has been reported in a male-to-female transgender patient.[33] Treated conservatively, the patient responded to physical therapy, lymphatic drainage, and compression stockings.[33] If extensive symptoms exist, the treatment algorithm described in the siliconoma section may be attempted as resolving the siliconomas will alleviate their compression on the lymphatic system and will thus likely help resolve the secondary lymphedema. However, if the siliconoma algorithm is not reasonable or unsuccessful, the best option is supportive care, such as with the case reported in the literature. Appropriate treatment should be determined based on the individual presentation.

Silicone migration. Silicone migration secondary to large-volume injection or carriage by circulating macrophages can cause any of the above signs and symptoms at any site on the body.[3,5,19,25,33] To complicate the problem, patients may not recall that they had a silicone injection, causing the physician to not suspect silicone as an etiology and thus not appropriately manage the condition.[25] Silicone migration is best prevented by injecting as little as is necessary.

Persistent erythema and telangiectasias. Persistent erythema and telangiectasias following injection is an uncommonly reported complication and should only be considered in the absence of inflammatory symptoms. If these are the only complaints that manifest, successful treatment has been reported with either a 532nm or 1064nm laser over multiple sessions.[22]

CONCLUSION

The authors' patient represents a growing class of individuals who face the delayed side effects of obtaining nonmedical grade silicone injections. In this case, the patient presented with painful nodules and firm plaques, but patients may also present with lymphadenopathy, fever, ulceration, nausea, and vomiting, among other symptoms. These patients should not be abandoned despite the medicolegal barriers that exist. The authors urge physicians to consider taking on these patients and treating them using the management algorithm highlighted above. It is especially crucial to include NSAIDs and antibacterial therapy in the treatment regimen for a considerable amount of time before switching to steroid and immunosuppressant treatment, given the possibility of biofilm formation and further complications.

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