

The Risk of Alar Necrosis Associated with Dermal Filler Injection

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BACKGROUND Injection of dermal fillers is one of the most commonly performed cosmetic procedures. Serious complications from fillers are rare but potentially devastating to patients and physicians. Skin necrosis, such as nasal alar necrosis, is one of the most feared serious complications of dermal fillers, but there is a paucity of literature on the incidence of such events, as well as potential treatment options.

METHODS We present a review of the literature and three cases of nasal alar necrosis after dermal filler injection.

CONCLUSION Nasal alar necrosis associated with dermal filler injection is a rare event. Proper technique and recognition of risk factors may reduce the incidence of this complication. Physicians should be aware of early intervention and treatment options should impending necrosis become apparent.

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Soft tissue augmentation with temporary dermal fillers is a fast-expanding field and has become an integral part of many aesthetic physicians' practices. According to the American Academy of Aesthetic Plastic Surgeons, 1,448,716 people received hyaluronic acid (HA) injections from plastic surgeons in 2007.¹ This number does not reflect every filler procedure performed, because it does not include the procedures performed by dermatologists or other physicians. The cosmetic goal of dermal fillers is to temporarily eliminate fine lines and wrinkles and rejuvenate patients' appearance. As with any medical intervention, complications can occur, and adverse events are not rare. Complication rates with injections of HA fillers have been reported to be up to 5%.² Fortunately, most adverse reactions are mild and transient.

Adverse events can be grouped into expected procedure-related events, such as bruising, erythema, and tenderness; events potentially related to improper technique, such as nodule formation; and,

finally, reactions to the product, such as granuloma formation.³

There are several important factors that may lessen the occurrence of adverse events. Before injecting any dermal filler, a thorough medical history including medication (especially blood thinners), allergies, and scarring history (e.g., tendency for keloids) should be taken. The injector should be well trained in injection technique and know which filler to implant at which depth. The best way to handle side effects is to prevent them.

Possible complications when injecting dermal fillers can be divided into early and delayed in terms of time of occurrence and minor and major in terms of severity.^{3,4} Minor complications occurring immediately or hours to days after injection include injection site reactions such as bruising, erythema, pain and tenderness, swelling, and itching.^{5,6} Minor adverse effects usually resolve within a week without sequelae.

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A rare but potentially severe early-occurring complication is an immediate hypersensitivity reaction to the injected foreign substance, which can rarely lead to anaphylactic shock.⁷ Autologous tissue does not cause such responses, but animal- or cadaver-derived products may.

Other early-occurring adverse events are asymmetry, which should be avoidable with good injection technique. Lumpiness, nodules, or a bluish discoloration (Tyndall effect) and other early complications may be attributed to poor injection technique by placing the filler too superficially.⁸ One advantage of temporary HA fillers is that overcorrected areas or nodules can be dissolved by injection of hyaluronidase.⁹

A rare delayed major adverse event is the formation of granulomas. These have been reported to occur in roughly 0.1% of the patient population, mostly after the injection of permanent or semipermanent fillers.¹⁰ They usually occur within the first 6 months after injection, but can also occur as late as years after. Such foreign body reactions can be treated by repeated intralesional steroid injections. In extensive granulomatous reactions, surgery may be the only good treatment option.¹¹

The most severe and feared early-occurring complication is tissue necrosis, due to interruption of the vascular supply to the area by direct injury of the vessel, compression of the area around the vessel, or obstruction of the vessel by the filler material.¹² It is a rare event. In patients undergoing collagen injections, it has been reported in nine of 10,000 patients, although some areas, such as the glabella, are at higher risk, as has been reported for the injection of Zyplast (Allergan, Inc., Irvine, CA), with which 50% of tissue necrosis occurred in the glabellar area.^{13,14} This process is often associated with prolonged blanching and possibly pain at the site of injection, followed later by a dusky discoloration, although Hirsch and colleagues reported on an impending necrosis with the first symptom presenting only 6 hours after injection and being a dusky purple dis-

coloration of the affected area.¹⁵ When suspecting such an event, one should immediately discontinue injection, apply heat and nitroglycerin paste to induce vasodilation, and massage the area.¹⁶ There have been various reports on necrosis after injections with dermal fillers in the glabellar region.¹⁷⁻¹⁹ There are few reports on necrosis of the alar area upon injection of a dermal filler. Recently Inoue and colleagues reported on skin necrosis of the nasal ala after injecting the nasal tip with the HA filler Restlyane (Q-Med, Uppsala, Sweden) and injecting the upper lip, vermilion border, and nasolabial fold with a human tissue-derived, reconstituted collagen matrix (Sheba; Hans Biomed, Daejeon, South Korea).²⁰ This is the first report on alar necrosis after dermal filler injection.

We present a series of three more cases of alar necrosis after dermal filler injection.

Case 1

Patient was a 38-year-old woman who had undergone a rhinoplasty and received HA injection to the nasolabial folds. The procedure was uneventful. The patient contacted the injecting physician's office 1 day after injection to complain of a skin "irritation" on the left side of her nose with swelling and numbness but felt that she was improving.

The patient was seen 2 days later in clinic (3 days after injection) and found to have an approximately 1-cm area of necrosis (Figure 1). Given that it had been several days since injection, conservative treatment with bacitracin was advised. The patient was seen 2 days later, and superficial debridement was performed. The patient experienced a full recovery without untoward effects.

Case 2

Patient was a 25-year-old woman who received HA injection to the nasal tip. She reported an immediate reaction of erythema to a physician other than the one who had performed the injection (Figure 2). She was told to go to the emergency department,



Figure 1. Left ala 3 days after nasolabial fold injection with hyaluronic acid.

where she received nitropaste to the nose over an obvious reticulated area the same day of injection. The next day, she was given hyaluronidase and approximately three injections of hyaluronidase over the next 7 days. Continuous topical nitropaste and oral antibiotics were used for 1 week. The patient experienced a full recovery without untoward effects.



Figure 2. Reticular pattern troubling for vascular compromise over entire nose in a patient who received hyaluronic acid injection to the nasal tip.



Figure 3. Alar eschar 1 week after nasolabial fold injection with hyaluronic acid.

Case 3

Patient was a 42-year-old man without history of previous nasal surgery. He received 1 mL of HA into each nasolabial fold. Several hours later, he experienced nasal tip pain and reported a developing bruise. Within 12 hours, he had developed an eschar (Figure 3). He reported the reaction and was treated by a physician other than the one who had performed the injection. At that time, he had dusky erythema over the entire nasal tip. He was treated with 40 U of hyaluronidase, and the dark eschar was treated with hydrocolloid dressings. During the healing process, the treating physician noted subtle, early notching of the alar rim; 0.5 mL of triamcinolone 4 mg/mL was injected into the rim, and approximately 0.1 mL of collagen was injected to support the rim. The patient healed without notching but has a scar and some mild vestibular asymmetry (Figure 4).

Discussion

Although rarely reported in the literature, complications related to interrupted blood supply to the nose can occur with nasolabial fold dermal injection. The exact mechanism of this event is unknown. We theorize that, as injected HA expands because of



Figure 4. Nasal scarring after necrosis.

its hydrophilic action, the facial artery, angular artery, or its branches becomes compressed. The facial artery runs in an oblique direction over the mandible toward the nasal sidewall. It passes under the zygomaticus muscles, crossing the nasolabial fold. It turns to run in the alar crease and along the lateral nasal wall, where it terminates in the angular artery, which continues toward the medial orbital rim. The lateral nasal artery, which is considered a branch of the facial artery but is commonly found at the junction of the facial artery and angular artery, dominates the nasal tip and ala vasculature (Figure 5). The lateral nasal artery is located in the subdermal plexus approximately 2 to 3 mm superior to the alar groove. Therefore, compression of the facial artery from nasal labial fold injection or compression of the angular artery, at the alar rim could explain nasal tip or alar necrosis.²¹ Alternatively,

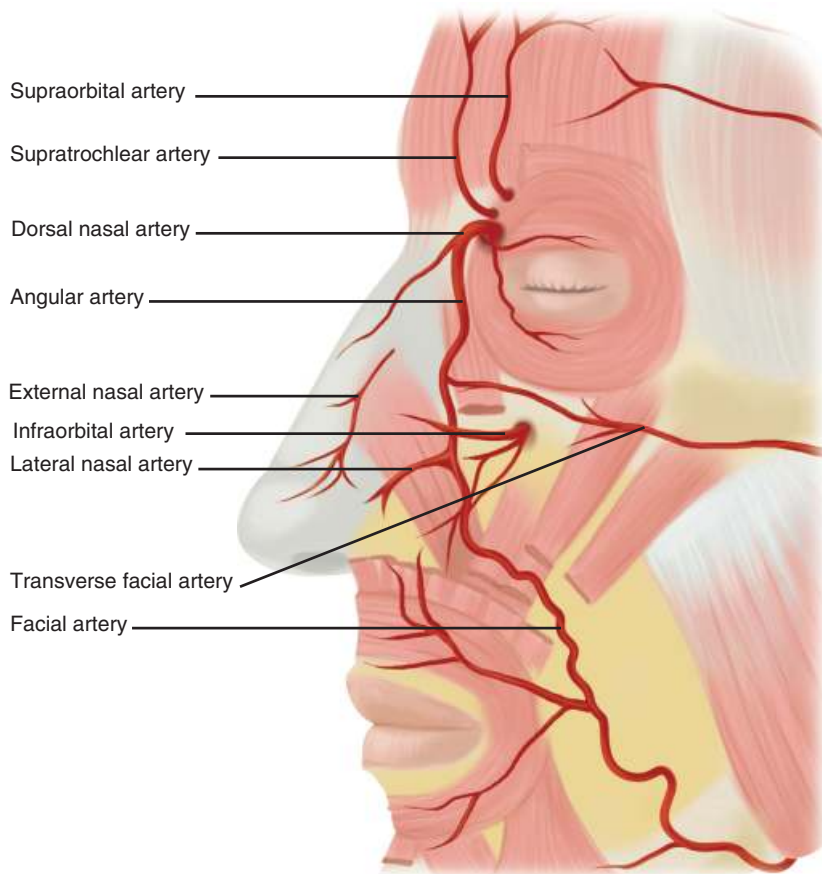


Figure 5. Nasal vasculature.

intravascular injection could lead to necrosis, although this would most likely manifest quickly, as in Case 1. All cases reported in the literature have involved HA injections, but there are also anecdotal reports involving calcium hydroxylapatite. As calcium hydroxylapatite becomes a more commonly used dermal filler, cases involving this product may become more prevalent.

Additionally, patients who have undergone previous nasal surgery, such as cosmetic rhinoplasty, may be at higher risk for such complications because of already altered and potentially compromised blood supply related to scarring under the nasal tip skin.

Although a rare complication, patients should be made aware of its potential.

Treatment options for impending necrosis are based on those recommended for the treatment of the glabella and remain anecdotal. No specific treatments have been elucidated for nasal involvement. Additionally, whether treatment should be initiated if the patient presents in a delayed fashion is unknown. Two of the three patients presented here consulted with a physician who did not perform the initial injection. Therefore, all physicians should be familiar with a treatment algorithm.

The authors recommend treatment with topical nitroglycerin paste at the first sign of blanching until improvement is noted; 75 U of hyaluronidase combined with 1.5 mL of 0.5% lidocaine (for HA injection) should be used as close to injection as possible if blanching, duskiness, or necrosis appears. Caution should be used when injecting hyaluronidase into the nose, although the primary author has used it successfully in the nasal tip in the case of nasal surgery. Rarely, patients can have a serious allergic reaction to hyaluronidase, including angioedema.²² Skin testing is sometimes recommended before the use of hyaluronidase, although skin testing may be impractical in the case of impending skin necrosis. Therefore, the patient should be given emergency instructions.

Even if patient presentation is delayed, treatment is still recommended because it may restore normal circulation and speed the healing process. Gentle debridement followed by application of a protective dressing or antibiotic ointment is also recommended, although patients can develop hypersensitivity to the ointment, which can complicate symptoms.²³ Any increase in discomfort or erythema should prompt investigation as to whether the ointment may be implicated. In the case of tissue loss, no reconstruction is recommended, even if necessary, for several months, until the eschar has fallen off and normal circulation and tissue integrity have been restored.

Hyperbaric oxygen has been used successfully for nasal tip grafting in cases of cancer or trauma reconstruction.²⁴⁻²⁶ The utility of hyperbaric oxygen in the case of vascular compromise due to cosmetic dermal injection has not been explored. Given the excellent aesthetic outcome in our cases, we do not feel that the cost, risks, and inconvenience of hyperbaric oxygen treatment is warranted. Additionally, this treatment is not available in all areas, although if more extensive cases of alar necrosis arise, consideration should be given to this treatment.

All patients should be seen often in follow-up to provide psychological support and to monitor for improvement.

Conclusion

The cases we present highlight a potentially dangerous and emerging complication of nasolabial fold correction with dermal fillers. Patients and practitioners need to be aware of this possibility so that appropriate treatment may be initiated in a timely manner.

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