Skin Necrosis of the Nasal Ala after Injection of Dermal Fillers

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Dermal filler is frequently used for soft tissue augmentation and contour correction. Generally, injectable, nonpermanent soft tissue augmentation materials are well tolerated and can be used safely in almost all candidates for facial augmentation, but these fillers are associated with the risk of early and late side effects and complications. Early on, there may be swelling, redness, bruising, and skin necrosis after intradermal or subdermal injections. Later, immunologic phenomena may appear, such as late-onset allergy, nonallergic foreign body granuloma, and hypertrophic scars.1 The most serious complication is localized tissue necrosis, induced by mechanical interruption of the local vascularity. This complication occurs rarely; in one study, the rate was nine in 10,000 patients who underwent collagen implantation.2 In two reported cases, hyaluronic acid injection of the glabellar and nasal alar regions induced arterial embolization.3,4

After the accidental intra-arterial injection of dermal fillers, there is a risk of vascular embolization, especially when injecting into the subcutis in the glabellar region, the nasal ala, and the nasolabial folds. It is important that the treating physician be aware that interruption of the vascular supply to the area by compression of or direct injury to vessels, as well as by vascular embolization, causes injection necrosis.

Here, we report the case of a 37-year-old woman who experienced sudden skin necrosis in the nasal alar region after an injection of dermal filler into the nasolabial fold.

Case Report

A 37-year-old Korean woman with no previous history of aesthetic surgery underwent injection of hyaluronic acid gel (Restylane, Q-Med, Uppsal, Sweden) for wrinkle correction of the nasolabial fold. Immediately after the injection, the patient reported sharp pain on the right side of her face. A few hours later, a reddish discoloration appeared on the right side of the nose and along the nasolabial fold. With a referral from a local general clinic, the patient visited our hospital 4 days after the procedure. She presented with a gangrenous skin necrosis measuring 1.5 × 1.3 cm and eschar involving the right nasal alar region. Intense erythema was seen on the area nourished by the lateral nasal branch and angular artery of the facial artery (Figure 1). Intravenous administration of 5000 IU of low-molecular-weight heparin (LMWH) and alprostadil (10 μg/2 mL ampules [amp], 5 ng/kg per min) was then started and continued for 5 days. Three-dimensional computed tomographic (3D-CT) angiography performed 10 days after the procedure demonstrated suspicious vascular occlusion of the terminal-branch arteriole of the angular artery and compensatory dilation of collateral vessels (Figure 2). The wound was treated with diligent moisturized wound care and daily dressings for 16

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days, until demarcation of the wound was evident. The necrosis extended to the surrounding skin and subcutaneous tissue but not to the lower lateral cartilage and was surgically removed on day 20. Histopathological examination of the biopsy specimen, obtained from the right nasal alar region, showed severe epidermal necrosis with acute and chronic nonspecific inflammation and multifocal amorphous material deposition in the dermis and vascular lumen (Figure 3).

A full-thickness skin graft, harvested from the ipsilateral postauricular area, was successfully performed. The patient has been followed for 3 months. Postoperatively, the right nasal ala has contracted slightly (Figure 4B).

Discussion

Schanz and colleagues reported on a patient who developed glabellar necrosis due to arterial embolization, which occurred after treatment with Restylane for augmentation of frown lines. In the present case, the skin of the right nasal alar subunit became completely necrotic, despite the absence of direct filler injection into the nasal alar area.

The external nose has an abundant blood supply, provided by the ophthalmic branch of the internal carotid artery and the facial branch of the external carotid artery. Classically, the external nasal branch of each ophthalmic artery runs along the dorsum of the nose to anastomose freely with the lateral nasal branch of the facial artery on each side, as well as with its superior labial branches. Therefore, the external nose has angiosomes supplying it bilaterally and establishing a major connection between the internal and external carotid systems. As is the case in the glabellar region, the blood supply of the nasal ala may depend strongly on a single arterial branch.
mass effect due to inappropriate filler material. Histopathologic examination of the biopsy specimen, obtained from the right nasal alar region, showed that the margin of the wound was confined to the nasal alar subunit because the nasolabial area (the course of the angular branch) was intact (Figure 4A). Accordingly, although intra-arterial embolization of the angular branch could not be confirmed directly, epidermal necrosis and intravascular and subdermal foreign-body deposition could be identified. The subdermal depositions of dermal filler suggested leakage into a terminal-branch arteriole.

Together, these findings led to the conclusion that the development of localized skin necrosis of the nasal alar region was due to intravascular embolization of the terminal-branch arteriole after the accidental intra-arterial injection of dermal filler.

Sharp pain and the whitish change in the early phase after injection suggested acute embolization of the artery or massive compression of the arterial branch by filler material. Painless blanching or bruising of the immediate area surrounding the injection is the initial sign of injection necrosis caused by dermal fillers. Blanching is usually, but not always, immediate at the time of the injection. Over the next 2 to 3 days, the skin appeared dusky and then black, with an eschar of necrotic skin developing over an ulcer. The eschar protects the underlying granulating wound and eventually sloughs off. To minimize the risk of local necrosis and embolization from the injection of dermal fillers, the needle tip must not be
As the field of injectable soft tissue augmentation grows, so does the number of reports of adverse events. Injecting physicians should have outstanding knowledge of subcutaneous facial anatomy to help prevent adverse events.

In general, subcutaneous structures most at risk of injury are vascular structures, nerves, and as reported in this issue, the parotid duct and gland.\(^1\)

There are numerous reports of vascular injury and necrosis after injection of soft tissue fillers.\(^2\)–\(^7\) Vascular injury and occlusion can happen by direct injection into the vascular lumen or by injecting around the vessel creating sidewall compression and occlusion. In either case, the surrounding tissue fed by the occluded vessel often immediately blanches white and may slowly develop blue to purple reticulated color. In such cases, massage may help alleviate the problem, as may application of nitropaste. Problems caused by hyaluronic acid have been successfully managed with injection of hyalurondase.\(^7\) The structures most at risk are the angular artery running subdermally at the lateral portion the superior nasolabial fold and the supratrochlear artery in the glabellar area (Figure 1). All of these arteries have anastomoses, and it is possible to create a large field of watershed vascular injury if the vascular occlusion is significant. In high-risk areas injecting in a slow retrograde linear fashion above the subdermis is recommended to avoid vascular injury.

Nerves may also be injured with injectable soft tissue fillers. Many physicians are now injecting on a deep epiperiosteal plane when volumizing the

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