Preventing, Identifying, and Managing Cosmetic Procedure Complications, Part 1: Soft-Tissue Augmentation and Botulinum Toxin Injections

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This column highlights some of the potential complications that have been associated with cosmetic procedures. Tips for how dermatology residents may prevent, identify, and manage complications from cosmetic procedures for optimal patient outcomes is provided. In part 1 of this series, soft-tissue augmentation and botulinum toxin injections are discussed. Part 2 will focus on chemical peels and laser therapy.

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The primary cosmetic procedures that dermatology residents will perform or assist in performing during their training are soft-tissue augmentation, botulinum toxin injections, chemical peels, and laser therapy. Because complications can occur from these procedures, it is important for residents to learn how to prevent, identify, and manage them for optimal patient outcomes. In part 1 of this 2-part series, soft-tissue augmentation and botulinum toxin injections are discussed. Chemical peels and laser therapy will be addressed in part 2.

Soft-Tissue Augmentation

Soft-tissue fillers include those that are made from collagen (bovine or human), hyaluronic acid (HA), poly-L-lactic acid, calcium hydroxylapatite, silicone, and polymethylmethacrylate. In general, acute complications of soft-tissue filler injections include erythema, swelling, and bruising.[1-3] Patients who take blood thinners or supplements (eg, vitamin E, ginseng, garlic, ginger) should be asked to discontinue use 1 week prior to the procedure. Patients who take blood thinners also should be counseled to expect some bruising. Prior to injection, the skin should be thoroughly cleansed to avoid introducing skin bacteria into the injection site and to reduce infection risk. Postinjection erythema may be related to mast cell activation, which is temporary and should resolve after a few days.[1-3]

If you find yourself injecting the filler too superficially, you may notice that the skin begins to take on a blue-gray hue[1-3] that is known as the Tyndall effect and can be prevented by injecting the filler at the proper level. For example, collagen-based fillers should be placed at the mid dermis, thicker HA fillers should be placed in the deep dermis, and calcium hydroxylapatite should be placed at the junction of the dermis and subcutaneous tissue. Polymethylmethacrylate and poly-L-lactic acid should both be placed subdermally.[1-3]

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The gravest immediate complications associated with soft-tissue filler injections are occlusion of the central retinal artery and/or skin necrosis.[1-4] Residents should never inject filler to the glabella or to the nose.[1-3] Injections at these sites are sometimes performed but should only be performed by experienced dermatologists. The perioral and tear trough regions also are high-risk injection areas that require a high degree of experience and should only be injected with proper supervision by an experienced dermatologist.[1-3] Residents generally can avoid these complications, though not with a 100% guarantee, by avoiding injections in high-risk areas, aspirating to check for blood, and slowly injecting a small amount of filler into the treatment area.[1-3] A consensus statement on management of injection-induced necrosis advises to apply a nitropaste ointment 2% to the treatment site or administer an oral aspirin if the patient develops severe pain; vision loss; or acute skin discoloration, especially blanching.[4] For HA-based fillers, at least 200 U of hyaluronidase should be injected. It has been suggested that saline can be injected to flush out calcium hydroxylapatite fillers.[3] Warm compresses should be placed on the involved area. Following these interventions, any patient with vision loss or orbital pain should immediately undergo ophthalmologic evaluation.[3] The most important intervention occurs in the first 24 hours.[3,4] After 24 hours, careful wound care, oral anticoagulants, and hyperbaric oxygen therapy have been suggested as management options.[3]

There are 2 major chronic complications of soft-tissue filler injection, including delayed-onset infection, which occurs 2 weeks or more postinjection, and granuloma formation.[1-3] Chronic low-grade infection at the injection site may be indicative of biofilm formation. If an HA filler was used, it should be dissolved with hyaluronidase to help break up the biofilm nidus.[3] A course of oral antibiotics also may be indicated.[1-3] Intralesional steroids may be used but only after antibiotics have been administered. A biofilm that develops from more permanent fillers may be more difficult to manage. Atypical mycobacterial infections have been known to develop at injection sites, which should be considered in refractory cases.[1-3,5]

Calcium hydroxylapatite, polymethylmethacrylate, and silicone can stimulate chronic immune system activation, which makes them more prone to granuloma formation.[1-3] Once infection is ruled out, granulomas may be treated with intralesional steroids, surgical excision (if the results would be cosmetically acceptable), laser therapy, or potentially local injection of an immunosuppressant (eg, methotrexate, 5-fluorouracil).[3]

Botulinum Toxin Injections

Patients who are pregnant, lactating, or have neuromuscular disease are not candidates for botulinum toxin injections. There also is a risk that patients taking calcium channel blockers or aminoglycoside antibiotics may experience potentiated effects of the botulinum toxin.[6]

Patients should be informed that a postinjection headache may occur and should be treated with over-the-counter medications.[6] Complication-free botulinum toxin procedures depend heavily on the physician's knowledge of facial anatomy.[1,6] The diagrams provided by Hirsch and Stier[1] offer an excellent guide on where to place the injections. Brow droop, eyelid ptosis, and "Spock brow" (eyebrows that are overarched) largely can be avoided by proper injection point placement. A Spock brow may be corrected by injecting the lateral upper forehead with a few units to correct the exaggerated arch.[6,7] For eyelid ptosis, apraclonidine 0.05% drops (1–2 drops 3 times daily) should be used until the ptosis resolves.[6] Phenylephrine hydrochloride drops may be used should a patient have a documented sensitivity to apraclonidine but should not be used in a patient with acute angle-closure glaucoma or aneurysms.[6]

Final Thoughts

Learning to perform soft-tissue augmentation and botulinum toxin injections can be a satisfying and fun part of dermatology residency. Preventing, identifying, and managing any complications that may occur is an integral part of performing these procedures.

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