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Orbital infarction syndrome following hyaluronic acid filler rhinoplasty

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ABSTRACT

Purpose: Over the last decade, injectable soft tissue fillers have become an essential part of facial plastic surgery practice. We report here a tragic complication of hyaluronic acid filler injection in a young healthy woman, management offered, and the outcome.

Observations: A 32-year-old woman developed unilateral acute blindness, orbital pain, total ophthalmoplegia, and anterior and posterior segment ischemia immediately following hyaluronic acid injection. Urgent measures were taken including hyaluronidase enzyme injection, vigorous messaging, and systemic steroids. Eight weeks later, the extraocular motility has fully recovered; however, the consequences of ischemia on the anterior and posterior ocular segments persisted.

Conclusions and Importance: Describing a major refractory complication following injecting hyaluronic acid dermal filler. Prompt intervention including the use retro or peribulbar injection of hyaluronidase has a little impact when it comes to reversing ocular sequalae. Therefore, injectors should be aware of facial danger zones that could potentially lead to this devastating outcome.

1. Introduction

Filler rhinoplasty utilizing hyaluronic acid is becoming an increasingly popular procedure being simpler and cheaper option with fewer side effects and a shorter down time.[1]

Occasionally, serious complications may occur. We describe a case with acute orbital infarction and facial skin necrosis following a hyaluronic acid injection. Urgent steps were followed; however, the visual effects of arterial occlusion by filler are devastating and irreversible.

2. Case report

At an aesthetic clinic, a 32-years-old woman was scheduled for a non-surgical filler rhinoplasty to correct a nasal hump deformity. A few seconds after injecting 0.5 mL of hyaluronic acid filler over the nasal bridge with a 30-gauge needle, she noted sudden complete loss of vison in her left eye. While still at the doctor's office, she received hyaluronidase enzyme injections subcutaneously (40 Units/cm^2) in the area over the nose and around the left eye; however, a firm swelling with tenderness around the left eye started to develop. The patient rushed to the ED with worsening persistent dull, aching pain, and bluish discoloration of the facial skin. She was evaluated by an ophthalmologist on-call within less than one hour, her visual acuity was no light perception (NLP) in the left eye. The left globe was frozen with hypotropia, exotropia, and complete external ophthalmoplegia with blepharoptosis (Fig. 1A). Slit lamp biomicroscopy of the left eye showed conjunctival chemosis, and grade 4 corneal haze obscuring other intraocular structures (Fig. 1B). She was diagnosed with acute left orbital infarction secondary to hyaluronic acid filler injection. Then, an immediate peribulbar injection of 2 cc (total of 300 units) hyaluronidase enzyme was given followed by vigorous massage aiming to disburse the bulk of the filler material; however, no improvement in vision noted. A three-dimensional computed tomography angiogram (3D-CTA) of the head and neck showed patent arterial vasculature. A computed tomography (CT) of the head and the orbits showed normal brain parenchyma without focal lesion. The patient received intravenous methylprednisolone 1 gm daily for 5 days, in addition to broad spectrum antibiotic coverage, antibiotic creams, and oral aspirin. After 8 weeks from presentation, her visual acuity did not change. The skin necrosis resolved with residual scarring. Left extraocular movement and blepharoptosis improved (Fig. 2). Slit lamp biomicroscope revealed clear cornea, with a dilated pupil and iris atrophy. Fundus exam indicated severe ischemia of the optic nerve and retina (Fig. 3A). Optical coherence tomography demonstrated diffuse retinal thinning of the inferior macula (Fig. 3B).

3. Discussion

Fillers by definition, refers to all materials that can increase volume

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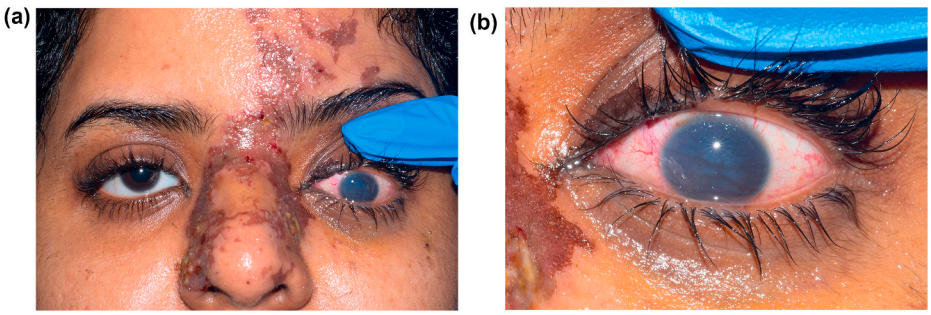

Fig. 1. External photos obtained on day 1. 1A. Necrotic tissues on both sides of the nose, and the left forehead. The globe is frozen with left hypotropia and exotropia. 1B. Closer view to the eye showing diffuse conjunctival injection, superior subconjunctival hemorrhage, and grade 4 corneal haze indicating anterior segment ischemia.

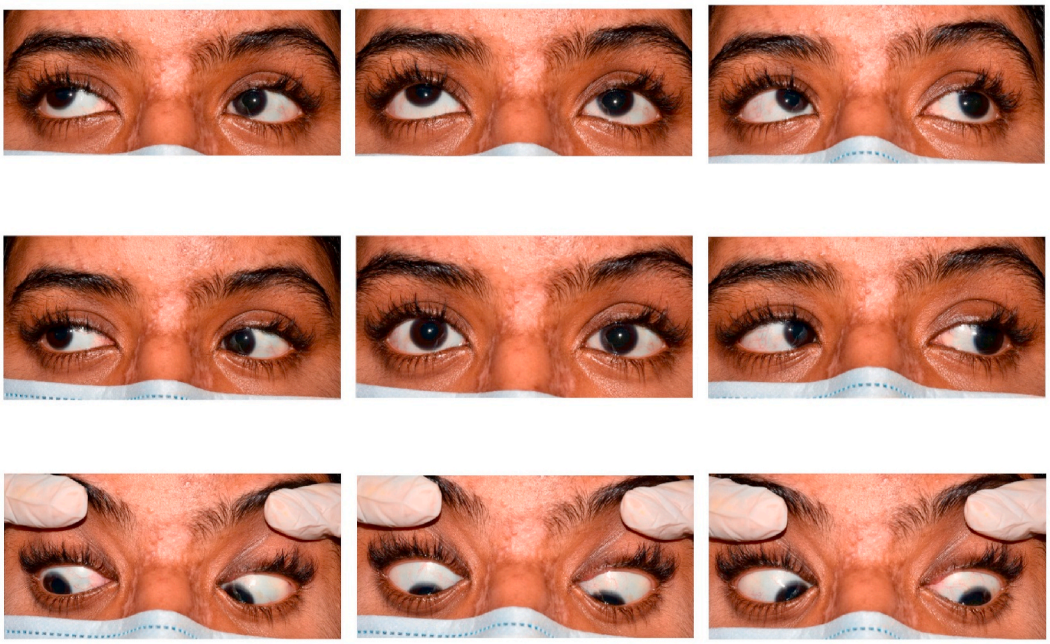

Fig. 2. The 9 cardinal positions photos show near full ocular motility with mild residual limitation of elevation in the left eye 8 weeks later.

by injection. The most well-known types of fillers include hyaluronic acid products, collagen, paraffin, and liquid silicon.[2] Most of the fillers have a good safety profile with most complications being swelling, erythema, bruising, discoloration, or granuloma formation. However, the most serious complications that occurs after rhinoplasty using filler is vascular ischemia and tissue necrosis.[3] The mechanism of necrosis can be divided into intravascular or extravascular causes. Intravascular factors include direct block of arteries and chemical damage of the endothelial lining.[4] Extravascular causes include external venous compression due to excessive volume of injection, or edema and inflammatory reaction caused by a component of the filler.[5] Amid the previously suggested factors, intraarterial embolism is supported by many investigators as a main cause for vascular compromise after filler injection.

The nose, nasolabial fold, and glabella are considered high risk areas for injections given the rich vascular supply, with contributions from the internal carotid artery (ICA) and the external carotid artery (ECA) via the facial artery. The lateral nasal artery which is a branch of the facial artery, supplies the skin on the nose, and forms anastomoses with the ophthalmic artery.[6] During injecting, the filler may reverse the flow in the lateral nasal artery and then travel through the ophthalmic artery just proximal to the origin of the retinal artery. As these are considered small arteries, it does not take a large volume of filler to occlude the retinal circulation and induce permanent ischemia.

Glaich et al. suggested an urgent treatment protocol that can be used to treat vascular compromise, this included vigorous massaging, warm compresses, 2% nitroglycerine paste, and injecting hyaluronidase enzyme.[7] But when blindness develops, many questions rise regarding the use of hyaluronidase enzyme, Carruthers et al.[8] suggested a retrobulbar or peribulbar approach for hyaluronidase injection to treat hyaluronic acid gel–induced blindness, as it has been shown to be capable of penetrating human arterial wall in vitro. However, another in vitro study found that hyaluronidase lacks the ability to diffuse through the dural sheath suggesting that retrobulbar hyaluronidase injection is unlikely to alleviate hyaluronic acid gel–mediated central retinal artery occlusion and blindness.[9] Our patient received subcutaneous and peribulbar hyaluronidase within the proposed window of treatment before the development of irreversible retinal damage. However, this treatment was unable to substantially recanalize retinal artery occlusion for our patient.

This case report does not rule out the probability that patients who receive peribulbar hyaluronidase within four hours after filler injection can benefit from this treatment. It is also important to keep in mind that retrobulbar injection itself and Hyaluronidase may cause serious complications,[10] and requires precautions. Further studies to assess utility of using other routes of injecting hyaluronidase including intraarterial, and

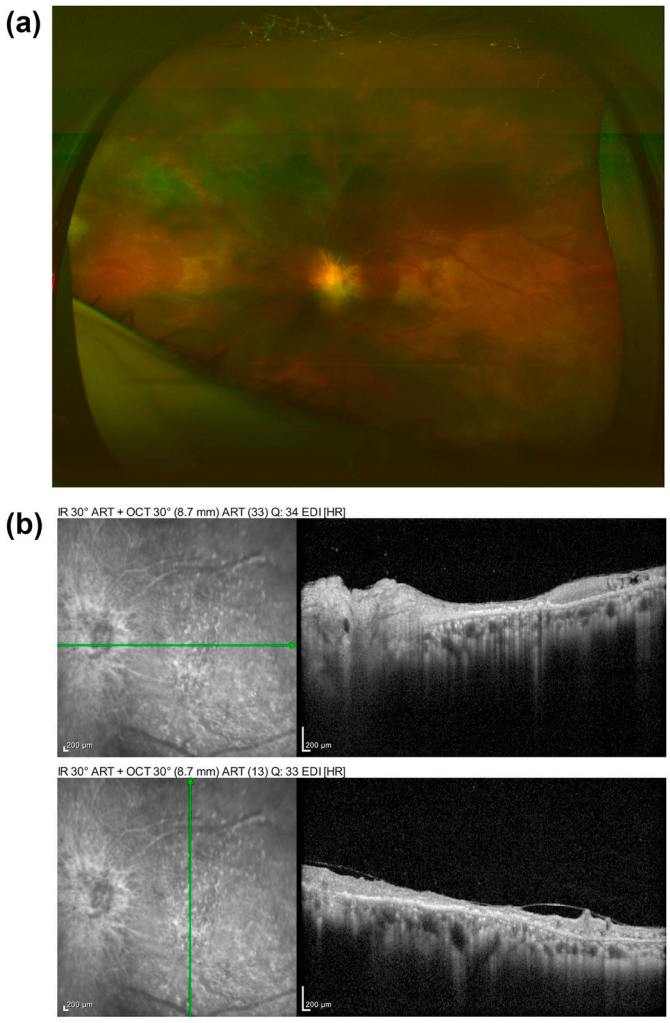

Fig. 3. Optos ultra-widefield retinal imaging and OCT of the macula of the left eye 8 weeks following ischemia development. 3A. Fibrovascular membrane formation over the optic disc. Intra-arterial emboli visible along the superior temporal retinal artery. Diffuse retinal ischemia with pigmentary changes. 3B. Loss of normal architecture of the retina due to severe ischemia involving inner and outer retina.

intravitreal will be required before any definitive recommendations can be set forth.

4. Conclusions

Blindness due to an embolism of hyaluronic acid filler is instant and associated with excruciating ocular pain. Treatment of blindness is rarely successful.

Patient consent

Patient consented to de-personalizing the Confidential Health Information and sharing the same in a non-identifiable data format for the purposes of education and research.

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Authorship

The author meets the current ICMJE criteria for Authorship.

Declaration of competing interest

Luai Eldweik has no financial disclosures.

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