



Glabella impending skin necrosis: a case report

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Abstract

A 47-year-old female patient undergoing hyaluronic acid injection in the glabella region suffered intravascular injection leading to marked discoloration (whitening) of the whole angiosome of the supratrochlear artery, extending to the areas of the anastomoses to the left upper eyelid, the dorsum of the nose, and the left sidewall of the nose. The syringe was immediately withdrawn while aspirating and prompt salvage counter-measures were taken, including application of warm compresses, vigorous massaging, oral administration of aspirin, repeated injections of hyaluronidase, and application of nitroglycerine paste on the affected area. The patient was followed up on a daily basis and the only additional treatment was the application of a combined antibiotic/steroid cream. The area affected healed satisfactorily with no scarring after 20 days. Our treatment protocol is discussed with special mention to the emerging role of hyaluronidase as the single most important rescue measure in the treatment of hyaluronic acid filler-related vascular adverse events.

Level of Evidence: Level V, therapeutic study

Keywords Hyaluronic acid · Fillers · Intravascular injection · Vascular adverse events · Vascular compromise · Glabella · Hyaluronidase

Introduction

According to the 2016 ASPS statistics, the use of dermal fillers has increased by 2% from 2015 to 2016 and by 298% from 2000 to 2016 [1]. This raise has also led to an increase in the rate of complications, especially since these products are widely used by untrained physicians, let alone non-physicians.

Dermal filler injections are generally well tolerated but they can cause a series of early and late complications that are technique-related or material-related. Among the most dreaded complications are vascular adverse events and, in particular, intravascular filler injection leading to skin necrosis, vision impairment, or cerebral vascular events by way of arterial embolism or venous obstruction.

Case report

A female patient first presented to our clinic in 1999 at the age of 30, seeking non-surgical facial rejuvenation, and has since been treated on several occasions with neuromodulators and hyaluronic acid (HA) dermal fillers of different manufacturers. HA dermal fillers have been routinely used on this patient for treatment of the nasolabial folds, marionette lines, and the glabella area.

In October 2016, at the age of 47, she visited our clinic for a repeat HA treatment to the nasolabial folds and glabella area (frown lines). Anesthetic cream (EMLA 5%, Astra) was applied to the treatment areas for 40 min. A luer-lock prefilled syringe of 1 ml 20 mg/ml HA with a 27-gauge needle was used. The technique which we usually use is that of linear threading combined with multiple serial punctures. The procedure for the nasolabial folds went smoothly and we proceeded to the glabella.

Immediately after the first puncture, and even though aspiration was performed, a marked skin area of discoloration (whitening) appeared at the area of distribution of the supratrochlear artery (supratrochlear artery angiosome), extending to the areas of the anastomoses to the left upper eyelid,

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Fig. 1 A 47-year-old female patient undergoing hyaluronic acid injection in the glabella region. Marked skin area of discoloration (whitening) in the area of distribution of the supratrochlear artery (angiosome), extending to the areas of the anastomoses to the left upper eyelid, the dorsum of the nose, and the left sidewall of the nose

the dorsum of the nose, and the left sidewall of the nose (Fig. 1). The patient did not complain of any pain at the time of injection. The syringe was immediately withdrawn while aspirating and prompt salvage counter-measures were taken:

- (1) The area was vigorously massaged and warm compresses were applied,
- (2) 500 mg of aspirin was administered orally,
- (3) 200 IU of ovine hyaluronidase (Hyalase®, Wockhardt UK Ltd) was injected in the area around the vessel and repeated every half an hour up to 600 IU,
- (4) and nitroglycerine paste 2% was placed on the glabella skin

The discoloration (whitening) did not improve despite these treatments.



Fig. 2 Livedo reticularis (slow capillary refill and dusky blue-red discoloration) appearing 24 h after injection

The following day the patient complained of excruciating pain and livedo reticularis (slow capillary refill and dusky blue-red discoloration) appeared in the area in question (Fig. 2).

Two days later, blisters appeared and the pain subsided. A combined antibiotic and corticosteroid cream (fusidic acid/betamethasone valerate 20 mg/g + 1 mg/g, Fucicort® Lipid, Leo Pharma) was prescribed and hyperbaric oxygen treatment was arranged for the same day. Unfortunately, the patient could not complete the hyperbaric oxygen treatment session due to claustrophobia and inability to perform a Valsava maneuver during the dry diving.

The patient was followed up on a daily basis and the only treatment was the aforementioned combined antibiotic/steroid cream. The area affected healed satisfactorily with no scarring in 20 days (Fig. 3).

Discussion

By minimally altering the material, manufacturers of hyaluronic acid fillers have been able to create HA products that are well tolerated by the immune system and exhibit favorable physical and mechanical properties.

Dermal fillers are one of the most commonly performed cosmetic procedures. Serious complications such as vascular adverse events, are rare, but can be devastating to both patients and doctors. Injectable filler-related vascular adverse events can be due to arterial or venous obstruction, either by way of intravascular injection or by way of external pressure (intra-dermal bleeding/hematoma or compression from the filler). The latter is particularly relevant to venous obstruction.

The recent incorporation of lidocaine in dermal fillers increases the risk of intravascular injection due to the vasodilatory effect of lidocaine. On the contrary, the use



Fig. 3 Satisfactory healing with no scarring after 20 days

of adrenaline prior to the treatment, such as with local anesthetic injections, causes vasoconstriction, reducing the size of the vessels and the risk of intravascular injection.

Venous occlusion has delayed presentation with dull pain and dark discoloration. On the other hand, arterial occlusion presents immediately with sharp, severe pain, and blanching of the arterial angiosome. In case of accidental arterial embolization of the central retinal artery by the filler material, the patient may suffer one the most serious complications, visual loss [2, 3].

The treatment for filler-related vascular adverse events consists of the following steps [2, 4–6]:

- stop injection immediately
- attempt aspiration
- massage the area
- apply warm compresses
- apply 2% nitroglycerin paste
- inject hyaluronidase 200–600 IU
- give aspirin PO
- apply antibiotic cream with corticosteroids
- perform conservative debridement only.

Every clinic performing injectable treatments should have a crash cart containing hyaluronidase, warm compresses, aspirin, and nitroglycerine paste 2%.

Hyaluronidase has emerged as the single most important rescue measure in the treatment of hyaluronic acid filler-related vascular adverse events [7]. Hyaluronidase is a naturally occurring enzyme that degrades hyaluronic acid by splitting the bond between glucosamine and glucuronic acid [8]. Although the use of hyaluronidase in treating dermal filler complications is off-label, its use is allowed provided the patient's best interest and autonomy are respected and forms part of the informed consent [1]. Ever since its first use as a reversal tool for hyaluronic acid fillers in 2004 [8], hyaluronidase has been established as the main rescue agent in the treatment of hyaluronic acid filler complications. A recent published research [4, 5, 7] has advocated the use of large repeated doses of hyaluronidase in the treatment of vascular adverse events, and some authors are even suggesting that hyaluronidase is the only effective agent in the treatment of such complications [7].

Conclusion

The increasing number of dermal filler procedures has unavoidably led to an increase in the rate of complications.

Hyaluronidase has emerged as the single most effective rescue agent in the treatment of severe hyaluronic acid filler-related complications and vascular complications in particular. National and international societies and governing bodies must urge their members to receive proper and continuing training in the prevention and management of dermal filler complications.

Authorship credit All authors have met the ICMJE guidelines for authorship credit as follows:

George J. Zambacos: conception and design, drafting the article, and revising the article critically for important intellectual content; final approval of the version to be submitted; and agreement to be accountable for all aspects of the work.

Dimitrios A. Hapsas: treating physician and provision of clinical information; drafting the article and revising the article critically for important intellectual content; and final approval of the version to be submitted.

Apostolos D. Mandrekas: treating physician and provision of clinical information; conception and design of the paper; revising the article critically for important intellectual content; final approval of the version to be submitted; and agreement to be accountable for all aspects of the work.

Compliance with ethical standards

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Conflict of interest George J. Zambacos, Dimitrios A. Hapsas, and Apostolos D. Mandrekas declare that they have no conflict of interest.

Ethical approval Not applicable.

Informed consent Informed consent was obtained from the patient presented in this article.

Patient consent Patients provided written consent for the use of their images.

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