

Hyperbaric Oxygen Therapy in Hyaluronic Acid Filler–Induced Dermal Ischemia

Since hyaluronic acid (HA) fillers are effective and relatively safe, they have become increasingly popular over the past years. Nevertheless, injection with HA fillers can lead to complications, with varying levels of severity. One of the most severe early-occurring complications after injection with HA filler is vascular compromise¹; this can lead to ischemia, which may result in necrosis of the skin.

Several recommendations have been made for the treatment of this complication. In severe cases of skin necrosis, hyperbaric oxygen therapy (HBOT) can be considered, in which patients inhale 100% oxygen at 2 to 3 the atmospheric pressure at sea level.²

Described below are 2 patients in whom HBOT was used to treat HA filler–induced dermal ischemia.

Patient 1

A 55-year-old woman received injections with crosslinked HA in the dorsum and columella of the nose and in the nasolabial folds. Immediately after injection of a total of 1-mL HA, discoloration of the upper lip occurred. Most likely, the buccal branch of the maxillary artery was occluded. The capillary refill time was prolonged (13 seconds). After 30 minutes, the patient was injected with hyaluronidase (150 U) at various depths in the affected area, that is, the nose and upper lip. The patient also received hyaluronidase injections at the base of the columella and next to the apertura pyriformis, as the filler might have ended up intra-arterial in these areas. The patient was also treated with tadalafil, fusidic acid, prednisolone, and aspirin. The next day, the patient received hyaluronidase again and underwent an experimental treatment with platelet-rich plasma, to stimulate and accelerate soft-tissue healing. However, the patient's condition did not improve, and 6 days after the initial

dermal filler injections, the patient appeared at the cosmetic clinic with 3 wounds, 2 on the right vermilion border of the upper lip and 1 on the right ala. Because slough on the vermilion of the lip indicated infection of the wound, amoxicillin/clavulanic acid treatment was started.

Despite these treatments, the patient's condition did not improve, and she was sent to the hyperbaric oxygen department of the Amsterdam University Medical Centers—location Academic Medical Center (AMC) to prevent permanent sequelae.

Two days after wound development, that is 8 days after the initial dermal filler injections, HBOT was started. At each session, the patient was administered 100% oxygen for a total of 80 minutes under increased pressure of 2.4 atmospheres absolute. Using an oronasal mask, 100% oxygen was delivered in 4 episodes of 20 minutes each, each episode interrupted by 5 minutes of regular air breathing; this resulted in a hyperbaric session lasting (in total) 110 minutes. Figure 1 shows a photograph of the patient before the start of HBOT. During therapy, there was progression in wound healing. HBOT was continued until the wounds had recovered completely without any scarring, which was realized after 21 sessions (Figure 2). During the first 7 days, the patient received therapy twice a day. During the subsequent week, the patient underwent treatment once a day, continuing throughout the weekend.

Patient 2

The second case concerns a 43-year-old man who received injections with crosslinked HA filler in the chin and nasolabial folds. Immediately after injection, perfusion was reduced in the right half of the face at the



Figure 1. Photograph of Patient #1 before starting hyperbaric oxygen therapy.

medial cheek, nose, and upper lip. Most likely, the facial artery was occluded. In a cosmetic clinic, during 4 days, the patient was injected multiple times with hyaluronidase. The patient was also treated with amoxicillin/clavulanic acid, fusidic acid, valacyclovir, and carbasalate calcium and also received several types of analgesics.

However, because the patient's condition did not improve, 6 days after the initial filler injections, the patient was sent to the Amsterdam University Medical Centers—location AMC for HBOT.

Figure 3 shows the patient's condition before starting HBOT. HBOT was continued until the wounds had recovered completely without any scarring (Figure 4). The patient was administered 10 sessions of HBOT using the same method as described above (Patient 1). During the first 2 days, the patient received this treatment twice daily and, during the following 6 days, only once a day.

Discussion

Most adverse events which occur after the use of HA fillers are mild and self-limiting. However, a rare but severe complication of HA fillers is vascular compromise. Although vascular compromise caused by dermal fillers is a rare complication, the prevalence may increase with the rising popularity of these fillers. Appropriate treatment for this complication is necessary because it can cause facial necrosis. Hyaluronidase is an enzyme which catalyzes the degradation of HA to reverse the effects of the fillers



Figure 2. Photograph of Patient #1 after finishing hyperbaric oxygen therapy.

and is commonly used in the treatment of this complication.¹

Hyperbaric oxygen therapy should be considered in severe cases of skin necrosis. Clinical efficacy from HBOT is mainly derived from modulation of intracellular transduction cascades, leading to synthesis of growth factors and promoting wound healing and ameliorating postischemic and postinflammatory injuries.³ Indications for HBOT include necrotizing soft-tissue infections and enhancement of healing in selected problem wounds.⁴ However, the value of HBOT in the treatment of this complication has not yet been extensively examined.

The numbers of sessions with HBOT differed between the 2 patients (21 and 10) because the amount of therapy required for wounds to heal varied. This variation is also seen in other cases in which HBOT has been successfully used in the treatment of vascular complications after injection of cosmetic fillers.⁵ More research on the use of HBOT in injection-induced necrosis is needed, as it seems to be a promising treatment option to prevent permanent sequelae.

Conclusion

Vascular compromise caused by dermal fillers is a major concern. The patients described here illustrate the potential benefit of HBOT to treat wounds caused by vascular occlusion after cosmetic dermal



Figure 3. Photograph of Patient #2 before starting hyperbaric oxygen therapy.

injections. However, more research on the use of HBOT in similar cases is required.

References

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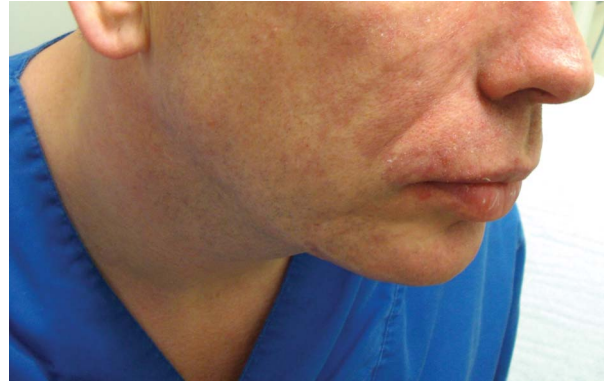


Figure 4. Photograph of Patient #2 after finishing hyperbaric oxygen therapy.

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