Case reports

A case of facial vascular occlusion after hyaluronic acid cosmetic filler injection treated with adjunctive hyperbaric oxygen

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Keywords

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Abstract

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Treatment of suspected upper lip area vascular occlusion caused by facial hyaluronic acid filler injections with hyperbaric oxygen is reported. The patient was initially treated with hyaluronidase injections in the cosmetic clinic then again in the emergency department. Persistent symptoms and signs of occlusion prompted hyperbaric oxygen treatment at 284 kPa (nine treatments over seven days). The outcome was positive for this patient and adds supportive evidence to the sparse literature, which are mainly case studies.

Introduction

Soft tissue injuries have been reported from vascular obstruction caused by the injection of hyaluronic acid filler. The standard initial approach to treatment is with the injection of hyaluronidase to dissolve the filler.¹ Persisting vascular occlusion has been treated with hyperbaric oxygen in several reported case studies.^{2–4} Here we report another case of vascular occlusion treated with hyaluronidase and hyperbaric oxygen treatment (HBOT).

Case report

The patient reported in this case report approved the publication of clinical details and photographs.

A 36-year-old female non-smoker with no significant past medical history was referred by medical staff at a cosmetic clinic after developing pain, swelling, and dusky colouration in her upper lip 12 hours after receiving hyaluronic acid filler injections (0.15 ml Stylage Medium; crosslinked hyaluronic acid in mannitol) into this same area. Vascular occlusion by the dermal filler was suspected. Initial management by the clinic involved regional injection of hyaluronidase 1,500 IU x five boluses plus aspirin.¹ Although there was a minor improvement, persisting discolouration and pain prompted the decision to transport to the Emergency Department of the local public hospital for presumed continued upper lip vascular occlusion (see Figure 1).

During her emergency admission she was given further injections of hyaluronidase (two x 1,500 IU) and was assessed by the hyperbaric physician on call. The patient had no contra-indications to HBOT and was initially treated at 284 kPa (2.8 atmospheres absolute [atm abs]) in a regimen involving three twenty minute oxygen breathing periods separated by five minute air breaks, followed by a 30 minute decompression. Initial treatment took place in a multiplace chamber with similar follow-up treatments twice daily for two days and once daily for four days in a monoplace chamber. A total of nine HBOT treatments were given.

The patient reported improved pain and objectively had some resolution of the swelling after the first treatment, and by treatment six she had normal capillary refill and reported subjectively normal skin temperature in the affected region (Figure 2). At the end of the treatments the physical appearance of the facial area was perceived to be back to normal by both the patient and the medical staff.

The patient was followed up at two weeks by hyperbaric staff with total resolution of all the symptoms (Figure 3).

Figure 1 Appearance of the upper lip before any hyperbaric oxygen treatment



Figure 3 Appearance of lips two weeks after completion of hyperbaric oxygen treatments



Discussion

Injection of filler in cosmetic clinics is a multi-billion-dollar industry and becoming more accessible and acceptable.⁵ Case reports of vascular occlusion following dermal filler or autologous fat injection vary from pain and localised skin necrosis to retinal artery occlusion, sensorineural deafness, stroke and even death.⁶⁻⁹ Most of the literature pertaining to acute vascular occlusions in the head and neck and hyperbaric oxygen have historically referenced central retinal artery occlusion (CRAO) or branch retinal artery occlusion (BRAO).¹⁰

In Australia, the Australian Health Practitioner Regulation Agency publishes guidelines for non-surgical cosmetic procedures performed by medical professionals.¹¹ However, there is a significant unregulated industry including black-market injectables and home injectors.¹² There is no impediment to buying hyaluronic acid online and selfinjecting. There is a broad range of target areas in the face for dermal fillers, including jaw line, chin, infra-orbital, and glabella.

Figure 2 Appearance of upper lips after five hyperbaric oxygen treatments



The primary medical emergency response to vascular occlusion is injection of pulsed high dose hyaluronidase in the affected area to dissolve the hyaluronic acid filler material.¹ This can be repeated up to four cycles of 1,500 IU hourly. If this fails, anecdotal evidence supports the use of HBOT in achieving better outcomes, but treatment times and pressures vary.²⁻⁴ The presumed beneficial mechanism is supporting tissue oxygenation during the initial hypoxic event, reduction in swelling, and downregulation of triggered inflammatory mediators.¹³ Longer term benefits may include modulation of angiogenesis and connective tissue formation/repair. There are no large randomised controlled trials regarding HBOT and cosmetic vascular occlusion but extrapolation of the data supporting HBOT for CRAO/BRAO would appear to present a solid pathophysiological model base for arguing the benefits.^{14,15} Hyperbaric oxygen treatment has been used successfully in other soft tissue injuries of the face.¹⁶ The potential longterm harm caused by vascular occlusion in the face such as scarring, facial distortion, mastication and speech issues, psychological harm and permanent disfigurement or sensory impairment should encourage research into mitigating these harmful outcomes. In Tasmania, HBOT was included in the earlier CRAO/BRAO protocol (guidelines for management of soft tissue filler-induced vision loss) but was left out of the 2022/3 guidelines because they referred to the National guidelines (RANZCO Filler Blindness Guidelines).¹⁷ We are currently working to rectify this omission.

Conclusions

Consideration should be given to treating vascular occlusion caused by dermal fillers such as HA, with HBOT as an adjunct to hyaluronidase injections. This is supported by pathophysiological models and by limited case studies. Larger trials would be ideal although the low prevalence would create difficulties in recruitment. However, this cosmetic procedure is becoming more common therefore we may yet see an increase in complications.

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