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CASE REPORT
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Managing Complications of Submental Artery Involvement after Hyaluronic Acid Filler Injection in Chin Region

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Summary: Hyaluronic acid dermal fillers are becoming popular all over the world, but due to the presence of many blood vessels in the face, there is always a small possibility of vascular complications. We present a case with the ischemic involvement of chin and neck skin after accidental submental artery involvement after hyaluronic acid filler injection for chin region. Impending skin necrosis on the chin and upper neck on the right side was diagnosed quickly by observing the skin changes in the immediate postfiller phase. Pain in the mandible and in the muscles during swallowing due to possible ischemia of muscles supplied by submental artery was another crucial diagnostic feature. All parts of the affected zone were treated with high-dose pulsed hyaluronidase protocol using 4 pulses of hyaluronidase injection in first 24 hours after filler injection. Complete resolution of cutaneous ischemic changes and painful swallowing was achieved within days after treatment. Knowledge of presenting features of postfiller vascular complications and the extent of vascular territory of the involved artery is quite helpful in quickly instituting treatment leading to the near-complete recovery with minimal sequelae. *(Plast Reconstr Surg Glob Open 2018;6:e1789; doi: 10.1097/GOX.0000000000001789; Published online 25 May 2018.)*

Hyaluronic acid (HA) dermal fillers are becoming popular all over the world for facial treatments. However, due to the presence of many blood vessels in the face, there is always a small possibility of vascular complications because of accidental intraarterial injection. Although soft-tissue fillers have a very favorable safety profile, adverse events can rarely happen even in the hands of an experienced injector.[1] It is imperative for aesthetic practitioners to promptly recognize the features of post HA filler vascular occlusion, for management to begin immediately.

CASE REPORT

A 31-year-old Indonesian female patient was injected at a private hospital for chin augmentation. She had the previous history of 3 ml HA fillers injection in the chin area 2 months earlier and history of acne in chin area in the past. There was no history of previous health problems, smoking, or any allergy. She was not on any systemic treatments and not using any topical products.

Juvederm Voluma (Allergan Inc., Irvine, Calif.) filler that has a concentration of 20 mg/ml of HA and premixed with lidocaine was injected by an experienced injector, using the 27 G sharp needle in the supraperiosteal plane. Injection on the chin apex was given in midline using 1.4 ml of filler followed by 0.3 ml on each side of midline in the anterior chin area after performing aspiration. The injection was given slowly and with minimal pressure. All injections were given in supraperiosteal plane. Immediately after completing the filler injections, blanching of skin on the right side of chin and upper neck areas was noted. The patient complained of excessive pain on the chin spreading to the mandible and gingival area immediately after the injection. She also complained of severe pain during swallowing. Ten minutes after completion of injections, livedo reticularis/skin mottling was beginning to show around the blanched skin patch extending from the mental crease to the upper cervical area with skin overlap on the left side across midline in some areas (Fig. 1). The decision to dissolve the HA filler material with high-dose pulsed hyaluronidase was taken immediately. As adjoining

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Fig. 1. Postinjection picture taken 15 minutes after filler injection in the chin. Skin discoloration and demarcation of the ischemic area visible in chin and neck.

skin units of the chin and upper neck were involved, 1,000 U of hyaluronidase was injected using a 30 G needle at chin and neck area, which became demarcated after filler injection, was injected and 1 cm beyond the demarcated affected zone was also injected. Within minutes, reperfusion was noted in most of the involved area (Fig. 2). After 60 minutes, some patches of mottling were still seen in affected area along with persistence of painful swallowing and a further 1,000 U of hyaluronidase was injected using a 27 G cannula, passing both in deep and superficial planes. A cannula was used to avoid the possibility of any additional bruising. Immediate reperfusion was again noted in residual mottled skin patches and pain during swallowing also reduced markedly. The patient was also put on oral Cefixime 200 mg twice daily and acetylsalicylic acid 75 mg once daily along with topical Mupirocin ointment for 5 days.

During the post-hyaluronidase injection period, there was no increase in the size of the involved area. After 6 hours, the affected area was injected again with the third pulse of 1,000 U of hyaluronidase. The patient was sent home after treating physician was satisfied with perfusion status of skin. The patient was reviewed after 24 hours of filler injection, and though most of the areas were well perfused with some residual pain, the patient was injected with the fourth pulse of 1,000 U hyaluronidase using a 27 G cannula.

Continuous maintenance of good capillary refill and improvement in pain in the affected area were considered the endpoint of hyaluronidase treatment after the fourth pulse. Forty-eight hours after filler injection, the patient had developed multiple small pustules over the whole territory. On the fifth-day postinjection, pustules on the chin started to dry, leaving some crusts (Fig. 3). Pain in the chin apex and during swallowing was minimal. On the seventh day

Fig. 2. Picture taken immediately after first high-dose pulsed hyaluronidase (HDPH) treatment showing reperfusion in the ischemic zone with a small area of blanching (shown by an arrow), still in the middle of the ischemic zone.

Fig. 3. Five days post-hyaluronidase, with skin changes like pustules and crusting around the mental crease, extending to the chin apex.

Fig. 4. Cadaveric dissection, demonstrating the course of the submental artery and its branches and its relationship (shown by an arrow) to chin injection points. (Picture credits: Krishan Mohan Kapoor).

postinjection, pustules had healed without any residual scarring, and there was no pain in the chin apex and during swallowing. However, some hyperpigmentation and erythema around the mental crease were noted that improved markedly in next 2 weeks.

DISCUSSION

This case is being presented for injectors to learn about the possibility of intraarterial injection in the chin area during filler injection and its management. The chin region is considered a safer area, as very few cases of post-filler vascular complications have been reported in the literature.[2] The presence of submental artery and its communication with inferior labial artery and mental artery could be basis for a more extensive territory involvement during inadvertent intravascular injection of filling substance.[3] Although vascular complications can be avoided mostly through detailed knowledge of vascular anatomy,[4] injectors must also learn to recognize the presenting features of such complications quickly to institute hyaluronidase-based treatment protocols.[5,6]

The submental artery is the largest branch of the facial artery in the neck with an average diameter of 1.69 mm[7] (Fig. 4). The average size of the territory supplied by submental artery is significant and measures 45 ± 10.2 cm.[8] The facial artery gives origin to the submental artery behind or at the superior edge of the submandibular gland.[9] The submental artery runs antero-medially below the mandible and then runs superficial to the mylohyoid muscle to reach the chin. It gives off some branches to the submandibular gland and perforating branches to the platysma and mylohyoid muscles. The terminal branches of the submental artery give off some perforating branches while crossing the anterior belly of the digastric muscle. The superficial terminal branch passes between the skin and levator labii inferioris and anastomoses with the inferior labial artery. The deep branch passes between the muscle and the bone, supplies the lip and periosteum of the mandible, and anastomoses with the inferior labial and mental arteries.[10]

The presenting feature of pain during swallowing could be explained as a sign of ischemia in the arterial branches to digastric, mylohyoid and platysma muscle, and pain in mandible and gingiva could be due to ischemia in periosteal arterial branches. Livedo reticularis in this patient extending from the mental crease down to the upper cervical area with skin overlap on the left side across midline in some areas showed that vascular interruption happened in the territory supplied by the submental artery.

In this case, probability of intraarterial injection is higher compared with external compression, because of following features: (1) appearance of immediate blanching within seconds and livedo in 10–15 minutes; (2) absence of strong facial bands in the area of injection, which may cause acute compartment syndrome; (3) immediate muscle pain at a site quite distant from point of injection but within vascular territory of involved artery; (4) development of pustules such as lesions in affected skin, possibly due to micro skin necrosis secondary to microcirculation involvement.

Hyaluronidase is very important for managing cutaneous complications secondary to intravascular HA filler injection. The dose of hyaluronidase is estimated depending on the number of adjoining areas affected. The recommended dose of a minimum of 200–300 units of hyaluronidase and up to 1,500 units have been mentioned in literature if needed.[10] The fine 30 G needle was used for very superficial injection, as it is easier to inject superficially with very fine needle, while a 27 G needle was used for deeper injection. An estimate of 1,000 units for 2 adjoining areas of chin and neck, as recommended in high-dose pulsed hyaluronidase protocol, was used in this case for each pulse. This protocol has proven to be very successful over past 2 years in managing vascular complications related to filler injections.[11]

CONCLUSIONS

This case report describes successful management of impending skin necrosis resulting from the involvement of submental artery after HA fillers injection. The submental artery presents a potential risk factor for the vascular accident during chin filler injections. Quick diagnosis of vascular obstruction and identification of involved arterial territory was helpful in managing the ischemic zone successfully with hyaluronidase-based treatment protocol.

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