Injection Filler, Vascular Occlusion and Tissue Necrosis

Shannon H. Allen MD, Craig N. Czyz DO, Jill A. Foster MD, Allan E. Wulc MD

1. Department of Otolaryngology, Temple University, Philadelphia, PA
2. Division of Ophthalmology, Section Oculofacial Plastic and Reconstructive Surgery, Ohio University College of Medicine, Columbus, OH
3. Department of Ophthalmology, The Ohio State University, Columbus, OH
4. Department of Ophthalmology, University of Pennsylvania Scheie Eye Institute, Philadelphia, PA

ABSTRACT

Over the past several years dermal fillers have been utilized with increasing frequency for soft-tissue augmentation. Injection site reactions and related vascular injuries have been well noted. Calcium hydroxylapatite (CaHA) (Radiesse, Bioform Medical, San Mateo, CA) was introduced in the United States in 2000. The majority of complications associated with CaHA have shown to be transient and resolve following supportive therapy. The more serious side effects including focal necrosis and ophthalmic injury have been previously reported. Effective local supportive therapy and outcomes were reviewed. These reports and case reports form the basis for our treatment recommendations.

CASE STUDY

An otherwise healthy 47-year-old woman underwent injection of Radiesse (CaHA) to treat nasolabial folds. She presented to the emergency department reporting right eye pain and vision loss. Figure 1A shows the area involved with injection. Initial visual acuity (VA) assessment revealed 20/20 O/D, 20/20 O/S. On examination, there was a retrograde vascular blush noted in the right conjunctiva and inferior rectus vessels, and pain was alleviated with amblyopia of the right eye. Aspiration therapy was initiated. Right conjunctiva vessels were noted to be cyanotic and flash in 24 hours and then tapered. Three days following initial retrograde vascular congestion was noted on the medial aspect of the globe (Fig. B). Right eye keratitis and lower lid edema with ulceration were reported (Fig. C). Pain symptoms improved and visual acuity was corrected to 20/20 O/D. Enzyme-linked immunosorbent assay was evaluated and an oral antibiotic was provided in the event that signs of infection should arise. Two months following initial evaluation a pupillary dilated exam revealed areas of linear hypopigmentation of the choroid (Fig. D) consistent with hyaluronic acid fillers. Asymptomatic lesions were noted for comparison, unknown if this was a result of retrograde injection.

Discussion

We postulate that the CaHA entered a dual branch of the ophthalmic artery, from there moved in a retrograde fashion along the branches into periorbital facial arteries to ophthalmic artery and subsequent distal retinal and choroidal arteries. The proposed pathway follows retrograde flow through periorbital branches of the ophthalmic artery and subsequent large vessels. Table 1. Outcomes of CaHA related injection necrosis.

CaHA injection fillers are commonly utilized in the nasolabial fold, oral commissure, glabella, and lip for correction of facial rhytids and volume loss. Complications have previously been divided into early or delayed type according to time of presentation. The most frequently reported complications are minor and include injection site reactions such as bruising, erythema, pain, edema, and pruritus. These complications occur less frequently reported complications are minor and include injection site reactions such as bruising, erythema, pain, edema, and pruritus. These complications occur less frequently and are generally reactive in nature and require no further intervention. Minor complications are generally managed with visual monitoring. Major complications occur less frequently and have a predilection for certain “danger zones” areas such as the palpebral, glabellar, and intramuscular periorbital vascular territories, which are known to be the greater risk. The glabellar region is considered a particularly high-risk area for intravascular injection due to anastomosis of facial vessels with orbital vascular territories. Necrosis is caused by interruption of the vascular supply to the area by compression, trauma, or injection of the vessels (with filler material), with or without arterial occlusion. The best treatment continues to be prevention of vascular compromise. The next step is prevention of capillary fillers injection. Fillers such as poly-lactic acid and CaHA are generally used in the treatment of tissue necrosis. At the time of retraction of a tissue necrosis, there is a report suggesting favorable response to local subcutaneous injections of low molecular weight heparin. However the utility of these interventions has yet to be proven. HBO has even been refuted in cases of arterial obstruction.

REFERENCES

A MEDLINE-based (2000 to 2011) review of reported complications and treatments of CaHA injectable filler materials was performed for English language journals. Injection area, affected area(s), treatment, and outcomes were recorded.

11. Although CaHA remains a good choice for the treatment of soft tissue augmentation and facial rejuvenation, a number of factors need to be considered. These factors include the effects of the filler material on the surrounding tissue and the potential for complications. Therefore, it is important to fully understand the potential risks and benefits of CaHA injection fillers before using them in clinical practice. The potential complications of CaHA injection fillers include pain, edema, erythema, and pruritus, which are typically minor and resolve within a few days of injection. More severe complications include tissue necrosis, which may require surgical intervention.

CONCLUSIONS

Calcium hydroxylapatite is difficult to remove when complications such as ocular involvement arise. Treatment remains open to consensus regarding optimal therapy. However, there are some consistent recommendations associated with the management of complications, including the importance of early recognition, rapid intervention, and prevention of similar complications in future. In the absence of randomized controlled trials, the use of fibrin glue and hyperbaric oxygen (HBO) have all been suggested. However the utility of these interventions has yet to be proven. HBO has even been refuted in cases of arterial obstruction. Indirect measures such as corticosteroids, hyperbaric oxygen, and anti-inflammatory therapy have been utilized to prevent or treat complications. However, the lack of randomized controlled trials and the absence of evidence-based guidelines make it difficult to draw conclusions about the efficacy of these interventions. Further research is needed to determine the optimal treatment strategies for patients with complications associated with CaHA injection fillers.