Published in final edited form as:

J Vitreoretin Dis. 2019 May 1; 3(3): 190–193. doi:10.1177/2474126419834782.

Ophthalmic Artery Occlusion and Subsequent Retinal Fibrosis From a Calcium Hydroxylapatite Filler Injection

Daniel J. Oh¹, Yi Jiang¹, and William F. Mieler¹

¹Department of Ophthalmology and Visual Sciences, Illinois Eye and Ear Infirmary, University of Illinois at Chicago, 1855 West Taylor Street, Chicago, IL 60612

Abstract

Purpose: We report a case of otherwise healthy 48-year-old woman presenting with acute vision loss after injection of a soft tissue filler injection in the glabellar region with calcium hydroxylapatite microspheres (Radiesse®) with 9 months of follow-up.

Observations: Fundus photographs and spectral domain optical coherence tomography (SD-OCT) were obtained at presentation, 4 months of follow-up, and 9 months of follow-up. Acutely, the retina was characterized by significant pallor and thickening but evolved into diffuse retinal fibrosis and atrophy. The patient was no light perception at presentation, and did not recover any visual function.

Conclusions and Importance: Few case reports have described calcium hydroxylapatite filler injections leading to orbital and ocular complications. This is the first case report illustrating dense fibrotic and atrophic retinal changes on both fundus photography, fluorescein angiography, and SD-OCT. While various facial fillers have been reported to have serious ocular consequences, we illustrate the acute and subsequent sequelae of an ophthalmic artery occlusion from calcium hydroxylapatite microspheres (Radiesse®).

Keywords

calcium hydroxylapatite; facial filler; filler; ophthalmic artery; Radiesse

Introduction:

Facial fillers of various compositions used for cosmetic purposes in the peri-orbital region have been reported to have serious ophthalmic complications including anterior segment ischemia, oculomotor palsy, peri-orbital cutaneous infarctions, branch and central retinal

Corresponding Author: William F Mieler, MD, Illinois Eye & Ear Infirmary, University of Illinois at Chicago, 1855 West Taylor Street, Chicago, IL 60612, Telephone: 312 996-7832, wmieler@uic.edu.

Conflict of Interest: No authors have any proprietary interest in the subject matter of this manuscript.

Declaration of Conflicting Interests: The following authors have no financial disclosures: DO, YJ, WM.

Ethical Approval:

Ethical approval was not sought for the present study as our institution does not require approval for single-patient case reports.

Statement of informed consent:

Written consent to publish this case has been verbally obtained with the patient. This report does not contain any personal identifying information. Collection and evaluation of the protected patient health information was Health Insurance Portability and Accountability Act (HIPAA) compliant.

artery occlusions, ophthalmic artery occlusions, and cerebral vascular infarction.^{1,2} While there have been multiple proposed mechanisms of action, the most commonly accepted mechanism is from the retrograde flow of the injected material through branches of the ophthalmic artery such as the supratrochlear or supraorbital arteries. It is thought that sufficiently high intra-arterial injection pressure will cause retrograde flow and secondary embolic infarctions once the injection pressure is released.³ Despite the increasing number of reported ocular complications in the literature, no effective treatments are available. Calcium hydroxylapatite is a semipermanent soft tissue filler, lasting 1–2 years in the facial tissue.⁴ Like autologous fat and hyaluronic acid filler injections, calcium hydroxylapatite has also been subject to ocular embolism leading to orbital and ocular complications. The objective of the case is to demonstrate the acute and serious sequelae of an ophthalmic artery occlusion from calcium hydroxylapatite microspheres (Radiesse®).

Case Report:

A 48-year-old healthy woman presented with a four-day history of complete loss of vision in the right eye, after injection of a soft tissue filler injection in the glabellar region, the skin between the eyebrows and above the nose, with calcium hydroxylapatite microspheres (Radiesse®). The patient noted she had immediate loss of vision after several injections around her upper, lower, and lateral lid areas at a local spa 4 days prior to presentation.

At initial presentation to the University of Illinois at Chicago, her visual acuity was no light perception (NLP) OD, and 20/20 OS. Her intraocular pressures by applanation were 11 OD and 18 OS. There was a relative afferent pupillary defect OD and the pupil was mid-dilated, and non-reactive at 6 mm. Extraocular movements were intact. Anterior segment examination was otherwise within normal limits. Funduscopy examination of the right eye revealed an ophthalmic artery occlusion with diffuse disc pallor, whitening of the retina, and marked attenuation of retinal vessels (Figure 1A, 1B). The left eye examination was normal.

Fluorescein angiogram of the right eye showed an almost complete absence of flow in the posterior pole with some patchy choroidal fluorescence and leakage in the superior periphery in the late frames (Figure 1C). SD-OCT through the fovea demonstrated diffuse retinal thickening and several hyper-reflective foci in the inner retinal layers (Figure 1D). Observation was recommended, as there was no feasible therapy available to restore visual function. The patient returned monthly for follow-up examinations, and by month three, the examination demonstrated an increasing amount of macular fibrosis and scarring (Figure 2A, 2B).

The patient was most recently seen at month 9 following her periocular injections. She remained NLP with an intraocular of 15 mmHg. There was no sign of neovascularization despite significant ischemia and fibrosis on examination of the retina (Figure 3A). In contrast to her acute presentation, her SD-OCT now showed diffuse thinning attributed to retinal atrophy (Figure 3B). The patient was counseled once again regarding the possible risk of neovascular glaucoma and was given instructions regarding monocular precautions.

Discussion:

Injectable cosmetic fillers have been reported to cause various ophthalmic and orbital complications. The various fillers include calcium hydroxylapatite, autologous fat, hyaluronic acid, and collagen. Common injection sites include the glabellar region, nasolabial fold, or both areas.⁵ Of the fillers used, autologous fat is believed to most commonly cause visual deterioration from branch or central retinal artery occlusion, ophthalmic artery occlusion, and posterior ischemic optic neuropathy.⁶

Hyaluronic acid or Restylane fillers have also been reported to cause ocular complications including ophthalmic artery occlusions.^{2,7,8} Retinal branch artery occlusions have been observed in patients, with the presumed mechanism of action being retrograde arteriolar flow after intra-arterial injection into a peripheral branch of the ophthalmic artery.^{7,8} One case series Kim YK et al. reviewing ophthalmic and/or retinal artery occlusions in 7 patients: four receiving hyaluronic acid and three receiving autologous fat in the glabella and/or nasal dorsum region showed that symptoms of sudden vision loss occurred between one and four hours after administration.² All patients received facial filler injection in the glabella and/or nasal dorsum region.

Calcium hydroxylapatite fillers have also been subject to similar complications including hypersensitivity, orbital ecchymosis, inflammation, and ocular necrosis.^{1,4,11,12,13} To date, only a few adverse case reports have been described with calcium hydroxylapatite fillers, leading to variable long-term consequences.^{1,4,11,12,13} Cohen described a patient with initial fixation sparing supero-temporal central scotoma with otherwise 20/20 vision after calcium hydroxylapatite filler injection to the nose bridge.⁴ After 18 months of follow-up, the vision declined to 20/60 with significant progressive visual field deterioration and pallor of the optic disc.⁴ Such cases are highly variable in outcome. One case was reported which led to bilateral NLP vision following a filler injection also at the nasal bridge.¹² In addition, there was subsequent bilateral anterior segment ischemia, total ophthalmoplegia, and skin necrosis.¹² Another case described a young man who suddenly developed blepharoptosis and orbital pain which subsequently led to significant anterior segment ischemia.¹ Ultimately, orbital CT showed multiple emboli along conjunctival vessels and a diagnosis of ocular ischemic and ischemic oculomotor nerve palsy was made.¹ However, after 3 months his symptoms including visual acuity resolved completely.¹ Orbital concerns have also been raised showing that focal orbital inflammation and dysmotility was a consequence of calcium hydroxylapatite filler injection.¹³

Only one other case report has described vision loss after calcium hydroxylapatite injection to the glabella region.¹¹ While the best-corrected visual acuity ultimately improved from hand motion at 15 cm to 0.1 over 3 months, in this case, a shower of small emboli was observed as hyper-reflective depositions in the retinal layer on OCT and fundus photographs. In our case, we noted that a glabellar injection with calcium hydroxylapatite led to complete ophthalmic artery occlusion. Thus a large embolus can result from synthetic microsphere suspensions, such as Radiesse. The complete ophthalmic artery occlusion was subsequently confirmed by diffuse macular fibrosis ultimately leading to retinal atrophy.

Unfortunately, our patient never recovered any vision in the affected right eye. We report that the periocular injection of calcium hydroxylapatite microspheres in the glabellar region should be performed with caution. While inducement of a total ophthalmic artery occlusion is rare, it is a devastating complication for which there remains no viable or proven treatment option.

Acknowledgements:

Financial support: This work was supported by an unrestricted grant from Research to Prevent Blindness and an EY01792 from the National Eye Institute. The funders had no role in the study design, collection, analysis and interpretation of data, writing of the manuscript, nor decision to submit the manuscript for publication.

Funding: Core grant for vision research NEI P30 EY001792, Unrestricted RPB departmental grant

References:

1. Sung MS, Kim HG, Woo KI, Kim Y- D. Ocular ischemia and ischemic oculomotor nerve palsy after vascular embolization of injectable calcium hydroxylapatite filler. *Ophthal Plast Reconstr Surg* 2010;26:289–291.
2. Kim YK, Jung C, Woo SJ, Park KH. Cerebral Angiographic Findings of Cosmetic Facial Filler-related Ophthalmic and Retinal Artery Occlusion. *J Korean Med Sci*. 2015;30(12):1847–55. [PubMed: 26713062]
3. Park SW, Woo SJ, Park KH, Huh JW, Jung C, Kwon OK. Iatrogenic retinal artery occlusion caused by cosmetic facial filler injections. *Am J Ophthalmol*. 2012;154(4):653–662. [PubMed: 22835509]
4. Cohen E, Yatziv Y, Leibovitch I, et al. A case report of ophthalmic artery emboli secondary to Calcium Hydroxylapatite filler injection for nose augmentation- long-term outcome. *BMC Ophthalmol*. 2016;16:98. [PubMed: 27391691]
5. Park KH, Kim YK, Woo SJ, et al. Iatrogenic occlusion of the ophthalmic artery after cosmetic facial filler injections: a national survey by the Korean Retina Society. *JAMA Ophthalmol*. 2014;132(6):714–23. [PubMed: 24676334]
6. Szantyr A, Orski M, Marchewka I, Szuta M, Orska M, Zapala J. Ocular Complications Following Autologous Fat Injections into Facial Area: Case Report of a Recovery from Visual Loss After Ophthalmic Artery Occlusion and a Review of the Literature. *Aesthetic Plast Surg*. 2017;41(3):580–584. [PubMed: 28233134]
7. Huang P, Liu A, Ren H, Xue K. Color Doppler Flow Imaging of Retrobulbar Ocular Blood Flow Changes in Retinal Artery Occlusions Caused by Cosmetic Facial Filler Injections. *Ophthalmic Plast Reconstr Surg*. 2018
8. Peter S, Mennel S. Retinal branch artery occlusion following injection of hyaluronic acid (Restylane). *Clin Experiment Ophthalmol*. 2006;34(4):363–4. [PubMed: 16764658]
9. Hwang CJ, Mustak H, Gupta AA, Ramos RM, Goldberg RA, Duckwiler GR. Role of Retrobulbar Hyaluronidase in Filler-Associated Blindness: Evaluation of Fundus Perfusion and Electroretinogram Readings in an Animal Model. *Ophthalmic Plast Reconstr Surg*. 2018; Ahead of print. doi: 10.1097/IOP.0000000000001132
10. Zhu GZ, Sun ZS, Liao WX, et al. Efficacy of Retrobulbar Hyaluronidase Injection for Vision Loss Resulting from Hyaluronic Acid Filler Embolization. *Aesthet Surg J*. 2017;38(1):12–22. [PubMed: 28333176]
11. Hsiao SF, Huang YH. Partial vision recovery after iatrogenic retinal artery occlusion. *BMC Ophthalmol*. 2014;14:120. [PubMed: 25306218]
12. Kim YJ, Choi KS. Bilateral blindness after filler injection. *Plast Reconstr Surg*. 2013;131(2):298e–299e.
13. Dagı glass LR, Choi CJ, Lee NG. Orbital Complication Following Calcium Hydroxylapatite Filler Injection. *Ophthalmic Plast Reconstr Surg*. 2017;33(3S Suppl 1):S16–S17. [PubMed: 26524160]

14. Oh BL, Jung C, Park KH, Hong YJ, Woo SJ. Therapeutic Intra-arterial Hyaluronidase Infusion for Ophthalmic Artery Occlusion Following Cosmetic Facial Filler (Hyaluronic Acid) Injection. *Neuroophthalmology*. 2014;38(1):39–43. [PubMed: 27928273]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Figure 1A:
Ophthalmic artery occlusion seen on fundus examination of the right eye at presentation.

Figure 1B:
A wide-field fundus photograph of the right eye at presentation.

Figure 1C:

A late-frame image at four minutes of the fluorescein angiogram of the right eye showing patchy choroidal fluorescence and leakage in the superior periphery.

Figure 1D: Spectral domain optical coherence tomography (SD-OCT) of the right eye through the macula demonstrating diffuse retinal thickening and hyper-reflective foci in the inner retinal layers.

Figure 2A:
Fundus photograph at month 4 demonstrating diffuse retinal ischemia and fibrosis of the right eye.

Figure 2B:
Wide-field fundus photograph at month 4 demonstrating diffuse retinal ischemia and fibrosis of the right eye.

Figure 3A:
Fundus photograph at month 9 demonstrating increasing fibrosis and retinal atrophy.

Figure 3B:
SD-OCT at month 9 of the right eye through the macula demonstrating retinal thinning and scarring.