Case Report

Fatty menace: A case report of superior ophthalmic vein fat embolism due to autologous fat grafting

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Abstract

Autologous fat grafting is among the many procedures used for facial rejuvenation and reconstruction, and its popularity has been increasing in Asia and worldwide. This procedure carries a risk of arterial or venous occlusion, which can lead to serious consequences. Venous embolism following autologous fat grafting is rarely reported. Here, we present a case of superior ophthalmic vein fat embolism and orbital compartment syndrome in a patient who underwent autologous fat grafting. Timely diagnosis, appropriate referral, and comprehensive multidisciplinary assessment are crucial for achieving favorable clinical outcomes.

Keywords: Autologous fat grafting, Fat embolism, Orbital compartment syndrome, Superior ophthalmic vein.

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Introduction

Autologous fat grafting has been increasingly used in Asia and worldwide for facial rejuvenation and reconstruction. Despite the familiarity with this technique, many complications have been reported, including facial edema and ecchymosis, cellulitis and granuloma, skin irregularities, skin blistering, scarring, and vascular complications [1-4]. Isolated venous fat embolism following autologous fat grafting is rarely mentioned. This case report presents a rare case of superior ophthalmic vein fat embolism and orbital compartment syndrome due to autologous fat grafting.

Case summary

A healthy 38-year-old female presented to our emergency department (ED) with a sudden onset of pain, swelling, and a blurred vision in her right eye for the past 3 hours. Upon taking her medical history, it was revealed that she had undergone autologous fat grafting at a clinic. Approximately 45 ml of fat graft were harvested and injected into bilateral temporal and right periorbital areas. The symptoms began to manifest about 2 hours after the procedure. She denied a history of previous surgery or trauma.

Upon arrival, she was fully conscious, and her vital signs were within normal limits. A physical examination of her right eye revealed a visual acuity (VA) of 20/70, an intraocular pressure (IOP) of 53 mmHg, and a negative relative afferent pupillary defect (RAPD). Additionally, she had chemosis, injected conjunctiva, and limited upward and downward gaze. The physical examination of her left eye yielded normal results, and her neurologic examination was also normal.

Emergency CT venography of the orbit was performed. The CTV revealed a tubular-shaped fat-attenuation (-60 Hounsfield unit; HU) filling defect in the dilated right superior ophthalmic vein, along with right intraconal fat stranding, right proptosis, stretching of the right optic nerve, and engorgement of the right extraocular muscles (Figure 1). Based on her clinical presentation and CT findings, a diagnosis

of superior ophthalmic vein fat embolism and orbital compartment syndrome was established. Ophthalmologists and interventional neuroradiologists were consulted to participate in the patient's care.

Figure 1. *Axial (A and B) and coronal-reformatted (C) CTV images show a dilated right superior ophthalmic vein with intraluminal fat-attenuation (-60 HU) filling defect (red arrows in A and C). Additionally, right eye proptosis, right retrobulbar fat stranding, stretching of the right optic nerve, and engorgement of the right extraocular muscles are noted, suggesting orbital congestion.*

The initial treatment consisted of 250 mg of oral acetazolamide followed by 250 mg every 6 hours, 50 ml of 50% oral glycerol followed by 80 ml every 8 hours, brimonidine 0.2% ophthalmic solution every 12 hours, and timolol 0.5% ophthalmic solution every 12 hours. Unfortunately, there was no improvement in her VA and IOP after the medical treatment. Consequently, lateral canthotomy and inferior cantholysis were performed. Shortly after the surgery, her right eye VA improved to 20/20, and the IOP of the right eye was 16 mmHg. She also reported an improvement in right eye pain. As a result, the planned endovascular treatment with transvenous embolectomy was postponed. Additionally, 1000 mg of intravenous methylprednisolone was administered, followed by oral prednisolone at 50 mg per day for two weeks. She was discharged without any complications after 5 days of hospitalization. At the three-month follow-up, she had achieved complete clinical recovery, denying any blurred vision or eye pain. Her right eye VA remained at 20/20, and the right eye IOP was 15 mmHg. Follow-up CTV at 3 months (Figure 2) revealed decreased filling defects in the right superior ophthalmic vein and resolution of right orbital congestion.

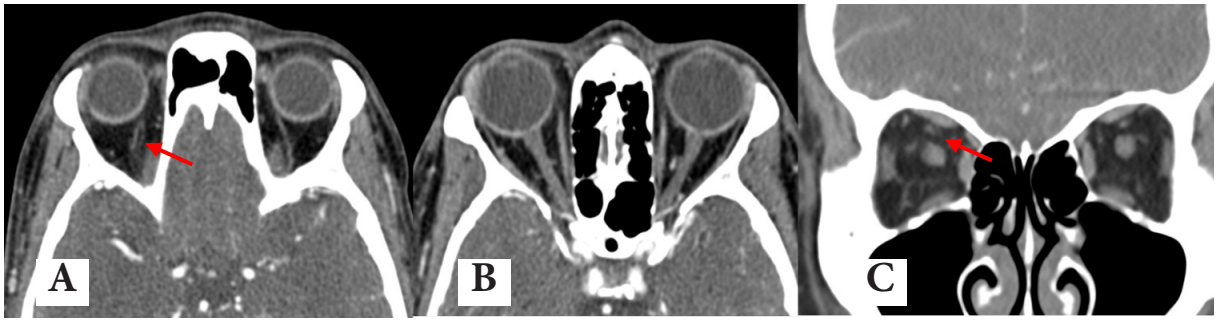

Figure 2. *Axial (A and B) and coronal-reformatted (C) CTV images at 3-month follow-up show decreased filling defect in the right superior ophthalmic vein (red arrows in A and C). Also note resolution of right orbital congestion.*

Discussion

Autologous fat grafting, also referred to as autologous fat injection or transfer, is a procedure that involves harvesting adipose tissue from areas like the flank, inner thigh, or abdomen, and then injecting it into recipient sites at desirable locations. This technique is one of many procedures used for facial rejuvenation and reconstruction, and its popularity has been increasing in Asia and globally [5].

Despite the favorable outcomes of this technique, many complications of autologous fat grafting have been reported. These complications include facial edema and ecchymosis, cellulitis, granuloma, skin irregularities, skin blistering, and scarring. In some cases, the patient may suffer blindness or stroke due to the retrograde movement of fat particles into the ophthalmic artery, central retinal artery, and internal carotid artery [1-4]. Isolated venous fat embolism following autologous fat grafting is rarely reported [6]. The embolized fat particle may cause mechanical obstruction of the vessel (macroscopic fat embolism) or trigger an inflammatory cascade, resulting in local blood vessel damage and endothelial injury (microscopic fat embolism) [7].

To the best of our knowledge, there is no published literature regarding orbital compartment syndrome as a complication of autologous facial fat grafting. We

propose that a macroscopic fat particle caused a blockage in the superior ophthalmic vein, which serves as an outflow venous drainage of the orbit. This blockage resulted in orbital congestion and a subsequent rise in intraorbital pressure. Given that the orbit is a closed conical space surrounded by bony walls, it is highly susceptible to any sudden increase in pressure, which can lead to impaired perfusion and ischemia of the optic nerve and retina.

Symptoms of orbital compartment syndrome include impaired VA, marked proptosis, and evidence of increased intraorbital pressure. Diagnosis of orbital compartment syndrome primarily relies on clinical assessment, and emergent intervention is needed before permanent visual loss occurs. CT imaging may aid in diagnosis in equivocal cases. Contrast-enhanced CT can demonstrate thrombosis or filling defects in the dilated superior ophthalmic vein, as observed in our case. Other findings of increased intraorbital pressure, such as proptosis, stretching of the optic nerve, posterior globe tenting, and retrobulbar fat stranding should be evaluated [8,9]. Besides identifying signs of increased intraorbital pressure, CT can help locate potential causes such as hematoma, emphysema, foreign bodies, or soft tissue expansion, which can guide further orbital decompression [8].

Conclusion

We described a rare complication of superior ophthalmic fat embolism and orbital compartment syndrome resulting from autologous fat grafting in the face. To prevent this complication, surgeons should perform the procedure with meticulous attention. Radiologists' awareness of this condition can facilitate timely diagnosis. Prompt detection, appropriate referral, and comprehensive multidisciplinary assessment are crucial for achieving favorable clinical outcomes.

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