Case Report

Orbital & Subcutaneous Emphysema after Vitrectomy in case of Traumatic Globe Rupture

Veena Borse[1], *Nishikant Borse*[2]

[1] Consultant Anaesthesiologist, Insight Eye Clinic, Mumbai , India

[2] Director and Consultant Vitreoretinal Surgeon

Abstract

Orbital emphysema is a rare complication when air is trapped in the orbital soft tissue.

It can occur as a complication of vitreous surgery during fluid gas exchange when the air can escape via the sclerotomies or from a traumatic perforation of the globe. It is also seen as a complication of facial trauma.

Mild cases can be safely observed and intervention is necessary if there is sight threatening emphysema.

Here we describe a case of orbital emphysema after a vitrectomy surgery. Since the emphysema was mild it was managed by observation only.

Keywords

Orbital Emphysema, globe Perforation , vitrectomy , fluid gas exchange , subcutaneous crepitus

Address for correspondence:

Dr Veena Borse
Director and Consultant Anesthesiologist
Insight Eye Clinic
E mail: veenaborse@yahoo.co.in

Article History

Received: 10th May 2025
Revision: 12th May 2025
Accepted: 28th May 2025
Published: 30th June 2025

Introduction

Orbital emphysema after vitrectomy is a rare but serious complication where air escapes and gets trapped in the orbital cavity after the surgery.[1] Very often this air then spreads to the subcutaneous tissue in the periorbital and facial area. Orbital Emphysema can happen during fluid-air exchange in vitrectomy surgery or post trauma from orbital/sinus fractures. It's important to recognize and treat this condition promptly to prevent potential complications like loss of vision in severe cases.

Most cases resolve spontaneously without any complications.[2,3] However In severe cases, orbital emphysema can lead to vision loss or other complications. Early diagnosis and treatment are crucial to prevent permanent visual impairment.[4] Also the operating team should be aware of this complication while operating upon eyes with trauma with globe rupture or perforation.[4]

Case Report

A 23-year-old male presented with a diminished vision in his right eye for two weeks following a cricket ball injury. On examination his vision was just hand movements. The eye had anterior chamber hyphaema and vitreous hemorrhage. (Figure 1)

How to cite this article: Veena Borse, Nishikant Borse. Orbital & Subcutaneous Emphysema after Vitrectomy in case of Traumatic Globe Rupture. Ind J Ophthal Anaesth 2025;5(2):11-3

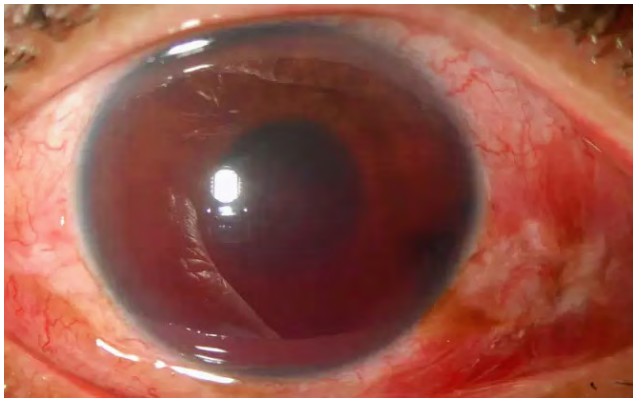

Fig 1. eye examination showing anterior chamber hyphaema

The B scan sonography showed a dense vitreous hemorrhage with vitreous incarceration at the posterior post equatorial area suggestive of a globe rupture. 25G vitrectomy surgery was planned under regional anaesthesia.

The preoperative vitals were within normal range. Routine preoperative examination, laboratory investigations including complete blood count, blood sugar and electrocardiogram were within normal limits. A written informed consent for performing the surgery under regional anaesthesia was obtained. An intravenous line was established. Standard monitoring with pulse oximeter, noninvasive blood pressure and electrocardiogram monitors was done. Regional anaesthesia was established through a peribulbar block with a 24G needle using 4ml of 2% Lignocaine + adrenaline (containing Hyaluronidase 25IU/ml) and 4ml of 0.5% Bupivacaine. The surgery was started after complete akinesia and analgesia was attained.

25G Valved Trocar cannula were placed to perform a 25G Vitrectomy surgery. After the vitreous hemorrhage was cleared; the globe perforation was seen located in the inferotemporal quadrant.

The vitreous was incarcerated in the wound site. The vitreous was carefully trimmed around the wound to prevent the wound from opening up. After completing the vitrectomy, a fluid air exchange was performed. Endolaser was done around the perforation wound and the surgery was completed after injecting 18% C3F8 gas in the vitreous cavity. After the surgical drapes were removed; the right orbit showed a severe edema with puffing of the eyelids. On palpation there was a distinct crepitus, diagnostic of subcutaneous emphysema. The patient was however comfortable and had no respiratory symptoms. This subcutaneous emphysema subsequently spread to the surrounding facial area. (Figure 2)

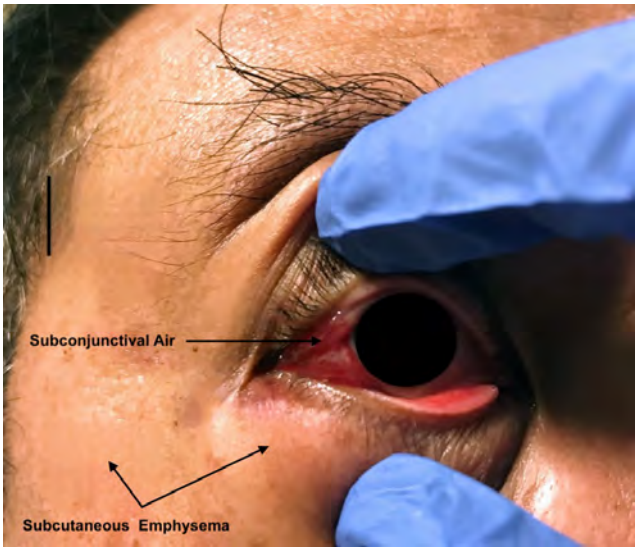

Fig 2. subcutaneous emphysema arounf facial area

Since the emphysema had not spread to the neck and chest area, it was decided to observe the patient. His vitals remained stable. The intraocular pressure was monitored as the intraocular gas would have leaked leading to ocular hypotony. The eye pressure remained at 10-12 mm Hg. The emphysema disappeared over the period of one week. The patient subsequently did well with a good visual recovery.

Discussion

23G & 25G Vitrectomy Surgery has become the standard of care in vitreoretinal surgeries since the last decade. 25G Vitrectomy using a valved cannula ensures a watertight surgery with a well maintained compensated intraocular pressure in most of the high end vitrectomy consoles.

The fluid air exchange is a critical step done during vitrectomy procedures whereby the intraocular fluid after vitrectomy is replaced with air. This air is injected via the infusion port by an air pump, from the vitrectomy console. The pump maintains the intraocular pressure usually set at around 30 – 35 mm Hg. If there is globe perforation, then the air which is injected under pressure can leak into the retroorbital/peri orbital areas leading to orbital and subcutaneous emphysema. (Fig 3) We presume that the same must have happened in this case. The eye retained the intraocular gas injected towards the completion of the surgery since it was not done under a positive pressure.

Orbital emphysema after vitrectomy is a rare but potentially serious complication of vitreous surgery, especially in cases of ocular trauma. While usually benign and self-limited, severe cases can lead to vision loss if not treated promptly. The presence of proptosis, crepitus and restricted eye movements due to the edema are diagnostic of this condition. Severe orbital emphysema can lead to an orbital compartment syndrome whereby the increased pressure vision loss if not managed actively. There are reports of a rare case where orbital emphysema lead to a severe compartment syndrome following inadverdent injection of undiluted C3F8 gas in the vitreous cavity. [6]

The literature has no clear consensus on the management of patients with orbital emphysema. In all cases patients should be advised to avoid any valsalva maneuvers, such as sneezing, coughing, or nose blowing, which may force additional air from the nasal passages into the orbit; especially in case of sinus fractures.. If retroseptal air is evident, the patient's vision should be periodically monitored. The intraorbital pressure may be indirectly monitored by measuring the intraocular pressure.[7]

The treatment in mild cases is usually just observation as the orbital emphysema may resolve spontaneously. In severe cases of orbital emphysema; analgesics for pain, prophylactic antibiotics to prevent infection, and sometimes IV steroids to reduce inflammation may be used.

However if it is sight threatening then decompression procedures like needle decompression or lateral canthotomy may be necessary to relieve the orbital pain and to relieve pressure within the orbit. In most cases, orbital emphysema resolves without permanent vision loss. However, prompt diagnosis and treatment are crucial to prevent severe complications like vision loss.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Algethami A, Schellini SA, Elkhamary SM, Talea MA, Semidey VA. Orbital and periorbital migration of silicone oil associated with emphysema development after retinal detachment repair - Case report and literature review. Am J Ophthalmol Case Rep. 2022 Feb 5;25:101376. doi: 10.1016/j.ajoc.2022.101376.
2. Hunts JH, Patrinely JR, Holds JB, Anderson RL. Orbital emphysema. Staging and acute management. Ophthalmology. 1994 May;101(5):960–6.
3. Sinha R, Kumar KR, Selvam V, Chowdhury AR. Subcutaneous emphysema - An unexpected cause for respiratory distress during vitreoretinal surgery under peribulbar block. Indian J Anaesth. 2018 Jan;62(1):79-80. doi: 10.4103/ija.IJA_606_17.
4. Zimmer-Galler IE, Bartley GB. Orbital emphysema: case reports and review of the literature. Mayo Clin Proc. 1994 Feb;69(2):115-21. doi: 10.1016/s0025-6196(12)61036-2.
5. Asnani, HT, Mehta VC, Nair AG, Jain V. Bilateral periorbital and cervicofacial emphysema following retinal surgery and fluid gas exchange in a case of inadvertent globe perforation. Indian Journal of Ophthalmol 2015 Jun; 63(6):p 541-2. doi: 10.4103/0301-4738.162615
6. Aziz A, Nagendran S, Perry M, et al. Orbital emphysema with loss of vision following undiluted intravitrel perfluoropropane administration. Adv Ophthalmol Vis Syst. 2019;9(2):53-4. doi: 10.15406/aovs.2019.09.00345
7. Enríquez AB, Wheelock-Gutierrez L, Golzarri MF, Planella S, Salcedo-Villanueva G, Salcedo-Casillas G, Ceriotto A, Rubio RI, Morales-Canton V. Unilateral Orbital Emphysema Secondary to Vitreoretinal Surgery. Ophthalmol Retina. 2020 Jul;4(7):708-719. doi: 10.1016/j.oret.2020.01.008. Epub 2020 Jan 13.