Transconjunctival orbital emphysema caused by compressed air injury: A case report

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Abstract

Orbital emphysema following conjunctival tear in the absence of orbital wall fracture, caused by air under pressure is rare. Usually orbital emphysema is seen in facial trauma associated with damage to the adjacent paranasal sinuses or facial bones. To the best of our knowledge, there have been only eight reports of orbital emphysema following use of compressed air during industrial work. The air under pressure is pushed through the subconjunctival space into the subcutaneous and retro-orbital spaces. We present here a rare cause of orbital emphysema in a young man working with compressed air gun. Although the emphysema was severe, there were no orbital bone fracture and the visual recovery of the patient was complete without attendant complications.

Keywords: Compressed air, conjunctival tear, crepitus, narrow palpebral fissure, orbital emphysema

Case Report

A 23-year-old healthy man was cleaning some tools with a compressed air gun, when the tubing of the air gun exploded close to his face. His left eyelid got swollen up due to this injury. The patient was not wearing protective eyewear at the time of cleaning.

The patient reported to the emergency medicine department of our institute 2 h after the injury. Ophthalmological examination revealed a best corrected visual acuity of 20/20 in the right eye and 20/30 in the left eye. Rest of ocular examination in the right eye was normal. There was periorbital edema with marked lid swelling on the left side with palpable crepitus. There was 360° chemosis and minimal restriction of ocular movements in all directions. On retraction of the lids, a 4-mm tear of the conjunctiva was seen in the superior fornix and a 3-mm tear of conjunctiva in the inferior fornix. Adjacent to the tear, air could be seen under the conjunctiva both superiorly and inferiorly. Minimal bleeding was noticed in the
region of the conjunctival tear superiorly. Subconjunctival hemorrhage was present nasally. The left eye cornea was clear, pupillary reactions - both direct and consensual were brisk. Fundus examination in the left eye done with a fully dilated pupil revealed an area of commotio retinae superotemporal to the optic disc. Intraocular pressure (IOP) measured with Goldman applanation tonometer was normal.

Computed tomography of both orbits done without contrast showed radiolucent shadows [Fig. 2 (A, B)] consistent with air in the preseptal tissues, periorbital and intraorbital regions of the left eye suggestive of orbital emphysema. There were no fractures noted on the 1.5 mm sections of the orbit. Paranasal sinuses did not show any air fluid level.

Patient was put on oral ampicillin and ibuprofen along with topical ciprofloxacin eye ointment 3 times daily and flurbiprofen eye drops 4 times daily. After 2 days, his visual acuity had improved to 20/20, but crepitus was still present and the commotio retinae persisted. The patient was reviewed 1 week later. The crepitus had disappeared, IOP was normal but fundus examination still showed commotio retinae. The retina appeared normal when the patient was seen 1 month after the injury. There were no complications seen during the last follow-up visit at 1 month.

Discussion

Orbital emphysema following a conjunctival tear in the absence of orbital wall fracture caused by the use of air under pressure is rare. Proptosis from orbital emphysema is usually associated with tense lids due to increased intraorbital tension and the characteristic stretching and narrowing of the palpebral fissure, whereas there is often widening of the palpebral fissure in proptosis due to other causes. The narrow palpebral fissure makes it difficult to visualize conjunctival lacerations near the fornix in compressed air injuries. Stroh and Finger\(^\text{3}\) reported a case of ocular injury with an air gun. An 8-mm conjunctival laceration resulted in transconjunctival migration of air into the subcutaneous, subconjunctival and retrobulbar spaces. The only other injury was a corneal abrasion. Complete resolution was noted one month after the injury.

Li et al.\(^\text{3}\) and Hitchings and McGill\(^\text{5}\) each reported a case of air under pressure causing orbital emphysema. There was no entry wound in the conjunctiva or any fracture of the orbital bones. Ocular movements were restricted, which recovered and the emphysema had resolved completely 4 weeks after the injury.

In this case, the compressed air blast was sufficient to lacerate the conjunctiva and orbital septum leading to orbitopalpebral emphysema.

Complications that can occur following orbital emphysema include glaucoma, uveitis, central retinal artery occlusion, optic atrophy, blowout fracture of the orbit and tearing of the ophthalmic veins with fatal air embolism.\(^\text{2,3,6}\)

Conclusion

This case was unique as orbital emphysema occurred without fracture of orbital walls and in spite of the severe and slowly resolving emphysema, there were no attendant complications. Although complete resolution was seen in all cases reported till date, the possibility of occurrence of vision-threatening complications makes the use of protective eyewear a useful precaution.

References


**Figures and Tables**

**Figure 1**

Orbital emphysema of the left orbit

**Figure 2A**
CT scan of the orbit-axial and coronal images showing air seen as hypodensities (white arrows) within the left orbit

Figure 2B

CT scan of the orbit-axial and coronal images showing air seen as hypodensities (white arrows) within the left orbit