Traumatic transconjunctival orbital emphysema

Edward M Stroh, Paul T Finger

Abstract
Orbital emphysema can be produced by transconjunctival migration of air from a high pressure airgun. In an industrial accident an 8 mm conjunctival laceration was produced in the superior fornix which acted as a portal of entry for air into the subconjunctival, subcutaneous, and retrobulbar spaces. Computed tomography revealed no evidence of orbital fracture and showed that traumatic orbital emphysema occurred without a broken orbital bone.

Traumatic orbital emphysema is usually the result of a fracture of the lamina papyracea or maxillary roof allowing air to pass from the sinuses into the orbit. Although orbital emphysema may follow violent nose blowing, sneezing, or infection, there is usually a history of antecedent trauma. The diagnosis is made when palpation of the eyelids produces pathognomonic crackling or crepitation, with radiological confirmation of orbital fracture. With computed tomography orbital fractures can be demonstrated in over 95% of cases. We present a rare cause of orbital emphysema.

Case report
A 34-year-old automobile mechanic accidentally directed a compressed airgun which delivered 100–120 pounds per square inch (psi) (690–830 kN/m²) toward his right eye. His mouth and nose were protected by a face mask, but his eyes were unshielded. He presented with a foreign body sensation and swelling of the skin of his right eyelid.

Ophthalmic examination revealed a visual acuity of 20/20 in each eye, normal pupillary reactions, and full ocular motility. Hertel exophthalmometry readings were symmetrical at 21 in each eye, with a base diameter of 98 mm. External palpation of the right upper and lower lid and left lower lid revealed crepitus. No evidence of skin laceration was noted over either eye. Applanation tensions of 13 mmHg in each eye were recorded. Slit-lamp biomicroscopy was significant for a linear corneal abrasion and subconjunctival bubbles in the right eye, with no evidence of anterior segment inflammation or haemorrhage (Fig 1). On double eversion of the right upper lid with retraction of the conjunctiva an 8 mm conjunctival laceration was found (Fig 2). The results of indirect ophthalmoscopy were within normal limits in both eyes.

Computed tomography showed subcutaneous radiolucent areas consistent with air within preseptal tissues and retro-orbital lucencies consistent with orbital emphysema (Fig 3). No air-fluid levels were noted in the sinuses, nor were fractures of the orbital bones noted on 2 mm axial and coronal sections.

Figure 1: Subconjunctival air.

Figure 2: An 8 mm conjunctival laceration is found in the region of the superior fornix.

Figure 3: Computed tomographic scan reveals subcutaneous, peribulbar, and retrobulbar radiolucent areas consistent with air.
Our patient was put on erythromycin ointment every six hours and improved within 24 hours. One month after treatment all evidence of trauma had resolved.

**Discussion**

Orbital emphysema most commonly results from orbital wall fractures. In 20 cases of traumatic orbital emphysema described by Lloyd all were associated with fractures of the bony walls of the orbit as diagnosed by x-rays. We found six cases of orbital emphysema caused by air blast trauma. In our case we used computed tomography to examine the state of the orbital bones and periorbital sinuses, to observe the presence and location of orbital air and the integrity of the globe, and to rule out the presence of solid orbital foreign bodies. This case also differs from others in that the patient did not develop serious sequelae such as glaucoma, hyphaema, uveitis, or optic neuropathy. There was also no evidence of intracranial extension of the air 'foreign body'. In fact this case demonstrates that air blast ocular injuries do not necessarily carry a poor ocular prognosis.

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