Posttraumatic orbital emphysema in a 7-year-old girl associated with bilateral raccoon eyes: Revisit of rare clinical emergency, with potential for rapid visual deterioration

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Abstract

Orbital emphysema is usually considered as self-limiting condition, rarely carries a risk of vision loss as catastrophic consequences due to occlusion of the central retinal artery. It can occur as a consequence of head trauma associated with fracture of the orbit, previous surgery, infection or exposure to high-pressure air jet. Authors report an interesting 7-year-old girl who presented with proptosis of left eye, associated with swelling of eyelids of both eyes. Computerized tomography scan head and orbit revealed orbital emphysema in the left eye with fracture of medial wall of left orbit and fracture of orbit roof with small pneumocephalus over left basifrontal region. Fortunately, she responded well to conservative therapy. Current article reminds uncommon condition to prevent potential visual loss, describing briefly management options.

Keywords: Orbit emphysema, orbit roof fracture, proptosis

Introduction

Emphysema of orbit is usually considered a self-limiting, transient phenomenon. However, mass of air in the orbital can cause occlusion of central retinal artery leading to potential for severe visual loss, so the rapid diagnosis and management is essential to preserve vision. It can present with proptosis, orbital pain, loss of vision, raised intraocular pressure, and central retinal artery occlusion causing ischemic optic neuropathy, rarely orbital compartment syndrome.[1,2] It can be caused by preceding head injury, infection, barotrauma, complications of surgery, injury from compressed-air hoses, and following forceful injection of air into the orbital soft tissue spaces.[3]

Case Report

A 7-year-old girl presented to our trauma hospital with a complaint of proptosis of left eye, pain in the orbital region associated with swelling and discoloration of both eyes lids following a fall from height. Examination showed Glasgow coma score of 15/15, presence of bilateral Raccoon’s eye with proptosis of left eyeball, visual acuity of 6/6 on both eyes with restricted medial gaze movement of left eyeball, rest of the neurological evaluation were within normal limit. The patient's laboratory investigations were within normal limit.

An urgent computerized tomography (CT) scan head and facial bones including the orbits was performed
and revealed fracture of medial orbital wall of left orbit, [Figure 1]. Air pockets were present between the left medial rectus and medial orbital wall. Bone window revealed fracture of orbit roof with small pneumocephalus over left basifrontal region [Figures 2 and 3]. Noncontrast CT head revealed small pockets of pneumocephalus [Figure 4]. She was kept in hospital and managed conservatively, over 4 days her vision remain stable with the subsidence of pain and reduction of periorbital swelling. At the last follow-up, 1-month following discharge her restricted medial gaze extra-ocular movement improved.

Discussion

Orbital emphysema is clinically characterized by presence of air pocket in the orbit acting as a mass effect. It can be caused by orbital wall fracture, include forceful nose blowing, postsurgical and pressure changes during air travel.[1]

Fractures of orbital wall typically occur at the thinnest sector including the medial wall permitting entry of air from the paranasal sinus. Thickness of the medial wall of orbit is thinner, about 0.25 mm, while isolated medial wall fractures occur in approximately 10–30% of cases of orbital trauma.[3,4,5] In pediatric age, orbit bones are elastic so, function as a trap door which results in a higher incidence of muscle entrapment following orbital wall fractures.[6,7] Trapped air pocket in periorbital spaces due to ball valve action of orbital soft tissue causes displacement of fracture fragment leading to herniation into the sinus cavity.[3] Depending on rapidity of air entrapment, total volume of entrapped air, presence of ball valve mechanism, patient can present with a range of clinical symptoms including proptosis, loss of vision, increased intraocular pressure, and central retinal artery occlusion, or orbital compartment syndrome.[3,5,7]

Clinically, patient presents with orbital pain, hypoesthesia, and restriction of ocular movement, diplopia or proptosis, and vision loss.

Computerized tomography scan aids in identifying the presence of orbital emphysema and anatomical location of air pocket underlying adjoining fracture of medial or floor or roof of orbit. Our case had fracture of medial wall and roof of orbit with associated basifrontal pneumocephalus.[1,7]

The aim of management of orbital emphysema associated with orbital fracture is to put a constant vigilance to look for raised intraorbital pressure effect like restricted ocular motility, sluggish pupillary reaction, disc edema or decreased visual acuity. Drainage of trapped air in the subcutaneous tissue, early detection and prompt remedial measures are necessary to preserve good vision.[1,4,6] Hence, when orbital emphysema shows signs of pressure effect - orbital compartment syndrome should be suspected and emergency decompression is necessary. It can be simply carried out by inserting a 24-gauge needle connected with underwater seal for regulated drainage of collected air causing mass effect.[4] Other methods are typically performed by either needle aspiration of trapped air or canthotomy which causes rapid decompression and complete resolution of raised intraorbital pressure symptoms.[2,3,4,5]

Footnotes

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Conflict of Interest: None declared.

References


**Figures and Tables**

**Figure 1**

Noncontrast computerized tomography orbit of a 7-year-old girl, bone window view showing collection of air in multiple pockets adjoining to medial rectus in left orbit

**Figure 2**
Noncontrast computerized tomography head, bone window view showing basifrontal pneumocephalus

**Figure 3**
Noncontrast computerized tomography orbit, bone window view showing fracture of orbital roof with frontal bone fracture

**Figure 4**
Noncontrast computerized tomography head demonstrating pneumocephalus