

Massive Orbital Emphysema— An Unusual Clinical Presentation of Isolated Medial Orbital Wall Fracture

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Orbital emphysema is an unusual complication of orbital fractures which are the common sequelae of periorbital trauma. Most cases are due to inferior orbital wall fractures. Here we report a case with an unusual clinical presentation of isolated left medial orbital wall fracture complicated with massive orbital emphysema. Without ophthalmic or neurologic defect, conservative management with cold compression and analgesics was prescribed. He was also advised not to blow his nose. On follow-up at 1 and 4 months, the orbital emphysema subsided, and the patient remained free of any optic impairment. Relevant literature is also reviewed.

Key words: blowout fractures, computed tomography, orbital emphysema, orbital wall fracture

INTRODUCTION

Although the medial wall of the orbit is involved in most orbital fractures, the inferior orbital wall has been reported as the most common site of isolated orbital fractures. Isolated medial wall fracture seldom occurs. Orbital emphysema is present in only about 5% of these patients¹. This is confirmed by such diagnostic advances as computed tomography, which have significantly increased the detection of pure medial orbital wall injuries. Symptoms such as diplopia, limitation of ocular motility, and enophthalmos may occur in 12.5% to 40% of patients with isolated medial orbital fractures. The following case illustrates such unusual clinical presentation with left orbital emphysema after periorbital blunt trauma.

CASE REPORT

A 47-year-old man sustained blunt trauma to the face by one hand during an assault. In addition to swelling of left orbit, severe painful sensation, nausea, and mild dizziness

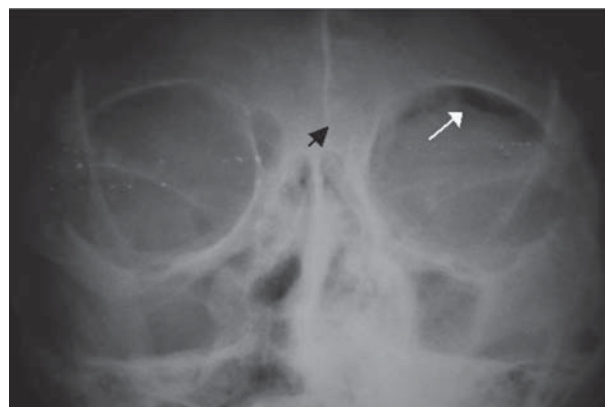


Fig. 1 A water's view of skull showed haziness of the left ethmoid sinus (black arrow) and massive orbital emphysema (white arrow) over the left orbital region.

were also noted at presentation. Physical examination revealed periorbital ecchymosis, gross edema, and marked subcutaneous emphysema with palpable crepitus. Visual acuity was 20/20 in both eyes. Extraocular movements and fundusoscopic examinations of both eyes were normal. A frontal view of the skull on X-ray showed haziness of the left ethmoid sinus and massive orbital emphysema (Fig. 1). Computed tomography scan disclosed a fracture of the medial orbital wall with significant displacement of the fractured fragments and air in the orbit (Fig. 2). Because no ophthalmologic or neurologic complications were noted during examinations, conservative management with cold

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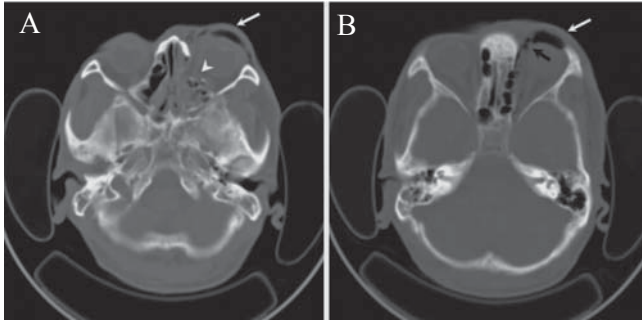


Fig. 2 This is a case of acute orbital fracture with massive emphysema in the 47 year-old man. A. Discontinuous bony structure (white arrow) of medial left orbital wall with adjacent periosteal swelling and hematoma into the underlying nasal cavity and massive gas accumulation in the pre-eyeball space (arrow head) are illustrated. B. Massive gas accumulation upper ward extending into the pre-eyeball space (white arrow) and medial aspect of the eyeball (black arrow) is illustrated.

compression and oral analgesics was prescribed. On follow-up at 1 and 4 months later, the orbital emphysema subsided and the patient remained free of any optic impairment.

DISCUSSION

Orbital emphysema is a benign and transient complication of orbital fractures, and about 50% of cases result from blowout fractures². Three different theories have so far been proposed to explain the mechanism of blowout fractures, globe-to-wall contact theory, hydraulic theory and bone conduction theory. Regardless of the mechanism of fractures, pure blowout fractures first occur at the lamina papyracea of the ethmoid or maxillary roof, the weakest areas of the orbital wall upon anatomic study³. Thus, theoretically the most commonly involved area is the medial orbital wall. However, the inferior orbital wall has been reported as the most common site of pure orbital blowout fractures.

Orbital emphysema usually results from a fracture of the orbital wall, allowing air to pass from the sinuses into the orbit. It can be a late complication secondary to sneezing, strong inspiration, or coughing as a result of sudden increased upper airway pressure after the injury⁴. Although orbital trauma is the most common reported etiology, orbital emphysema may result from pulmonary barotrauma, infection, and operation⁵. It is generally a benign and self-limited condition. However, it may compromise retinal

and optic nerve vascularisation, a so-called tension orbital emphysema, followed by loss of vision. Therefore, the condition requires rapid management⁶.

Clinical investigation shows that 85% of all orbital fractures involve the floor, 49% the medial wall, 18% the roof, and 8% the lateral wall⁷. However, the incidence of isolated medial wall fractures varies from 0 to 10%⁸. Common clinical presentations of medial wall fractures include periorbital edema and ecchymosis, subconjunctival haemorrhage, subcutaneous emphysema, epistaxis, narrowing of the palpebral fissure, limitation of eyeball movement, horizontal diplopia, and enophthalmos.

On plain radiograph, the key diagnostic signs of isolated medial fracture are haziness of the ethmoid sinus and disruption of the medial orbital wall. The occurrence of periorbital emphysema is an unusual symptom for isolated medial orbital wall fractures. Indications for treatment are horizontal diplopia, computed tomographic evidence of muscle entrapment, early enophthalmos of 2 mm or more, and a large orbital wall defect likely to result in late enophthalmos^{8,9}. Emergent drainage of air in the involved orbit using a 25-gauge needle mounted with a syringe may release the tension status⁶. Immediate surgical exploration and reconstruction of the orbit is necessary in such cases.

In our case, the development of isolated fracture to the lamina papyracea, is likely a consequence of hydraulic transmission of intraorbital pressure directly towards the medial orbital wall. In most cases these injuries are associated with other facial injuries, particularly fractures of the orbital floor^{1,2}. Massive orbital emphysema is believed to be the action of suddenly increased intranasal pressure after nose-blowing or sneezing, which forces the originally non-displaced fracture to move and allow air communication between the orbit and the ethmoid sinuses. A CT scan confirmed the diagnosis but no muscle entrapment or enophthalmos was identified. Because no ophthalmologic or neurologic complications were noted during examinations, conservative treatment with cold package and oral analgesics were given later. On follow-up at 1 and 4 months, the orbital emphysema subsided, and the patient remained free of any visual impairment.

CONCLUSION

A case of a blowout isolated medial orbital fracture secondary to blunt trauma is reported. Severe complications that could result from such condition should be recognized early by emergency department personnel. These patients should be followed closely to help prevent or manage further complications or sequelae.

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