CASE REPORT

Proptosis Presenting as a Delayed Sign of Frontal Extradural Haematoma

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SUMMARY

We report a case of a young man who presented with proptosis as a delayed manifestation of a frontal extradural haematoma (EDH) following a minor head injury. A computed tomography (CT) of the brain done 72 hours after trauma revealed a large extradural haematoma in the right anterior cranial fossa with orbital roof fracture and subperiosteal clot extension into the orbital cavity. Right frontal craniotomy with evacuation of haematoma was done and the proptosis completely resolved after surgery. The clinical course, possible mechanism and management of the patient are discussed.

KEY WORDS:
Proptosis, Extradural haematoma, Orbital subperiosteal extension

INTRODUCTION

Extradural haematoma (EDH) is a common intracranial pathology following motor vehicle accidents, comprising about 0.2-6% of all head injuries[1]. Most cases are detected early during a routine CT brain which is done within 24 hours after the injury. Patients usually present with signs of increased intracranial pressure with loss of consciousness after a lucid interval. However, the diagnosis of frontal EDH can be missed or delayed due to minimal neurological sign which would not require a CT brain during acute presentation. Proptosis is a rare presentation of frontal EDH unless it is associated with subperiosteal extension into the orbital cavity[1,2]. Delay in the treatment of this condition may lead to permanent blindness.

We report a rare case of frontal EDH associated with orbital subperiosteal extension presenting late with proptosis as the main clinical manifestation.

CASE REPORT

A 21 year old Malay man was involved in a motor-vehicle accident and sustained a small bruise over his right forehead after his head hit the road. He was asymptomatic until three days after the trauma when he started to have bulging of the right eye followed by double vision. He was admitted to a district hospital for further investigation. His Glasgow Coma Score (GCS) was full and higher mental function was normal

Neurogical examination revealed abnormalities confined to the right eye. He had a right a periorbital haematoma with proptosis and complete opthalmoplegia (Figure 1). His pupill size was 3mm in size and reacted normally to light. Right visual acuity was normal. There was no papilledema or orbital bruit. Examination of the other systems was unremarkable. A CT scan of the brain revealed a right orbital roof fracture with a large extradural haematoma in the frontal region measuring 5x4x3cm in diameter with a volume of 50 ml. The haematoma had extended subperiosteally into the orbital cavity through the fractured orbital roof causing significant compression of the eye ball and its extraocular muscles (Figure 2).

We performed an emergency right frontal craniotomy to evacuate the haematoma. The EDH in the right frontal region was evacuated completely. There was a comminuted fracture of the roof of the right orbit. The fractured segment

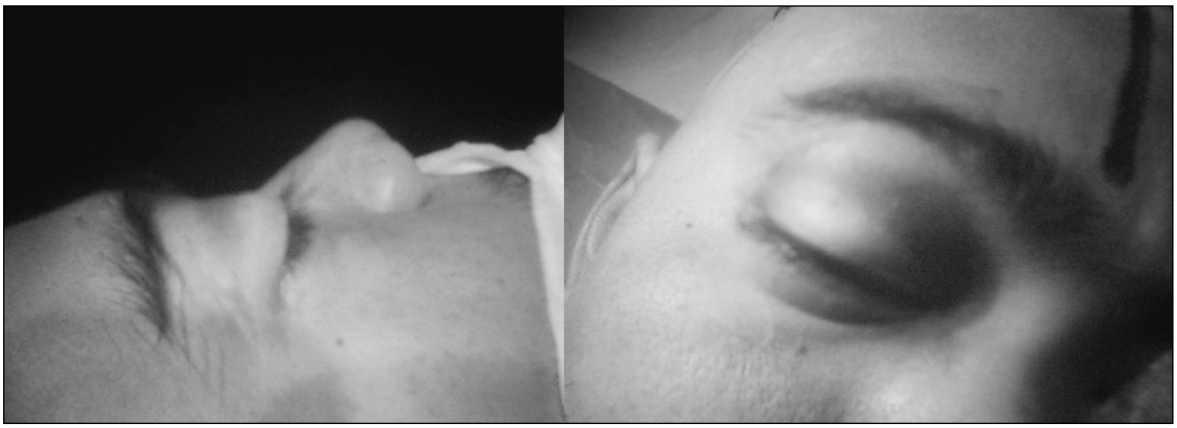

Fig. 1: Picture showing periorbital haematoma and proptosis of the right eye before surgery.
(Note: Consent obtained from patient for publication.)

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Fig. 2: A sagital view of the computed tomography (CT) scan showing the frontal EDH with orbital roof fracture (arrow) and subperiosteal haematoma extension causing right eye proptosis.

was mobile and easily removed leaving a 1.5x2.0cm bony window at the orbital roof. Through the window opening, another 10 ml of haematoma was removed by irrigation and gentle suction. There was no active bleeding vessel found during surgery.

Post operatively, the patient made an excellent recovery. The right eye proptosis and opthalmolegia disappeared completely within three days of surgery. A repeat CT scan brain showed complete evacuation of the haematoma and the right eye ball had returned to the normal position. He was discharged well seven days after surgery. Unfortunately, he defaulted follow-up due to severe financial problem.

DISCUSSION

Proptosis is an uncommon presentation of acute EDH following head injury. It may occur as a delayed sign of frontal EDH associated with subperiosteal extension into orbital cavity. Other associated eye findings include downward globe displacement, opthalmoplegia, chemosis, lid haematoma and visual dysfunction[1]. Proptosis can occur in patients with subperiosteal haematoma immediately or within days after the trauma[1,2]. In our case, the proptosis only appeared three days after trauma making the diagnosis of frontal EDH delayed.

EDH with orbital subperiosteal extension is a rare condition but represents a well-defined clinical entity. This uncommon lesion is usually associated with orbital roof fracture and can lead to permanent blindness if not treated early [1]. Young adults and men are frequently affected with an average age of onset of 17.3 years [1]. A child with proptosis and vertical diplopia or visual loss after blunt trauma should be suspected to have subperiosteal haematoma until proven otherwise[3]. It was thought that orbital subperiosteal haematoma occurs as a result of rupture of subperiosteal vessels or extension of haematoma from the subgaleal or extradural space. The differential diagnosis would include carotid-cavernous fistula, orbital roof fractures, orbital subperiosteal abscess and coagulopathies. These diagnoses can easily be ruled out with detailed clinical assessment and CT brain.

The mechanism of proptosis in patients with frontal EDH associated with orbital subperiosteal extension has been suggested to be due beeding from the subgaleal vessels[1,2]. In our case, the cause of proptosis was due to frontal trauma to the supraorbital region causing a 'blow-in' fracture of the orbital roof permitting blood to enter the orbital cavity. The fractured segment of the orbital roof had dissected the periorbita that created a potential cavity for blood to collect. Blood from the anterior cranial fossa entered the orbital cavity through the bony opening and further dissected the periorbita. As the haematoma got bigger, it pushed the eyeball anteriorly and out from the orbital cavity causing proptosis. The significant size of the haematoma compressed the extra-ocular muscles and the nerve surrounding it causing opthalmoplegia and blindness.

The definitive treatment of patients with frontal EDH associated with orbital extension is surgery. In patients with signs of intraocular pressure or decreased visual aquity, surgical removal of the orbital subperiosteal haematoma is mandatory and should be done as soon as possible[1] . The aim of surgery is to release the mass effect to the adjacent brain due to haematoma compression and to remove the intra-orbital clot. A standard frontal craniotomy with or without orbitotomy is normally used to evacuate the haematoma which is located at the frontal region. Apart from complete haematoma removal and bleeding control, craniotomy also allows better visualization and repair of the fractured orbital roof. Through the opening of the orbital roof, the orbital haematoma can be removed. Fractures of more than 2cm in the orbital roof should be repaired to avoid complications which may occur later.

Some surgeons advocate percutaneous needle aspiration as an alternative for craniotomy which is less invasive but technically challenging[2]. The disadvantages of this technique are re-bleeding and incomplete haematoma clearance. Some authors also advocate trial of conservative treatment, topical use of timolol maleate and acetozolamide. Since orbital subperiosteal compartment is an avascular space, haematomas in this region take a few weeks to resolve making conservative treatment less effective [1]. Pope-Pegram LD *et. al* in their review of 11 cases of orbital subperiosteal haematoma treated successfully reported that six patients underwent needle aspiration, four patients underwent surgical evacuation and one case spontaneously resolved after six months [2]. Our patient made an excellent recovery following craniotomy which was done immediately after admission.

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