

An Interesting Case of Paediatric Penetrating Head Trauma by a Wedge of Concrete

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Abstract: Traumatic Brain Injury is among the leading cause of morbidity and mortality in modern times. Data suggests that almost 50 % of all trauma related deaths are secondary to traumatic brain injuries (TBI). Penetrating head trauma by definition means a wound in which a projectile breaches cranium but does not exit it, such can result from accidental events like road traffic accidents, occupational accidents or even household accidents apart from homicidal or suicidal intentions. As such these are rare in paediatric age group. Here we report the case of a 4 year old male child with history of fall of a concrete slab over head with penetration of a wedge of concrete into skull and his miraculous survival.

Keywords: penetrating head injury, Traumatic Brain Injuries, paediatric neurosurgery

INTRODUCTION

Though head injury is quite common in paediatric age group penetrating head injuries per se are quite rare. On literature search we could find the case reports on such injuries resulting from iron rods, nails, screwdrivers, or even sharp toys, but in this case the child suffered penetrating head injury due to fall of loose concrete slab from the roof in his home. A 5cmx 4cmx1cm wedge of concrete penetrated through the vertex of skull into his brain parenchyma. Understanding the clinical gravity in such situations is of utmost importance as it has high morbidity and mortality. Innovative therapeutic approaches are usually needed.

CASE REPORTS

A 4 year old male child was brought to the emergency department by his father with alleged history of fall of loose concrete slab from roof of house on his head with a wedge shaped piece of concrete penetrating right through his skull. There was history of loss of consciousness for about 10 minutes but no history of vomiting, convulsions or oral/nasal/aural bleed.

On examination, his pulse was 100/min, BP 90/60 mm of Hg. There was no evidence of rib/clavicle fracture or subcutaneous emphysema on examining

respiratory system. Abdomen was soft on palpation with no tenderness or guarding. CVS examination revealed no abnormalities. Extremities on examination appear normal. His Glasgow Coma Scale score was E4 M5 V4. His pupils were bilaterally equally reacting to light. On local examination there was a concrete foreign body was seen penetrating the parietal bone at vertex of skull in the midline with 2 cm of it seen projecting from the skin surface [Fig 1].

CT brain with 3D reconstruction was performed which revealed that the 5 cm long 4cm wide and 1 cm thick foreign body was piercing brain parenchyma through a minimally displaced fractured defect up to a depth of 3cm in the front-parietal region[Fig 2]. Decision was taken to immediately shift the patient for emergency craniotomy.

Patient was taken up for Bi-front-parietal craniotomy and foreign body removal. Elliptical incision was taken around the foreign body. Burr holes were made and Box shaped craniotomy was done incorporating the foreign body. Bone flap incorporating the foreign body was removed. Dura was found to be breached. Foreign bodies like hair follicles and dirt were removed and lax duraplasty was done. Bone flap was not repositioned as it was contaminated and wound was closed after insertion of suction drain. The

procedure was tolerated well; the patient was extubated and shifted to intensive care unit. On post-op day 1 patients GCS was 15/15 with no neurological deficit. Gradually patient's condition improved, suction drain was removed and by post op day 5 discharged. On follow-up patient's CNS examination was found to be within normal limits.



Fig-1: Photograph of the child showing Penetrating concrete block seen penetrating the vertex

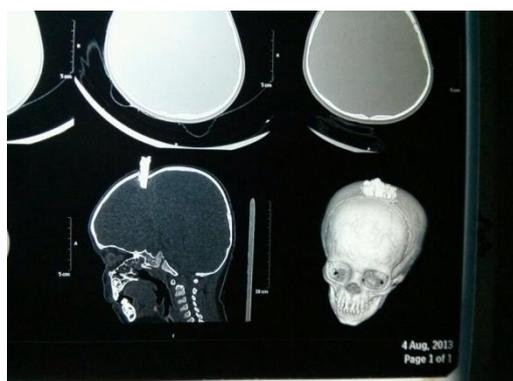


Fig-2: C T Scan of brain showing penetration of concrete through the vertex into the brain parenchyma

DISCUSSION

Although head injuries are quite common in children penetrating trauma to skull as such is a rarity and represents a tiny percentage of traumatic brain injuries in paediatric age group [1]. Trivial fall is the most common mechanism causing head injury in children with linear non displaced fracture of skull bones being the most common resulting injury [2]. Penetrating Head injuries with objects such as metal rods, wires, chopsticks, wooden branches, glass have been documented. In cases of penetrating injury the consequence of the injury depends on the kinetic energy and trajectory of the projectile. In case of high velocity missiles, injuries occur not only from initial laceration and crushing of brain tissue but also from subsequent cavitation. The high velocity object causes rotation and shock wave that cause stretch injuries and formation a cavity that is three to four times greater in diameter than

missile itself. Though this cavity is reduced in size once the force is over, the tissue that was compressed during cavitation remains injured. Penetrating head injuries are unlikely to have counter coup injuries or diffuse brain injuries and are usually focal [3]. The high velocity injuries tend to cause worst associated damage, perforating injuries have even worse prognosis [4]. Damage from low velocity penetrating injuries is restricted to the tract of the stab wound, because the lower-velocity object does not create as much cavitation.

Here we present a moderate velocity penetrating trauma to skull by concrete (cement) block which dislodged from the wall of dilapidated house. Child abuse was ruled out in our case. In our case report, besides the penetrating Injury, the patient had underlying contusion due to impact of the concrete block. Early clinical diagnosis, urgent x-ray skull and CT brain is important for a favourable prognosis [4]. In the presence of an obvious penetrating injury with an imbedded foreign body, no attempt should be made to remove the object until the patient has had a thorough clinical and radiological evaluation [5]. MRI is contraindicated in penetration of metallic objects. Early complications of penetrating head injury are post-operative infection and late complication may involve CSF leak due to fistula formation [6]. Such cases require innovative surgery to tackle the problem. We conclude by stating that aggressive intensive care of patient in combination with prompt neurosurgical intervention helped in reducing the mortality and morbidity in this particular case. Finally the paradigm "Better safe, than sorry" implies in prevention of head injury. Primary prevention of head injury remains important.

REFERENCES

1. Koestler J, Keshavarz R; Penetrating head injury in children; a case report and Review of literature. *J Emerg Med*, 2001; 21(2): 145-150.
2. Atabaki SM; Pediatric head injury. *Pediatric Rev*, 2007; 28:215-224.
3. Vinas FC, Pilitsis J; Penetrating Head Trauma, 2006.
4. Dawodu S; Traumatic Brain Injury: Definition, Epidemiology, Pathophysiology, 2007.
5. Tan MH, Chaudhari KA; Penetrating Head injury from an electrical plug. *Injury*, 2003; 34(12):950-953.
6. Hagan RE; Early complications following penetrating wounds of brain. *J Neurosurgery*, 1971; 34:132-141.