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Post- traumatic Compound Elevated Fracture of Skull Simulating a Formal Craniotomy

Eski bir Kranyotomiyi Taklit Eden Kafatasının Karmaşık Kalkma Kırığı

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ABSTRACT

Fracture of the cranial bones following trauma is common. The fracture most commonly encountered in clinical practice is an undisplaced linear fracture of a skull bone or a depressed skull fracture. Compound elevated skull fracture, unlike depressed skull fracture is an extremely rare variety of post-traumatic cranial injury, seldom seen in modern clinical practice. Authors report one such rare case of compound elevated skull fracture, simulating a formal fronto-parietal craniotomy, in a 20-year-old male patient following a railway accident. The mechanism of its production as well as the management of such injury is discussed.

KEYWORDS: Skull fracture, Elevated skull fracture, Head injury

ÖZ

Travmaya bağlı kranyal kemiklerin kırıkları sıktır. Klinik uygulamada kırıklar en sık kafatası kemiklerinin lineer basit kırıkları veya çökme kırıkları olarak görülür. Kafatasının çökme kırığının tersine karmaşık kalkmış kafatası kırığı, post-travmatik kafa yaralanmalarının modern klinik uygulamada nadir görülen oldukça değişik bir şeklidir. Yazarlar demiryolu trafik kazasi geçiren 20 yaşında bir erkek hastada eski bir fronto-paryetel kranyotomiyi taklit eden nadir bir karmaşık kalkmış kafatası kırığını sunmaktadırlar. Bu yaralanmaların oluş mekanizması ve tedavisi tartışılmıştır.

ANAHTAR SÖZCÜKLER: Kafatası kırığı, Kalkmış kafatası kırığı, Kafa yaralanması

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INTRODUCTION

Fracture is defined as a breach in the continuity of the bone. Skull fractures are traditionally classified into linear, comminuted, or depressed fracture[3]. A depressed fracture is defined as any fracture with an in-driven fracture fragment. Any of these can be simple (closed) or compound (open). Theoretically, it is possible to have skull fracture with a fragment elevated above the level of the intact skull bone. However, such an entity has found little mention in standard neurosurgical texts, and clinical evidence of this fracture type has only been highlighted in the literature in few instances [1,2,4,5]. The authors present an unique case of traumatic compound elevated calvarial fracture simulating a formal frontoparietal craniotomy in a 20-year-old male.

CASE HISTORY

A 20-year-old man was brought to our emergency unit with alleged history of railway accident four hours back followed by unconsciousness since then. History revealed that he was travelling in an overcrowded suburban local train and part of his body was outside the moving train. He sustained injury when his head struck against the electric pole installed by the side of railway track. The patient was unconscious since that accident and was rushed by police to the emergency unit. At presentation, he had a pulse rate of 110 per minute and a blood pressure of 110/80 mm Hg. There was no clinical evidence of long bone fracture or any abdominal solid organ injury. His Glasgow Coma Scale (GCS) score was E1V1M2. The patient was immediately intubated in casualty and put on mechanical ventilatory support. Examination revealed that there was traumatic avulsion of calvarium along with the scalp flap in the left frontoparietal region. The underlying dura was intact and the bone flap so avulsed that it was simulating a formal fronto-parietal craniotomy (Figure 1). Non-contrast computerized tomography (NCCT) of the head with a bone window revealed left frontoparietal bone elevated fracture along with underlying left frontal contusion and traumatic subarachnoid haemorrhage (SAH) (Figure 2A, 2B).

The patient was immediately taken for emergency surgery. Thorough debridement of the wound was done. The bone flap, in view of gross contamination, was removed and kept in bone bank. Dura was found to be intact and hence not opened.

Figure 1. *Clinical photograph of the patient showing avusion of calvarial bone flap simulating left frontoparietal craniotomy. Note the dura is intact.*

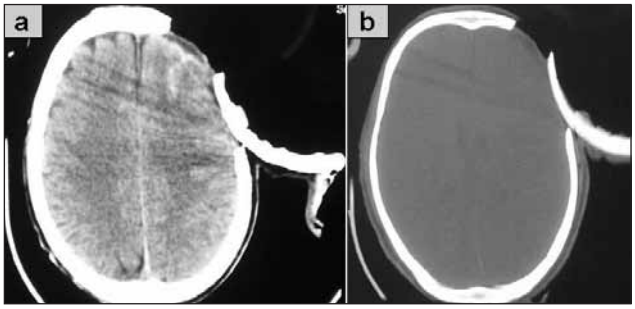

Figure 2. *Non-Contrast Computerized Tomography (NCCT) head (**A**) and bone window (**B**) showing elevated fracture left frontoparietal bone with underlying left frontal haemorrhagic contusion and traumatic subarachnoid haemorrhage (SAH).*

The patient was given Cefoperazone- Sulbactum, Netilmycin and Metrogyl in anti-meningitic doses, along with decongestants and anti-epileptic medication. The patient was tracheostomized in post-operative period and was gradually weaned off from the ventilator and decannulated. He improved to E2V1M5 status, was discharged and is now on regular follow-up.

DISCUSSION

Fracture of the cranial bones following trauma is common. Avulsion and loss of the fractured fragments may sometimes occur with compound

elevated fractures (1). The agent of wounding in calvarial fracture is often directed inwards, resulting in a fracture with a depressed fragment, because the inward direction of the applied force drives the fragment intracranially. However in some cases, a tangential force applied to the calvarium elevates the fracture fragment by a lateral pull of the object or rotation of the head (2). This was the most likely mechanism of fracture elevation in our case as the subject hit the electric pole when part of his body including the head was outside a rapidly moving train. The scalp wound in this situation is often long.

Elevated fractures are always compound as earlier reported (1,2,4,5). Dural breach is often present. However, in our case the dura was intact which is quite unusual considering the high velocity impact.

Cranial Non-Contrast Computerized Tomography (NCCT head) is the investigation of choice as it also detects associated intracranial haematoma, contusions or subarachnoid haemorrhage; all of which are associated with a worse prognosis.

An elevated fracture of the skull should be managed as an open depressed skull fracture. Delay or failure to operate may be complicated by intracranial sepsis. Extensive wound debridement should be carried out with antiseptic solutions. Dural breach, if present, should be repaired primarily or by using a pericranial or temporalis fascia graft. The patient should be started on broad-spectrum intravenous antibiotics in anti-meningitic doses. It seems appropriate not to replace the avulsed bone in view of gross contamination. Cranioplasty can be performed at a later date once the patient recovers with the same bone flap or appropriate synthetic cranioplasty material.

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