

Gun shot injury as a cause of elevated skull fracture

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Agents of wounding in head injury often cause displacement of free bone fragment towards the intracranial cavity because of the inward direction of such wounding force. This type of injury is the more common type when a free segment of skull fracture occurs; resulting in what is called depressed skull fracture [Figure 1]. In some rare instances, the free bone fragment is elevated above the intact skull bone. Only few of such cases have been reported in modern literature.^[1-5] The common mechanism in these cases was a lateral pull on the free bone fragment arising from a long, thin, relatively sharp and strong object. The mechanism was not certain in other cases, which occurred following road traffic accidents.^[1,3] The following case illustrates another possible pathomechanism of this rare injury. A 39-year-old male truck driver presented to us with loss of consciousness of 4 hour- duration, following a gunshot injury to the head. The shooting range was about 4 meters. His physical examination revealed a young patient with Glasgow coma score of 9 with right facioparalysis and a spastic right hemiparalysis. There was diffuse left fronto-parieto-temporal scalp swelling with a left posterior parietal puncture wound and an exit wound at the left frontal region, measuring about 1.5 cm in diameter. Both wounds were discharging altered blood with contused brain matter. The diagnosis was gunshot injury to the head with moderate head injury and bihemispheric deficits, worse in the left hemisphere. The cranial computerized tomography scan showed extensive left hemispheric multifocal hemorrhagic contusions, multiple intra-axial bony fragments and diffuse brain swelling with midline shift to the right. There was a left posterior parietal skull perforation with comminuted, elevated left frontal fracture. [Figure 2] A left fronto-parieto-temporal decompressive

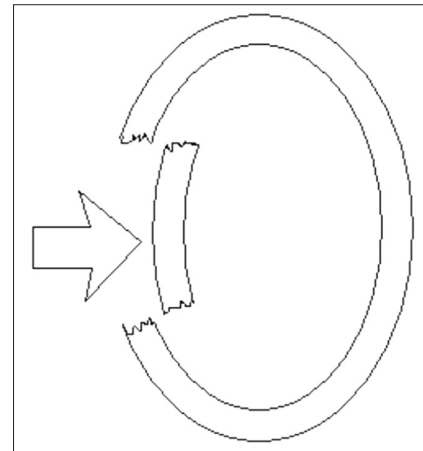


Figure 1: Diagrammatic representation of depressed skull fracture. The arrow represents the applied force causing the fracture with displacement of the floating segment inwards

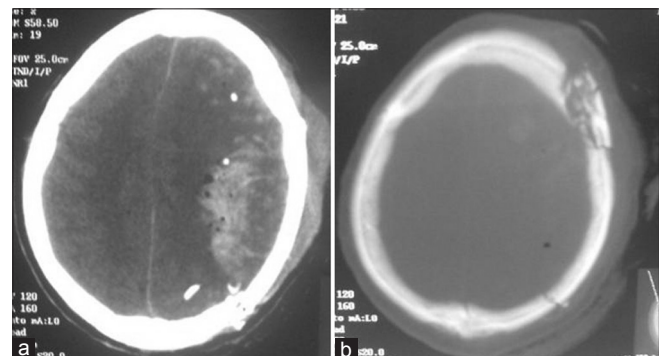


Figure 2: Cranial CT scan, brain and bone windows

craniectomy and wound debridement was performed. The findings at surgery were: An elevated left frontal and linear left fronto-parietal skull fractures as well as left hemispheric cortical contusions. During the post-operative period, global aphasia and dense right spastic hemiparalysis were noted, and these resolved gradually. The patient has made progressive recovery with resolution of his aphasia, and he currently walks with no support. Our patient's injury was the perforating gunshot type, in contrast to the elongated sharp or blunt weapons that were predominant in earlier case reports.^[1-3] The elevated fracture in this case

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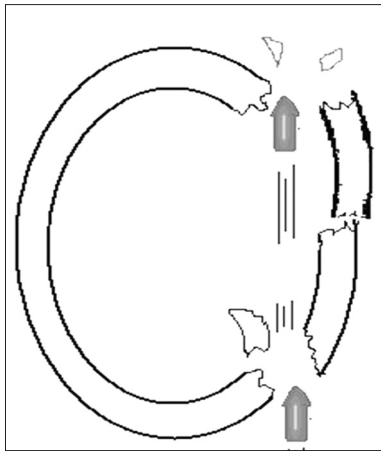


Figure 3: Elevated skull fracture from gunshot head injury

was most likely from the outward force, impacted on the frontal bone from the bullet that was exiting the intracranial cavity. This is further illustrated in Figure 3. Elevated skull fractures have been proven to be a distinct entity with both imaging modalities and surgical findings. It often results

from a significant centrifugal force applied to the head with a weapon, often causing significant structural injury, neurologic deficits and sequela. Most cases are compound fracture, requiring surgical intervention.

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