

An unusual cause of depressed skull fracture in a child: A case report and review the literature

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Abstract

Compound depressed skull fractures occur commonly from assault with various sharp and blunt objects and Open depressed skull fractures can occur in a variety of settings. Our case was a 7 years old boy that ceiling fan falling on his head when he was playing in his room, we start treatment for him by maintenance therapy and we did relocation and reifications of that part of injured skull and after all parts of treatments we discharge him with no evidence of hematoma and brain injury. The management of choice in preventing infection from open depressed skull fractures is operative debridement and thorough irrigation. There is evidence that select cases can be safely managed without operation, The distinction between antibiotic treatment and prophylaxis is blurred, as contamination of the wound has already occurred at the time of injury. The prevalence of infective complications (Abscess, Empyema, Meningitis) after compound depressed skull fractures ranges from 4% to 10%, that is based on treatment and severity of damage. Surgery is indicated when there is definite evidence of dural penetration and in the older child with an unacceptable cosmetic appearance. Surgery is indicated when there is definite evidence of dural penetration and in the older child with an unacceptable cosmetic appearance Early operation is recommended to reduce the incidence of infection. Elevation and debridement is recommended as the surgical method of choice. Primary bone fragment replacement is a surgical option in the absence of wound infection at the time of surgery. All management strategies for open (compound) depressed fractures should include antibiotics. The risks of dural tear and brain laceration increase with the depth of the depression. In addition to intracranial hemorrhage, complications of depressed skull fractures include compression of underlying brain parenchyma, intraparenchymal bone fragments, cerebrospinal fluid leak, growing skull fracture, and cosmetic deformity. The use of subgaleal topical vancomycin powder is an option to reduce the infection rates and mortality, especially in the cases of compound depressed fractures, which is considered as a dirty wound and prone to infection. It is especially recommended in the presence of dural injury and pneumocephalus.

Keywords: Open Head Injury, Depressed skull fracture; Head trauma. TBI , ATLS.

Background

Traumatic brain injury (TBI) is the leading cause of death and disability in children. Pediatric TBI is associated with several distinctive characteristics that differ from adults and are attributable to age-related anatomical and physiological differences, pattern of injuries based on the physical ability of the child, and difficulty in neurological evaluation in children.

Evidence suggests that children exhibit a specific pathological response to TBI with distinct accompanying neurological symptoms, and considerable efforts have been made to elucidate their pathophysiology. In addition, recent technical advances in diagnostic imaging of pediatric TBI has facilitated accurate diagnosis, appropriate treatment, prevention of complications, and helped predict long-term outcomes.(1). another type of skull injury is named ping pong



injury that "Ping-pong" fractures are a type of depressed fracture in which there is no rupture of the inner or outer table of the skull. It is produced by incomplete bone mineralization. Its appearance is frequent during neonatal and infant ages and is extremely rare outside of these age periods (2). The skull consists of 3 layers: the Inner Table, Diploe, and Outer table(3). A depressed skull fracture (DSF) is comminuted fractures in which the broken bones displace inward due to a blunt trauma, such as when the broken outer table is located below the normal anatomical position of the Inner table(5). Compound-depressed skull fractures occur commonly from assault with various sharp and blunt objects (7). The management of choice in preventing infection from open depressed skull fractures is operative debridement and thorough irrigation (11). There is evidence that select cases can be safely managed without operation (11,12), The distinction between antibiotic treatment and prophylaxis is blurred, as contamination of the wound has already occurred at the time of injury(13). The prevalence of infective complications (Abscess, Empyema, Meningitis) after compound depressed skull fractures ranges from 4% to 10%, that is based on treatment and severity of damage(14,15). Surgery is indicated when there is definite evidence of dural penetration and in the older child with an unacceptable cosmetic appearance (16). Surgery is indicated when there is definite evidence of dural penetration and in the older child with an unacceptable cosmetic appearance (17). Early operation is recommended to reduce the incidence of infection. Elevation and debridement is recommended as the surgical method of choice. Primary bone fragment replacement is a surgical option in the absence of wound infection at the time of surgery. All management strategies for open (compound) depressed fractures should include antibiotics.(18) The risks of dural tear and brain laceration increase with the depth of the depression. In addition to intracranial hemorrhage, complications of depressed skull fractures include compression of underlying brain parenchyma, intraparenchymal bone fragments, cerebrospinal fluid leak, growing skull fracture, and cosmetic deformity (19,20).

Importance:

This case presentation is trying to show simple events can create rare and horrible accident between children.

Case presentation:

Our case was a 7 years old boy that ceiling fan (4) felled on his head when he was playing in his room and her parents bring him to emergency part with this figure:(figure1)



Figure1: First appearance of patient

The ceiling fan is a common part of a house in lots of countries(6).



We admitted her and we did Brain CT and saw this figure:(figure2)



Figure2: Depressed fracture

Then we start the emergent therapy and maintenance therapy for him such as Antibiotic therapies on British Guidelines(10).

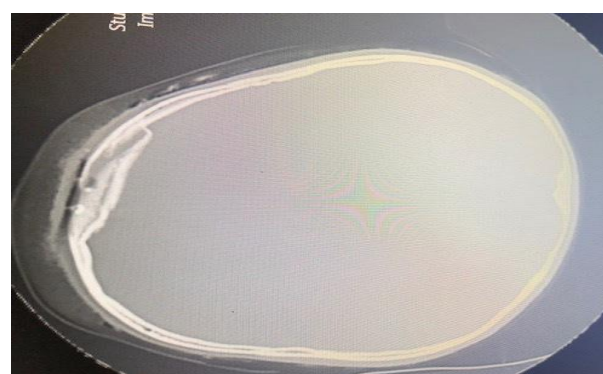


Figure3: Depressed fracture

Under British Guideline we admitted him, start antibiotics, and scheduled surgery to return replaced part to primary part. we start treatment for him by maintenance therapy and we did relocation and reifications of that part of injured skull and after all parts of treatments we discharge him with no evidence of hematoma and brain injury(10).

After all medications, we can discharge this boy with healthy life and alive without Infection and side effects.

Conclusion:

Open depressed skull fractures can occur in a variety of settings (7).

Fractures of the skull vault are influenced by various factors, which include the thickness of the vault and the force of the impact. Rapid dynamic loading occurred in this case, with the force probably acting for a very short time (<200 ms). The size of impacting device (that is, the ceiling fan) and the force of impact are directly related to the magnitude of the dynamic load(8). The complications and sequel of compound depressed fractures of the skull are minimized by early diagnosis and appropriate treatment(9). The Society of British Neurological Surgeons issued guidelines in 1998 for the indications for skull x ray following recent head trauma.(10). These include a history of loss of consciousness or amnesia, suspected penetrating injury, a scalp laceration >5 cm long, bruising or swelling, CSF leak from the nose or ear, and a violent mechanism of injury. The management of choice in preventing infection from open depressed skull fractures is operative debridement and thorough irrigation(11). though there is evidence that select cases can be safely managed without operation(11,12). The distinction between antibiotic treatment and prophylaxis is blurred, as contamination of the wound has already occurred at the time of injury(13). The prevalence of infective complications (Abscess, Empyema, Meningitis) after compound-depressed skull fractures ranges from 4% to 10%.(14,15).

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admission to the hospital for observation and/or acute intervention (21). Thus, a nonoperative approach is recommended for children who have simple depressed skull fractures without associated intracranial hematoma and in whom the bone depression is less than 1 cm, especially when they are not in a cosmetically apparent region of the skull(22). The use of subgaleal topical vancomycin powder is an option to reduce the infection rates and mortality, especially in the cases of compound depressed fractures, which is considered as a dirty wound and prone to infection. It is especially recommended in the presence of dural injury and pneumocephalus. (23)

Declarations:

Ethical Approval and Consent to participate:

The content of this manuscript are in accordance with the declaration of Helsinki for Ethics. No committee approval was required. Oral and written consent to participate was granted by the parents.

Consent for publication:

“Written informed consent was obtained from the patient's legal guardian for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.”

- Availability of supporting data

It is available.

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Ahmad Reza Shahraki is the Surgeon of patient and writes this paper. Reza Abaee collects datas and Elham Shahraki reviews paper.

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