

ORIGINAL ARTICLE

Management of Depressed Skull Fractures: Selective Conservative Management of Non Missile Injuries

SAFDAR HUSSAIN ARAIN¹, MUHAMMAD ASLAM SHAIKH², MUMTAZ ALI NAREJO³, NAJMUS SAQIB ANSARI⁴, ABDUL RAZAQUE MARI⁵

¹Associate Professor & Head, Department of Neurosurgery, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences, Gambat

²Associate Professor & Chairperson, Department of Neurosurgery, Chandka Medical College, Shaheed Mohtarma Benazir Bhutto Medical University, Larkana

³Assistant Professor, Department of Neurosurgery, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences, Gambat

⁴Assistant Professor, Department of Neurosurgery, Ghulam Muhammad Mahar Medical College Sukkur

⁵Associate Professor, Department of Neurosurgery, People's University of Medical & Health Sciences, Nawabshah

Correspondence to: Dr. Safdar Hussain Arain, E-mail: drsafdararain@gmail.com, Cell 0321-2318923

ABSTRACT

Objective: To determine the outcomes of management of depressed skull fractures.

Study Design: Descriptive Study

Place and Duration of Study: Department of Neurosurgeries, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences Gambat and Chandka Medical College Hospital, Larkana from 1st March 2020 to 28th February 2021.

Methodology: Eighty patients of both sexes were enrolled in this study. Patients were aged between 12-70 years of age. Patient's detailed demographics age, sex and body mass index were recorded. Diagnosis of skull fractures from closed head injury patients were undergone for CT scan Depressed fracture of more than 5 mm, cosmetically disfiguring fractures and fracture over the sinuses were operated. All the patients were given prophylactic antibiotics and anticonvulsants. Patients were followed for 4-months. Outcomes were assessed by Glasgow Coma Scale (GCS).

Results: Fifty five (68.8%) patients were males and thirty five (31.2%) were females with mean age was 18.21±7.32 years and mean body mass index was 20.04±3.14 kg/m². Road traffic accident (56.25%) was the most common cause of the injury followed by fall from the height 25 (31.25%). The compound fractures have 48 (60%) and simple fractures were 32 (40%). Surgery was done among 70 (87.5%) cases and 10 (12.5%) patients were conservatively treated. Among these 50 (62.5%) patients were completely recovered. Cerebrospinal fluid leak was the most common complication and was found in 13 (16.25%) cases.

Conclusion: The use of antibiotics and anticonvulsants had effective results during peri-operative periods to avoid infection and epilepsy. The initial stage of operation is particularly necessary when the fracture is larger than 5mm. Cerebrospinal fluid leaks occur after surgery as the most common complication.

Keywords: Depressed skull fracture, Non-missile injuries, Cerebrospinal fluid

INTRODUCTION

Nearly half of the deaths from trauma are due to head injury.¹ Around 2,000,000 head injuries occur annually in the USA and as many as 56,000 deaths annually.² Depressed skull fractures are fractures in which shattered bones are displaced to the inside, a very hazardous type of trauma occurring with 11% of severe head injuries.³ This form of fracture is likely to increase pressure on the brain to crush the sensitive tissues. Approximately 25% of skull fractures are complex and should be considered immediately.⁴ Complex depression fractures are the ones that tear the hard substance.

Etiology is frequently post-traumatic after falls or road accidents.⁵ 25% of patients with depressed skull breaks report a loss of consciousness for less than an hour and a further 25% describe loose awareness. The presentation can vary according to various related injuries, such as underlying hematoma, dural rupture, contusions in the brain and seizures.⁶ Dural rip with concomitant underlying brain damage has been documented varying in patients with depressed skull fractures.^{7,8} X-rays skull and CT scan heads are important research techniques to demonstrate fracture, type, position, depression, and cerebral injury.⁹

Depressed skull fractures will be treated depending on their degree of depression, external communication and neurological impairments. Operating indications in

depressed skull fractures include: complex depressed fractures, cerebrospinal fluid leaking, depression more than the inner side of the non-depressed bone, local neurological deficits induced by pressure of a depressed fragment, related lesions other than the underlying blood pressure, and the presence on the head of a depressed fracture for cosmetic reasons.¹⁰

The purpose of this study was to assess the results of conservatively treated depressed skull fractures.

MATERIALS AND METHODS

This descriptive study was conducted at Department of Neurosurgeries, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences, Gambat and Chandka Medical College Hospital, Larkana from 1st March 2020 to 28th February 2021 and comprised 80 patients. Patient's details demographics were recorded and age between 12-70 years. Patients did not have depressed skull fracture and below than 12 years were excluded. Causes of depressed skull fracture, duration since injury, clinical condition and CT scan findings were recorded. CT Scans were done in all cases. Depressed fracture of more than 5 mm, cosmetically disfiguring fractures and fracture over the sinuses were surgically managed.

Surgical procedures include; S shaped, linear or horse shoe flap incisions according to type and site of

depressed skull fractures, elevation of depressed bone fragment, removal of in driven bone fragment, repair of dural tear, evacuation of hematoma, homeostasis, debridement of wound margin and primary repair. Antibiotics and anticonvulsants were given to the patients. Patients were followed for 4-months and outcomes were assessed by GCS. Complete data was analyzed by SPSS-24.

RESULTS

Fifty five (68.8%) patients were males and 25 (31.2%) were females. Patients mean age was 18.21 ± 7.32 years with mean BMI 20.04 ± 3.14 kg/m². Road traffic accident (56.3%) was the most common cause of the injury followed by fall from the height 25 (31.3%). Frequency of compound fracture was 48 (60%) and simple fractures were 32 (40%) [Table 1]. Most of the affected region was temporal 45 (56.3%), frontal region found in 17 (21.3%), parietal region in 12 (15%), occipital region in 3 (3.7%) and other regions 3 (3.7%) [Table 2].

The surgery was done among 70 (87.5%) cases and 10 (12.5%) patients were conservatively treated. Among these 50 (62.5%) patients were completely recovered. While frequency of moderate disability was 15 (18.75%), severe disability found in 9 (11.25%) and wound infection developed in 6 (7.5%) [Table 3]. Cerebrospinal fluid leaks was the most common complication and was found in 13 (39.4%) cases followed by bleeding 9 (27.3%), meningitis found in 6 (18.2%) and loss of consciousness was in 5 (15.1%) [Table 4].

Table 1: Demographically details on presented cases

Variable	No.	%
Gender		
Male	55	68.8
Female	25	31.2
Mean age (years)	18.21 ± 7.32	
Mean BMI (kg/m ²)	20.04 ± 3.14	
Types of fracture		
Compound	48	60.0
Simple	32	40.0
Causes of fracture		
RTA	45	56.3
Fall from height	25	31.3
Assaults and others	10	12.5

Table 2: Effected regions of depressed skull fractures (n=80)

Effected regions	No.	%
Temporal	45	56.3
Frontal	17	21.3
Parietal	12	15.0
Occipital	3	3.7
Other regions	3	3.7

Table 3: Frequency of outcome presented with GCS (n=80)

Outcome	No.	%
Operated	70	87.5
Conservatively treated	10	12.5
GCS Outcomes		
Completely recovered	50	62.5
Moderate (Disability)	15	18.75
Severe (Disability)	9	11.25
Wound developed	6	7.5

Table 4: Postoperatively complications among patients (n=33)

Complication	No.	%
CSF leaks	13	39.4
Nose bleeding	9	27.3
Meningitis	6	18.2
Loss of consciousness	5	15.1

DISCUSSION

Globally, head injuries remain an important public health problem and contribute significantly to high morbidity, mortality and long term disability.¹¹ In the present study, patients were aged between 12-70 years and majority of patients were between 5 to 15 years. This result showed similarity to the study by Mushtaq et al¹², in their study most common age group was 5 to 16 years.

In the current study, fifty five (68.8%) patients were male and thirty five (31.2%) were females. Road traffic accident (56.25%) was the most common cause of the injury followed by fall from the height 25 (31.25%). Many of previous studies reported male patients were predominant and road traffic accidents were the major cause of depressed skull fractures followed by fall from height.^{13,14} Two factors typically influence the pattern of skull fracture. The first element is the impact force. The other aspect is the impact ratio. The impact rate even if scattered in wide areas by high energy, as in the case of a head injury to an individual who is wearing a motorcycle helmet, sometimes does not produce a skull fracture.

The major head injury in developing countries is a major issue in the intracranial injury. In the young population, it can be fatal.^{15,16} The treatment of these patients can be carried out using both conservative and surgical approaches according to cosmetics and the practical. In our study frequency of compound fracture was 48 (60%) and simple fractures were 32 (40%). Surgery was done among 70 (87.5%) cases and 10 (12.5%) patients were conservatively treated. Among these 50 (62.5%) patients were completely recovered. The relationship between GCS arrival and last functional result was positive in our research. These results are similar to previous studies.¹⁶ Studies have shown that GCS is a strong predictor of GOS performance.^{17,18} These are also good tools for evaluating the original neurological condition and the eventual outcome.

This study showed that 62.5% patients were fully recovered while frequency of moderate disability was 15 (18.75%), severe disability found in 9 (11.25%) and wound infection developed in 6 (7.5%). A study conducted by Asif et al¹⁹ in which they operated 100 patients of depressed skull fractures and they reported 55% had GCS 13-15.

Ali and Ali²⁰ have confirmed focal deficit in 14% and 9% had CSF leaks, 7% had extradural haematoma, and 15% of patients had gross Skull Deformation in a 7-year study of 98 cases of depressed fractures. The indications of emergence from surgical elevations of depressed skull fractures are also identified as the clinical and radiological features. In most cases, GCS patients have persistently increased ICP either because of a localized intracranial or parenchymal lesion or because they have diffuse brain oedema. Urgent exploration, debridement, and elevation of depressed fracturing can be desired due to a variety of reasons and these include surgical debridement of infected

injury, uplifting depressed-kidney segment of the skull, removal or resection of an acute extradural or subdural haematoma, hard repair in cases where the dural tear is not present.

Cerebrospinal fluid leaks was the most common complication and was found in 13 (16.25%) cases followed by bleeding 9 (11.25%), meningitis found in 6 (7.5%) and loss of consciousness was in 5 (6.25%). Following surgical management, this rate of complication of CSF is comparable to many of previous studies in which CSF was documented in 25 to 40% patients followed by loss of consciousness.^{21,22}

CONCLUSION

The depressed cranial fracture was most commonly observed in teen ages. The use of antibiotics and anticonvulsants had effective results during peri-operative periods to avoid infection and epilepsy. The initial stage of operation is particularly necessary when the fracture is larger than 5 mm. Cerebrospinal fluid leaks occur after surgery as the most common complication.

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