

# A Study on Outcomes of Surgical Treatment of Depressed Skull Fractures

MUHAMMAD IDRIS KHAN<sup>1</sup>, ADNAN MUNIR<sup>2</sup>

<sup>1</sup>AP MTI Khyber teaching Hospital Peshawar

<sup>2</sup>Registrar neurosurgery ward MTI khyber teaching hospital Peshawar

Corresponding author: Adnan Munir, Email: [Dradnanmunir88@gmail.com](mailto:Dradnanmunir88@gmail.com)

## ABSTRACT

**Introduction:** Trauma is a significant issue in both industrialized and developing nations. A significant risk factor for death in the young population is head injury

**Objective:** To assess the outcomes of surgical treatment of depressed skull fractures

**Methodology:** The current study was prospective study was done at Neurosurgery department of Khyber teaching Hospital Peshawar. The study duration was one years from March 2022 to March 2023. Causes of the depressed skull fracture, time since the injury, the kind of fracture, the location of the fracture, the reason for the fracture, the clinical state, and the CT scan results were noted. All patients had CT scans. DSF greater than 5 mm, disfiguring cosmetic fractures, and sinus fractures were surgically treated. The whole set of data was examined using SPSS 23.00.

**Results:** In our study, totally 80 patients were enrolled. The male patients in our study were 58 (72.5%) whereas female patients were 22 (27.5%). In the outcomes based on GCS, completely recovered patients were 58 (72.5%) patients, 11 (13.75%) were moderately disabled, 8(10%) severely disabled whereas 2(2.5%) patients were demised.

**Conclusion:** Trauma from depressed fractures is common in neurosurgical wards. One of the most important variables influencing outcome prediction is the neurologic state as indicated by the Glasgow coma scale. About two-thirds of patients who undergo surgical therapy of depressed skull fractures get successful results while one-third of patients are still classified as having severe disabilities. Complications, including death, are common after a depressed skull fracture.

**Keywords:** Outcome; surgical treatment: depressed skull fractures

## INTRODUCTION

Over the last twenty years, head trauma has risen to become the fourth-leading cause of mortality and disability globally. Traumatic brain injuries have significant social, economic, and health-related effects on both individuals and families (1). When someone hits their head hard, they often break their skull. This is called a closed head injury. On the other hand, when someone gets an open head injury, like a skull fracture, the injury goes through the skull and into the brain. Linear skull fractures and depressed skull fractures are the two main forms of skull fractures. There are many more forms of skull fractures, including growing skull fractures, basilar fractures and diastatic fractures. Researchers have shown that a skull fracture is a reliable indicator of both the severity of the underlying injury and the likely result of an accident involving head trauma (2, 3).

Both emerging and developed nations saw a rise in the incidence of trauma, particularly in crowded cities with heavy traffic. It thus becomes a global health and social problem (4). Worldwide, traumatic brain injury is a severe problem (5, 6). The prevalence of depressed skull fractures is rising in the most of head injury cases, necessitating qualified personnel and cutting-edge medical technology for better treatment and to preserve the patients' lives (7). The patients have been injured in high-energy incidents like assaults or car accidents. A better knowledge of the treatment of patients with head injuries was made possible by the development of the Advanced Trauma Life Support (ATLS) training program (8). Typically, a depressed skull fracture happens after a fast accident with a tiny item. Usually, the skull's outer and inner tables fracture simultaneously (9). The most frequent kind of dural venous sinus injury—depressed skull fracture across the superior sagittal sinus (SSS)—is associated with high morbidity and death. In 1.5 to 5% of all head injury patients, there is significant dural sinus damage (10). Surgery is a medical emergency that must be attended to quickly in the case of compound depressed fractures. Morbidity and death from skull fractures are reduced with early, conclusive diagnosis and treatment (11). Developing a strategy for improved surgical care of a depressed skull fracture was the goal of this research.

## MATERIALS AND METHODS

The current study was prospective study was done at Neurosurgery department of Khyber teaching Hospital Peshawar. The study duration was one years from March 2022 to March 2023. A total of 80 patients were enrolled in our study based on

WHO sample size calculator. The inclusion criteria for our study were all the patients of both the gender having age from 10-60 years presented with depressed skull fractures. The exclusion criteria were all the patients having no depressed skull fractures, age less than 10 years and more than 60 years and patients not willing to participate in our study. After obtaining a signed authorization from the patient, complete demographic information's were collected. Causes of the depressed skull fracture, time since the injury, the kind of fracture, the location of the fracture, the reason for the fracture, the clinical state, and the CT scan results were noted. All patients had CT scans. DSF greater than 5 mm, disfiguring cosmetic fractures, and sinus fractures were surgically treated. Incisions in the shape of an S, a linear, or a horseshoe depending on the type and location of the depressed skull fracture, elevation of the depressed bone fragment, removal of the in-driven bone fragment, repair of the dural tear, evacuation of the hematoma, homeostasis, debridement of the wound margin, and primary repair are all surgical procedures. Patients received antibiotics and anticonvulsants. Twelve weeks of patient follow-up were conducted. Results were evaluated by GCS. When evaluating categorical data, frequency and percentage were used, whereas standard deviation was used to evaluate descriptive variables. The whole set of data was examined using SPSS 23.00.

## RESULTS

In our study, totally 80 patients were enrolled. The male patients in our study were 58 (72.5%) whereas female patients were 22 (27.5%). On the basis of age distribution, the age of 40(50%) was <30 years, 24(30%) patients were with ages 30-50 years and only 16(20%) patients were with ages of more than 50 years. The mean body mass index of our enrolled patients was 21.1(±2.01)kg/m<sup>2</sup>. Based on the cause of injury, the road accident was the common cause of injury observed in 58 (72.5%) patients followed by fall from the height in 22 (27.5%). Based on type of fracture, compound fracture was observed in 48 (60%) patients while close fracture was observed in 32 (40%) patients. Based on mode of treatment, 72 (90%) patients were managed with surgical treatment while only 8 (10%) patients were managed with conservative treatments. (Table 1) Based on the Sites of fracture, the temporal fracture was observed in 40 (50%) patients, followed by frontal fracture in 20 (25%) patients, Parietal fracture in 12 (15%) patients, occipital fracture in 4 (5%) patients and others in 4 (5%) patients. (Figure 1) In the outcomes based on GCS,

completely recovered patients were 58 (72.5%) patients, 11 (13.75%) were moderately disabled, 8(10%) severely disabled whereas 2(2.5%) patients were demised. (Figure 2)

Table 1: Demographic and clinical parameters of the enrolled patients

Parameter	Sub category	Frequency (%)
Gender	Male	58 (72.5%)
	Female	22 (27.5%)
Age	Less than 30 years	40(50%)
	30-50 years	24(30%)
	More than 50 years	16(20%)
Cause of injury	Road accident	58 (72.5%)
	Fall from height	22 (27.5%)
Type of fracture	Compound	48 (60%)
	Closed	32 (40%)
Mode of treatment	Surgical	72 (90%)
	Conservative	8 (10%)

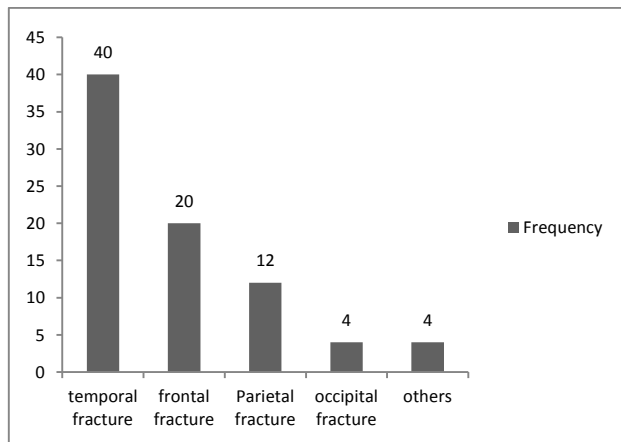


Figure 1: Distribution of patients based on site of fracture

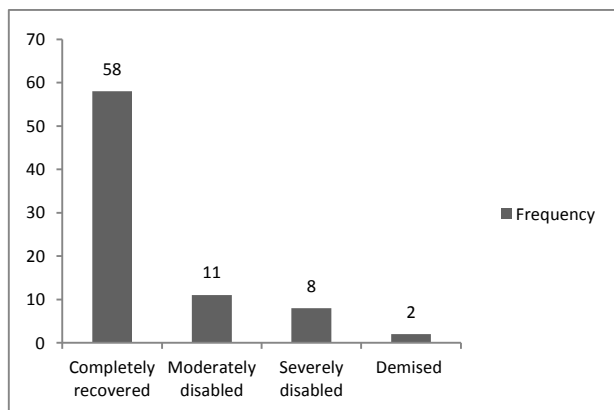


Figure 2: Outcomes of the enrolled patients based on GCS

## DISCUSSION

Trauma is a significant issue in both industrialized and developing nations. A significant risk factor for death in the young population is head injury (12). Head injuries continue to be a major public health concern on a global scale and have a considerable impact on high mortality, morbidity and long-term disability (13).

In our study, totally 80 patients were enrolled. The male patients in our study were 58 (72.5%) whereas female patients were 22 (27.5%). On the basis of age distribution, the age of 40(50%) was <30 years, 24(30%) patients were with ages 30-50 years and only 16(20%) patients were with ages of more than 50 years. The mean body mass index of our enrolled patients was 21.1(±2.01)kg/m<sup>2</sup>. These results are in accordance with the previous study done by H Ali et al. who reported that the male

were predominant in their study. Majority of the patients in their study were in the age range of less than 30 years. The mean (SD) BMI in their study was 20.04(±3.14) kg/m<sup>2</sup> (14). These results are also consistent with the findings of the Mushtaq et al, who reported 5-16 years as the most common age group (15). Based on the cause of injury, the road accident was the common cause of injury observed in 58 (72.5%) patients followed by fall from the height in 22 (27.5%). In the previous studies, the major cause for depressed skull fractures was reported as road traffic accident while the fall from height was the second most common reason (16, 17). The impact force is the first component. The impact ratio is the other factor. When a person who is wearing a motorcycle helmet suffers a head injury, the impact rate, even if it is widely dispersed by high energy, does not always result in a fractured skull. In underdeveloped nations, severe intracranial damage is a significant problem. It might be deadly among the young population (18, 19). According to cosmetics and the practical needs of these individuals, both conservative and surgical methods may be used to treat them.

Based on type of fracture, compound fracture was observed in 48 (60%) patients while close fracture was observed in 32 (40%) patients. Based on mode of treatment, 72 (90%) patients were managed with surgical treatment while only 8 (10%) patients were managed with conservative treatments. Based on the Sites of fracture, the temporal fracture was observed in 40 (50%) patients, followed by frontal fracture in 20 (25%) patients, Parietal fracture in 12 (15%) patients, occipital fracture in 4 (5%) patients and others in 4 (5%) patients. In the outcomes based on GCS, completely recovered patients were 58 (72.5%) patients, 11 (13.75%) were moderately disabled, 8(10%) severely disabled whereas 2(2.5%) patients were demised.

These findings concur with earlier research (19). According to studies, GCS is a reliable indicator of GOS efficacy (20, 21). These are useful techniques for assessing both the initial neurological state and the final result. According to a research by Asif M. et al. (16), of the 100 patients with depressed skull fractures they operated on, 55% had GCS 13 to 15. In a 7-year study of 98 instances with depressed fractures, Ali M and Ali L (22) found that 14% and 9% of the individuals had CSF leaks, 7% had extradural hemorrhages, and 15% of individuals had broad skull deformation. Clinical and radiological characteristics are also recognized as the signs of emergence following surgical elevations of depressed skull fractures. The most common causes of chronically elevated ICP in GCS patients are diffused cerebral edema or localized intracranial or parenchymal lesions. Our investigation revealed that the most frequent complication was a CSF leak, which was then followed by loss of consciousness. This incidence of DSF complication is similar to that of many other studies, in which 25 to 40% of patients had CSF leaks, which were then followed by loss of consciousness (23). A previous study done by Haider ali reported comparable results (14).

## CONCLUSION

Trauma from depressed fractures is common in neurosurgical wards. One of the most important variables influencing outcome prediction is the neurologic state as indicated by the Glasgow coma scale. About two-thirds of patients who undergo surgical therapy of depressed skull fractures get successful results while one-third of patients are still classified as having severe disabilities. Complications, including death, are common after a depressed skull fracture. This is to be expected, given how serious the injury is. Complications are intimately connected to postoperative functional results, thus all measures should be taken to avoid them.

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