Original Research Article

Retrospective study of depressed skull fractures at tertiary care centre

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A R T I C L E  I N F O

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A B S T R A C T

Aims: The aim of the study was to retrospectively analyse the patient data at our institute who underwent treatment for depressed skull fractures over a period of 3 years.

Materials and Methods: 300 patients who had depressed skull fractures due to various modes of injury were studied. Patients with multiple injuries were not included in this study. Age was no bar for enrollment in our study.

Results: Factors which seemed to affect recovery of patients include Cause of injury, Duration of impact, gcs at admission and discharge, underlying brain contusions and brain edema affected recovery. Demographic factors did not seem to affect recovery.

Conclusions: Patients without compound fracture and better gcs during initial resuscitation without brain contusion and edema fared better in our study.

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1. Introduction

Most of the head injury cases in India are of depressed skull fracture, where road traffic accidents in bikers not using a helmet is common. It also occurs due to falls and physical assault. Depressed fracture is defined when outer table of skull bone lies below the level of inner table. Sudden and severe impact on a particular part of skull bone causes depressed fracture. Depressed fracture may cause rise in intracranial pressure and brain lacerations. The outcome depends on various factors. This retrospective study is our attempt to highlight various factors affecting prognosis in depressed skull fracture patients.

2. Materials and Methods

This is a retrospective study of about 300 depressed fracture patients at our institute for the past three years. A total of 300 cases who underwent operative management were studied. Patients who had polytrauma and associated other comorbidities were excluded. Case records were studied for various factors on a case to case basis. Glasgow outcome scale was used to assess outcome from records. Various factors studied to see the outcome which include: Demographic factors, Cause of depressed fracture, location of fracture, simple or compound fracture, brain injury, GCS at admission and discharge and GOS. Statistical tests used to assess outcome.

3. Results

A total of 300 patients who underwent treatment for depressed skull fracture were studied. 254 patients (84.7%) had GOS 5 and 46 (15.4%) had a GOS of < 5. All these patient records were assessed with respect to the different factors and the results were analyzed to draw inference.

1. Age and sex: 26% patients were < 20 years and 58.7% of 20–40 years and 15.3% were > 40 years. 13.3% patients were female and 86.7% were male. Age and Sex did not seem to affect outcome in our patients.

2. Cause of injury: RTA caused most of our cases i.e., 66.7%. Other causes constituted 33.33%. Cause of Injury had its influence on outcome (P < 0.05). Road
traffic accidents caused more of dismal prognosis

3. GCS during initial resuscitation: 74% patients had a GCS of 13–15, and 14% had a GCS 9–12 and 12% had GCS <9 during initial resuscitation. Good Gcs during initial resuscitation had its impact on better outcome

4. Location of fracture: 59.4% patients had fracture of frontal region 5.3%, temporal 20.7%, parietal 2%, other regions had mixed region involvement. Location of fracture did not seem to affect outcome in this study

5. Other Injuries: 30% patients had brain contusions, and 17.3% had EDH, 1.3% patients had SDH and 4% patients had SAH. Brain contusions, lacerations and edema had its significant effect on outcome, patient without these injuries fared better in our study

6. Simple or compound fracture: Type of fracture did not seem to affect outcome on statistical tests

7. Dural tear: It did not affect outcome statistically i.e., P value > 0.05

### Table 1: Study of Various variables of Study Population

| Patient profile | No. of Patients | GOS 4, 5) | GOS 1, 2, 3 |
|-----------------|-----------------|-----------|-------------|
| Age group (years) |                 |           |             |
| <20             | 78              | 78        | Nil         |
| 20-40           | 176             | 160       | 16          |
| >40             | 46              | 46        | Nil         |
| Sex             |                 |           |             |
| Male            | 260             | 242       | 18          |
| Female          | 40              | 40        | Nil         |
| Mode of injury  |                 |           |             |
| RTA             | 200             | 184       | 16          |
| Non-RTA         | 100             | 98        | 2           |
| GCS at admission|                 |           |             |
| 13-15           | 222             | 220       | 2           |
| 9-12            | 42              | 40        | 2           |
| <9              | 36              | 22        | 14          |
| Site of fracture|                 |           |             |
| Frontal         | 178             | 168       | 10          |
| Temporal        | 16              | 16        | Nil         |
| Parietal        | 62              | 60        | 2           |
| Frontotemporal  | 6               | 6         | Nil         |
| Temporoparietal | 10              | 10        | Nil         |
| Parietooccipital| 10              | 8         | 2           |
| Frontoparietal  | 8               | 4         | 4           |
| Occipital       | 10              | 10        | Nil         |
| Associated brain injuries | | | |
| Contusion       | 90              | 78        | 12          |
| EDH             | 52              | 48        | 4           |
| SDH             | 4               | 4         | Nil         |
| SAH             | 12              | 12        | Nil         |
| Type of fracture|                 |           |             |
| Simple          | 44              | 42        | 2           |
| Compound        | 256             | 240       | 16          |
| Dural tear      | 166             | 156       | 10          |
| Present         | 134             | 126       | 8           |
| Absent          | 56              | 52        | 4           |
| Pneumocephalus  | 244             | 230       | 14          |
| Present         | 282             | 280       | 2           |
| Absent          | 14              | 8         | 6           |
| GCS at discharge|                 |           |             |
| 13-15           | 14              | 8         | 6           |
| <9              | 4               | Nil       | 4           |

In our study fractures due to RTA had more unfavourable outcome compared to non RTA group. Jagger et al. and Jamieson and Yelland also found similar results in their study where non-RTA group fared better. However Swann et al., found assault as the common cause of injury and these patients outcome was not good compared to RTA and other causes. Al Derazi et al. found industrial causes as the most common causes of injury like fall of objects while working.

Patients with good GCS during initial resuscitation i.e 13-15 (74%) had better outcome. 42 patients had GCS 9-
12 and 40 of them recovered better. 36 patients had GCS below 9 most of whom did not have good outcome. At the time of discharge 284 patients had GCS 13-15. 14 patients had GCS 9-12 and 4 patients had GCS <9. GCS at discharge strongly affect prognosis From these findings it can be concluded that GCS during initial resuscitation and discharge strongly affect the outcome. Hossain et al., found similar correlation with gcs during initial resuscitation and discharge with outcome in their study

In our study frontal fracture were most common, next in sequence was parietal followed by temporal. There were also more than one bone fracture. There was no significant correlation between location of fracture and prognosis except if it is involving the underlying dural sinus region. Al Derazi et al., found similar association in their study

In this study most common associated injury with depressed fracture were brain contusions followed by edh, sdh, and traumatic sah in descending order. SDH and SAH did not affect much on outcome but patients with brain contusions had poor outcome. While patients with EDH had poor prognosis probably due to injury to dural venous sinuses, these patients also had poor GCS during initial resuscitation. Hossain et al., found similar pattern of associated injuries in their study. Pneumocephalus did not have much bearing on outcome in this study. However Satardey et al. found poor prognosis with Pneumocephalus and tears in dura also there was poor outcome with compound type of fracture compared with simple fractures which is not found in this study. Lee et al., found seizures with low GCS.

5. Conclusions

Our study comprised 300 cases of depressed skull fracture who were treated over a period of 3 years at our institute. We found association between GCS during initial resuscitation and discharge with outcome with patients having good gcs faring better Other brain injuries along with depressed fracture increases morbidity and cause prolonged or poor recovery. Demographic factors do not affect outcome. The inference drawn from this study is depressed fractures due to other causes than RTA, with good GCS during initial resuscitation and discharge with no other injuries had good outcome.

6. Source of funding

None.

7. Conflict of interest

None.

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