

# Study of various modalities of management and outcome in patients of head injury at a tertiary hospital

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## Abstract

**Background:** With rapid modernization, advances made in transportation, and the upsurge of violence, the incidence of traumatic brain injury has increased many folds. Present study was aimed to study various modalities of management and outcome in patients of head injury at a tertiary hospital. **Material and Methods:** Present study was tertiary hospital-based prospective, descriptive and observational study conducted in patients of age 19-70 years, either gender, had isolated head injury with GCS 12 or less admitted to our hospital. **Results:** Out of the 120 patients who participated in the study, the Mean age was 36.6 years, majority of patients were from age group of 18-40 years (66%), followed by age group of 41-50 years (20%) and age group of 51- 60 years (12 %). Majority of patients who had come were of male gender (90%), Male to Female ratio was 9:1. Road traffic accident was the most common cause of mode of injury (74%). In our study EDH and SDH were the most common findings on non-contrast brain CT scan. EDH comprising of 27% and SDH comprising of 26% making the majority 53% of the population. SAH was the third highest finding making up 18% of the population, followed by haemorrhagic contusion (11%) and intra-parenchymal haemorrhage (7%). 99 patients (82%) were managed conservatively with monitoring in the surgical intensive care unit without the requirement of operative intervention. Operative interventions were required only in 21(18%) patients which included Craniotomy (7 patients) and Burr Hole (14 patients). **Conclusion:** In this study majority of head injuries did not require surgery and could be managed conservatively, and those patients who were managed operatively with Burr Holes and Craniotomy had good outcome.

**Keywords:** head injuries, conservative management, Burr Holes surgery, Craniotomy

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## INTRODUCTION

With rapid modernization, advances made in transportation, and the upsurge of violence, the incidence of traumatic brain injury has increased many folds. Much

of the mortality and morbidity in traumatic brain injury patients is due to delay in admission of the patient to a hospital, delayed detection of intracranial pathology and neglect of the associated injuries contributing to secondary brain damage.<sup>1</sup> Traumatic brain injury is a major public health issue in India. Head injury results in injuries, death and disabilities in all age groups but more in the young working and hence productive population.<sup>2</sup> In India, 1 out of 6 trauma victims succumb to death, every year more than 100,000 lives are lost. Fifty percent of those who die from traumatic brain injury do so within the first two hours of injury. Ninety five percent of trauma patients in India do not receive the required care during the “Golden Hour” period after an injury is sustained.<sup>3</sup> The identification of variables in the acute stage of head injury that could provide insight into patient outcomes is of great interest to

healthcare providers and researchers. Present study was aimed to study various modalities of management and outcome in patients of head injury at a tertiary hospital.

**MATERIAL AND METHODS**

Present study was tertiary hospital-based prospective, descriptive and observational study which has been carried out in the department of general surgery of our Institute during the period of 1st January 2018 to 31st August 2019. Study was approved by institutional ethical committee.

**Inclusion criteria**

- Patients of age 19-70 years, either gender, had isolated head injury with GCS 12 or less admitted to our hospital

**Exclusion criteria**

- On evaluation GCS more than 12
- Patients /Close relatives declining written informed consent.

Study was explained and written informed consents from patient’s close relatives was taken. Demographic data, detailed medical history, information about operative intervention, investigations, outcome, etc obtained from patients was entered in a pre-designed case record form. The patients were examined clinically, GCS score was assessed on admission, initial GCS assessment were made upon arrival to the casualty and 6 hours after patient had

been admitted in surgical intensive care unit, once the patients were resuscitated and stabilized, then CT scan was done and findings correlated. Neurosurgeon's consultation was taken and the necessity of conservative/operative intervention was decided. In cases requiring operative intervention, mode of surgery was decided on individual patient profile. Mode of Injury, requirement of intubation, CT scan findings, management strategy whether conservative/operative, and their outcome based on the Glasgow Outcome scale was assessed during discharge and follow up.

Data was collected and compiled using Microsoft Excel, analysed using descriptive statistics.

**RESULTS**

In this study, we have studied and analysed 120 head injury patients. All the traumatic brain injury patients underwent resuscitation and CT brain and were admitted in the surgical intensive care unit. Out of the 120 patients who participated in the study, the Mean age was 36.6 years, majority of patients were from age group of 18-40 years (66%), followed by age group of 41-50 years (20%) and age group of 51- 60 years (12 %). Majority of patients who had come were of male gender (90%), Male to Female ratio was 9:1.

**TABLE 1: Age and gender in relation to head injury**

Characteristic	Number of patients	Percentage
Age group (years)		
18-20	10	8%
21-30	34	28%
31-40	36	30%
41-50	24	20%
51-60	14	12%
61-70	2	2%
Gender		
Male	108	90%
Female	12	10%

Road traffic accident was the most common cause of mode of injury (74%). Most common mode of head injury in males were road traffic accident (81%), followed by fall (14%) and assault (5%). In the female population fall was the most common cause of head injury (92%) and road traffic accident (8%) case.

**Table 2: Mode of injury.**

Mode of injury	Male (n=108)	Female (n=12)	Total number of patients	Percentage
RTA	88 (81 %)	1 (8 %)	89 (74%)	74%
Falls	15 (14 %)	11 (92 %)	26 (22%)	22%
Assault	5 (5 %)	0	5 (4%)	

47(39%) patients had severe head injury according to GCS scoring system (GCS score ≤ 8). The remaining 73(61%) patients had moderate brain injury (GCS score 9- 12).

**Table 3: Severity of head injury based on Glasgow coma scale.**

Severity of head injury	Number of patients (n=120)	Percentage
Moderate (GCS-9-12)	73	61%
Severe (GCS 8 AND LESS)	47	39%

In our study EDH and SDH were the most common findings on non-contrast brain CT scan. EDH comprising of 27% and SDH comprising of 26% making the majority 53% of the population. SAH was the third highest finding making up 18% of the population, followed by haemorrhagic contusion (11%) and intra-parenchymal haemorrhage (7%). In 11% of the head injured population CT scan could not be done as they were not in a stable condition. We found out that mortality was least with EDH, none of the patients who was diagnosed with EDH on CT scan imaging died in our study, whereas SDH had the highest mortality as 13 patients out of 44 died due to SDH, SAH and Intra-parenchymal haemorrhage comprised of 7 each mortality and Haemorrhagic contusion resulted only in 3 mortality out of 44. All patients whose CT was not done died eventually as they had severe head injuries.

**Table 4: Intracranial findings on CT scan.**

CT SCAN FINDINGS	NO OF PATIENTS	PERCENTAGE
EDH	32	27%
SDH	31	26%
SAH	22	18%
HC	13	11%
IPH	9	7%
CT NOT DONE	13	11%

99 patients (82%) were managed conservatively with monitoring in the surgical intensive care unit without the requirement of operative intervention. Operative interventions were required only in 21(18%) patients which included Craniotomy (7 patients) and Burr Hole (14 patients).

**Table 5: Mode of management**

Mode Of Management	Number Of Patients	Percentage
Conservative	99	82%
Operative	21	18%

The patients with Favourable outcome i.e. Good recovery and Moderate Disablement were 69, and patients with Unfavourable outcome i.e. severely disabled and who died during treatment were 51. Out of the 108 Male population 63 (58%) had good recovery/moderate disability and 45 (42%) had severe disability/died. Whereas the female population had 6 (50%) favourable outcome and 6 (50%) unfavourable outcome.

**Table 6: Gender in relation to outcome.**

Sex	Good recovery/ Moderate disability	Severely disabled/Died	Total
Male	63	45	108
Female	6	6	12
<b>Total</b>	<b>69 (57%)</b>	<b>51 (43%)</b>	<b>110</b>

## DISCUSSION

The initial goal of care should be immediate attention to Airway Breathing and circulation (ABC); Early identification of the potential for traumatic brain injury in any trauma victim and minimization of secondary insults, such as hypoxic-ischemic injury" The goal of Traumatic brain injury management is to prevent this secondary insult. In all multi-trauma cases, patients must be treated according to the Advanced trauma life support (ATLS) protocols, because any patient will die much more quickly from systemic injuries than from CNS injuries.<sup>4</sup> In a study by Haroon S. *et al.*,<sup>5</sup> 79.2% cases belonged to the first four decades of life, the maximum number of patients were in the age group of 21 to 30 years (25.3%). Similar observations have also been made by Tandon *et al.*,<sup>6</sup> who reported the mean age of 25.87 years in a series of 681 patients, whereas the mean age of the patients studied by Turazzi; *et al.*,<sup>7</sup> was 34 years. Similar findings were noted

in present study. The Male to female ratio was 9:1. Different Indian authors noted similar findings, such as Sambasivan M<sup>8</sup> (15:1), Bharti P<sup>9</sup> (5.6:1) and Haroon S<sup>5</sup> (3.5:1). According to the global burden of disease study, India had highest rates of intracranial injury from road traffic accidents.<sup>2</sup> The Second leading cause of traumatic brain injury related outcomes in India was falls. Injuries are the seventh leading cause of mortality in India and 78% of these deaths are due to road traffic accident alone. Gururaj G.<sup>3</sup> *et al.* noted that road traffic injuries are the leading cause (60%) of traumatic brain injuries. Followed by falls (20% to 25%) and violence (10%). Similar findings were noted in present study. In this study majority of head injuries did not require surgery and were managed conservatively, 99 (82%) out of 120 patients were managed conservatively making it the majority, the causes being that in 13 patients of severe head injury CT scan could not be done, Close relatives of few patients did not give consent for operation given the high risk nature of

operation and therefore they were managed conservatively despite surgical indications, rest of the patients did not satisfy the indications for operative interventions. And therefore were managed conservatively. Out of the 21 patients managed operatively 14 patients underwent burr holes and 7 patients underwent craniotomy. 12 out of 14 burr hole patients had favourable outcome and only 2 died. 6 out of 7 craniotomy had favourable outcome and only 1 died. We found that EDH had the best outcome. Our study correlates with the findings of the study done by Croce M. *et al.*,<sup>10</sup> in his study 70% of 83 patients with GCS scores of 11-15 who had subdural hematomas less than 1 cm in width were successfully managed non-operatively with only 6% eventually requiring surgery. Another study by Patel NY *et al.*,<sup>11</sup> of 462 patients with head injuries with CT-imaged intracranial hematomas who were treated non-operatively found that only approximately 10% progressed clinically and eventually required surgery. Zaitun Zakaria *et al.*,<sup>12</sup> described three cases of EDH and their management, focusing on operative and non-operative treatment. They also reviewed, at that time, the available literature from the past three decades as well as the guidelines for management of EDH. They concluded that EDH can be managed non-operatively provided the GCS remains the same with symptomatic improvement. A study done by Moussa *et al.*,<sup>13</sup> found that 50 patients of EDH were managed successfully by conservative approach without the need of surgery. Many factors in head injury patients have been assessed and analysed, however, now is the time to expand our use of clinical knowledge beyond the Glasgow Coma scale, and create new scoring systems that take other variables like pupillary reactivity into account for establishing prognosis of head injury patients.

## CONCLUSION

In this study majority of head injuries did not require surgery and could be managed conservatively, and those patients who were managed operatively with Burr Holes and Craniotomy had good outcome. If conservative approach to head injury management can be shown as a suitable alternative to surgical intervention, it will offer a

mode of treatment that has fewer potential complications and risks than the traditional surgical route.

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