

## Original Research Article

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# The audit of traumatic head injuries in a tertiary care hospital in Mumbai: a retrospective study

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## ABSTRACT

**Background:** Trauma and trauma related deaths are a major health concern in any country of which half of the deaths are due to head injuries. Yet reliable statistics are difficult to discover from routinely collected data. This study helps to analyse the epidemiology, mortality and morbidity of traumatic head injury patients in a tertiary care hospital in Mumbai.

**Methods:** Retrospective data of one year (1<sup>st</sup> January 2019 to 31<sup>st</sup> December 2019) was collected from Medical records department. Demographic data, mode of injury, severity of injury, interventions done, duration of hospital stay, mortality and morbidity were recorded.

**Results:** Of the total 944 cases recorded, 785 (83%) were males. More than half of the patients were below 40 years of age. The leading cause of trauma was RTA (79%) followed by accidental fall (18%). Of all the trauma patients 110 (11%) were found to be under influence of alcohol. 77 patients (8%) on admission had poor GCS (0-3), while 766 (81%) on admission had good GCS (8 and above). 153 patients (16%) underwent neurosurgical intervention. Average length of hospital stay of most patients (545) was 4 to 7 days. Total mortality was 111 (12%). Mortality was high in patients with poor GCS on admission.

**Conclusions:** The above study gives statistics regarding the epidemiology, morbidity and mortality of patients of traumatic head injuries in a tertiary care hospital which can be used for future references in designing management policies to prevent traumatic head injuries.

**Keywords:** Audit, Head injury, Trauma

## INTRODUCTION

Injuries and violence pose a major public health and development problem world-wide. According to World Health Organisation (WHO) data for 2000, an estimated 5.06 million people die each year as a result of some form of injury, comprising almost 9% of all deaths.<sup>1</sup> Up to half of trauma deaths are due to head injuries.<sup>2</sup> We defined "head injury" as any trauma to the head except superficial injuries to the face.<sup>3</sup> Head injury covers a wide range of severity from patients who die before admission to hospital to those with head injuries so mild that they do not even attend hospital. Although traumatic head injury

is recognised as a major concern but reliable statistics are difficult to discover from routinely collected data. International comparisons of deaths from injury do not identify head injuries, although their incidence reflects geographical differences and trends over time in the frequency of trauma deaths as a whole. Evidence supports the fact that timely referral to trauma centres equipped with proper facilities to deal with serious head injuries, result in reduction of morbidity and mortality among victims.<sup>4</sup> However, the trauma care system in India is at a nascent stage and is confined to cities and semi urban areas.<sup>5</sup> Victims in India with serious injuries are at six times increased risk of death compared to their

counterparts from developed countries.<sup>6</sup> Better policies and concrete efforts are the need of the hour for effective and sustainable prevention and management of traumatic head injuries. One of the essential components is development of trauma registries to monitor the system and provide state wide cost and epidemiological statistics.<sup>7</sup> The objective of this study was to undertake an audit of traumatic head injuries in tertiary care hospital in Mumbai during a 12 month period (1<sup>st</sup> January 2019 to 31<sup>st</sup> December 2019) to define the demography, mechanism of injury, length of hospital stay, morbidity and outcomes in terms of mortality.

## METHODS

The present study is carried out at GSRTC and KEM Hospital, a tertiary care centre in department of General Surgery from 1<sup>st</sup> January 2019 to 31<sup>st</sup> December 2019. The present study was a hospital based retrospective observational study. The study population was of patients with traumatic head injuries fulfilling the below mentioned inclusion and exclusion criteria.

### Inclusion criteria

All admitted patients of exclusive head injury with age more than 12 years.

### Exclusion criteria

Patients brought dead to hospital, polytrauma patients admitted under other departments, patients managed through OPD.

### Methodology

Retrospective data 944 patients of trauma with exclusive head injury attending the hospital's emergency department over a period of one year, from 1<sup>st</sup> January 2019 to 31<sup>st</sup> December 2019, was collected from institute's Medical Records Department. The collected data was studied under below mentioned variables:

Demographic details such as age, sex, address, marital status, date of admission, and date of discharge/death; details of injury such as date of injury, mode of injury, external injuries if any, whether patient was under influence of alcohol at the time of trauma; system wise examination on admission namely, neurological, cardiovascular, respiratory and per abdominal; Glasgow Coma Scale (GCS) score at the time of admission for assessing the severity of trauma; radiological findings; surgical intervention done (if any)

Data obtained was compiled on a MS Office Excel Sheet (v 2010). Data was subjected to statistical analysis using Statistical package for social sciences (SPSS v 21.0, IBM). Descriptive statistics like percentage and frequency for categorical data has been depicted.

## RESULTS

Table 1 shows age and sex wise distribution of patients. Males were more than females. Among male's majority were seen in the age group of 25 to 40 years followed by 41 to 50 years. Among female's majority were in the age group of >55 years followed by 25 to 40 years. Overall majority of the study subjects were in the age group of 25 to 40 years followed by >55 years.

**Table 1: Age and sex wise distribution of patients.**

Age (in years)	Male	Female	Total
<25	173	26	199
25-40	288	45	333
41-55	178	22	200
>55	146	66	212
<b>Total</b>	<b>785</b>	<b>159</b>	<b>944</b>

Table 2 shows mode of injury. Of the 944 cases of traumatic head injury 754 (79.2%) were because of Road Traffic Accident (RTA), 168 Accidental (17.8%), 26 Assault (2.8%), and 2 Suicidal (0.2%). Amongst patients who had RTA, assault and suicidal as mode of injury majority were male, whereas amongst accidental majority were females.

**Table 2: Mode of injury.**

Mode of injury	Male		Female		Total	
	No.	%	No.	%	No.	%
<b>Accidental</b>	72	11.6	96	29.8	168	17.8
<b>Assault</b>	20	3.2	6	1.9	26	2.8
<b>RTA</b>	528	84.9	220	68.3	748	79.2
<b>Suicidal</b>	2	0.3	0	0	2	0.2
<b>Total</b>	<b>622</b>	<b>100</b>	<b>322</b>	<b>100</b>	<b>944</b>	<b>100</b>

Table 3 shows patients who were found to be under the influence of alcohol. Amongst 944 patients, history of alcohol consumption at the time of injury was positive in 110 patients i.e. 11.7%.

**Table 3: Patients found to be under the influence of alcohol.**

Presence of alcohol	Number	Percentage
<b>Yes</b>	110	11.7
<b>No</b>	834	88.3
<b>Total</b>	<b>944</b>	<b>100</b>

**Table 4: Glasgow Coma Scale (GCS) score on admission.**

GCS score	Number	Percentage
<3	77	81.1
<b>3-8</b>	<b>101</b>	<b>10.7</b>
<b>&gt;8</b>	<b>766</b>	<b>8.1</b>
<b>Total</b>	<b>944</b>	<b>100</b>

Table 4 shows Glasgow Coma Scale (GCS) score of the patients on admission. Amongst the 944 patients, majority had a GCS score above 8 (81.1%), while (10.7%) patients had GCS between 3 to 8 and (8.1%) patients had a GCS score below 3 on presentation to the hospital.

**Table 5: Radiological findings of head injury seen on a CT brain.**

Injury	Subarachnoid hemorrhage		Subdural hemorrhage		Extradural hemorrhage		Minor hematomas		Mixed	
	With midline shift	Without midline shift	With midline shift	Without midline shift	With midline shift	Without midline shift	With midline shift	Without midline shift	With midline shift	Without midline shift
<b>Number</b>	56	84	62	76	66	57	22	245	234	42
<b>Total</b>	140		138		123		267		276	
<b>Percentage</b>	40	60	44.9	55.1	53.7	46.3	8.2	91.8	84.8	15.2

**Table 6: Average duration of hospital stay.**

Average duration of hospital stay (in days)	Number	Percentage
<b>0-3</b>	380	40.3
<b>4-7</b>	512	54.2
<b>8-15</b>	27	2.9
<b>15-30</b>	15	1.6
<b>&gt;30</b>	10	1.0
<b>Total</b>	944	100

**Table 7: Various parameters having outcome as mortality.**

Parameter	Mortality Yes	Mortality No	Total	Percentage of mortality
<b>Sex</b>				
<b>Male</b>	92	693	785	11.7
<b>Female</b>	19	140	159	11.9
<b>Age group</b>				
<b>&lt;25</b>	19	180	199	9.5
<b>25-40</b>	20	313	333	6.0
<b>40-55</b>	26	174	200	13
<b>&gt;55</b>	46	166	212	21.7
<b>Mode of injury</b>				
<b>RTA</b>	70	678	748	9.4
<b>Accidental</b>	36	132	168	21.4
<b>Assault</b>	3	23	26	11.5
<b>Suicidal</b>	2	0	2	100
<b>GCS score on presentation</b>				
<b>&lt;3</b>	70	7	77	90.9
<b>3-8</b>	31	70	101	30.6
<b>&gt;8</b>	10	756	766	1.3
<b>Surgical intervention</b>				
<b>Yes</b>	58	95	153	37.9
<b>No</b>	53	738	791	6.7
<b>Midline shift</b>				
<b>Yes</b>	90	609	689	13.0
<b>No</b>	21	224	255	8.2

Table 5 shows radiological findings of head injury seen on a CT brain. Majority of them (33.6%) showed minor hematomas, followed by mixed patterns (28.2%) of hematomas and hemorrhages. Amongst total 944, 153 (16.2%) patients required surgical intervention, while rest 791 (83.8%) were managed by close neuro observation.

Table 6 shows average duration of hospital stay of patients of traumatic head injury. Average hospital stay of traumatic head injury patient was 4 to 7 days (54.2%) followed by 0 to 3 days (40.3%). Very few patients (1.1%) had a hospital stay of one month and above.

Table 7 shows number of patients with various parameters having outcome as mortality.

Of 944 patients 111 (11.8%) patients had mortality as an outcome of the traumatic head injury while rest 833 (88.2%) recovered and were discharged.

## DISCUSSION

This audit incorporates retrospectively collected data of one year of traumatic head injury patients in a tertiary care hospital in Mumbai.

In the present study, patient were aged 12 years and above. Most vulnerable age group was between 25 to 40 years consistent with similar studies conducted by Tian et al, Aykut et al, and Agrawal et al respectively.<sup>8-10</sup> In our study majority of patients were male as reported in previous studies by Cheung et al, Agrawal et al, and Karasu et al.<sup>9-11</sup>

The present study revealed road traffic accidents as the major cause for traumatic head injuries. This finding is comparable to studies done by Sharma et al, and Sindhu et al.<sup>12,13</sup> Road traffic accidents were followed by accidental falls as the second major cause of head injury in which number of females was more than males.

The importance of alcohol has to be highlighted in any trauma discussion. 11 percent were positive for alcohol, near to study by Jha et al were 16 percent were positive for alcohol, but far less than the study by Smith et al and Toole et al.<sup>14,15</sup> This fact again calls for more education and enforcement regarding drinking and driving. Alcohol consumptions not only predisposes to accidents but there

also is a high association of alcohol positivity with missed injuries.<sup>16</sup>

It was observed that patients with GCS score of 3 and less on admission had poor prognosis and highest rate of mortality (90.9%) while patients with GCS 8 and above had excellent prognosis and least mortality (1.3%) which establishes a strong correlation between GCS and outcomes in traumatic head injuries as seen in previous studies.<sup>17</sup> Choomuang et al have reported in their study that GCS is one of the most important factors in predicting outcomes in cases of head injury.<sup>18</sup>

Patients with midline shift had a higher mortality rate (13%) than those without any midline shift (8.2%). Previous studies by Gary et al and Tan et al have shown midline shift to be one of the worst prognostic factors in cases of traumatic head injuries.<sup>19,20</sup>

Amongst the total 944 patients, 83.8% did not require any active management and were managed conservatively while rest others required neurosurgical intervention. In those patients who went neurosurgical intervention mortality rate was 37.9%, mainly because these patients had severe head injuries with midline shifts or poor GCS on admission.

Average duration of hospital stay in our study was 4 to 7 days and only 1% of the patients had a prolonged hospital stay of more than one month. Recovery rate in patients in our study was 88.2% while 11.8% patients succumbed to the injury.

## CONCLUSION

Trauma and trauma related deaths is one of the major health concerns in India. Traumatic head injuries is the third cause of death in all age groups after malignancies and cardiovascular diseases. Hence the problem of trauma needs to be addressed aggressively in India. A mature trauma system would help in reducing in morbidity and mortality related to trauma. Hence we should customize our own guidelines keeping in mind our economic, manpower, training, and political resources. For this to happen it is important to ensure that reliable data are routinely collected about trauma and traumatic head injuries of all severities, their causes, and their outcomes in terms of morbidity and mortality.

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