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Original Research Article

Observational Study Assessing Severity and Outcome in Patients with Head Injuries: A Hospital-Based Study

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Abstract

Aim: The aim of study to know the pattern of injury in terms of severity and outcome in patients with head injuries admitted in trauma unit of a tertiary care Centre in Bihar region.

Methods: This study included 500 patients admitted at Department of General Surgery for one year. There after a complete history of all patients of head injury sustained due to RTA or fall was taken after taking written & informed consent. Those with polytrauma and others not attending the OPD for check-ups timely were eliminated from study. After admission in head injury unit, physical examination was performed in all subjects.

Results: It was observed that incidence of head injury was more in males than the females. Out of 500 cases, 450 (90%) victims were males and 50 (10%) cases were females. Out of 500 cases, maximum incidence of head injury was found in the age group of 21-30 years comprising 130 (26%) cases, followed by 31-40 years 120 (24%) and 41-50 years 110 (22%). The age group 51-60 yrs comprised of 80 (16%) cases. The other affected groups were 61-70 years and 71-80 years group comprising of 25 (5%) cases and 20 (4%) cases respectively. It was observed that road traffic accident was the commonest cause of head injury seen in 350 (70%) cases. This was followed by fall from height 90 (18%) cases and assault 50 (10%) cases. The other causes like fall of tree or wall over-head were seen in 2% cases. It was seen that most of the cases 300 (60%) died within 24 hours of admission to the hospital. 75 (15%) cases survived for 1-2 days. 50 (10%) of cases survived for 2-3 days. 50 (10%) cases survived for 3-7 days and about 10 (5%) of cases survived for more than 7 days. Thus the most fatal period was first 24 hours. It was evident that linear fracture was observed in 200 (40%) cases followed by depressed fracture in 75 (15%) and comminuted fracture in 45 (9%) cases. Thus the linear fracture was the most common skull fracture encountered at autopsy examination.

Conclusion: The study showed that most head injury victims brought to a tertiary care hospital, were due to road traffic accidents and males are more prone to get Head injury. So it warrants the urgency to establish good pre-hospital care and provision of efficient and prompt trauma services at Road side to prevent mortality aroused from RTA. RTA remains the most common cause for Head injury and demands good neurosurgical care for such patients.

Keywords: Head Injury, Skull Fracture, Intracranial Haemorrhage.

Introduction

Traumatic brain injury is leading cause of death and disability worldwide. Every year about 1.5 million affected people die and several millions receive emergency treatment. [1] Head injury is recognized as a major public health problem that is frequent cause of death and disability in young people and makes considerable demand on health services. [2] The quality of survival after severe and moderate head injury is highly dependent on the adequacy of cognitive recovery. Outcome assessments are usually based on the integrity of neurological function and give little information regarding cognitive abilities. [3] The mortality of children's caused by trauma and head injury is second only to congenital disease in developed countries. [4] Since 1970's Glasgow coma scale (GSC) and computed tomography (CT) scanning has been used in evaluating head injury patients. [5] Trauma presents with variety of injuries and problems that demand rapid evaluation, discussion, improvisation and intervention to save life and prevent permanent disability. [6]

The incidence of head injury is growing with greater mechanization in industry and an increase in high-velocity transport. The injuries could be caused by a penetrating or blunt force either by direct violence or indirectly, such as a fall at the feet or buttocks. There is no clear relation to the severity of injury to skull bones and the extent of cerebral disorder. Severe head injury, with or without peripheral trauma, is the commonest cause of death and/or disability up to the age of 45 years in developed countries. [7] This necessitated an in-depth analysis on the pattern of head Injury in road traffic accidents and other factors influencing the Pattern of head injuries. Any change in mental or physical performance associated with a blow on the head, associated with or without altered level of consciousness is defined as head injury [8], may be mild to severe depending on the impact & duration of injury. In the developing and developed nations the commonest reason of mortality and morbidity are injuries related to RTA (Road traffic accidents) and this may also consequence in short term or long term disability. [9] Therefore may act as a socioeconomic burden on such countries. Globally, injuries related to RTA are the most important reasons for disability adjusted life years lost and ranked at ninth level, and this is predicted to rank to third by 2020. [10]

Head injury is a major public health problem and has already attained epidemic proportions in India. As a result craniocerebral trauma places a huge financial and psychological burden upon the society. In India, the problem has become more acute over the last two decades, mainly due to increased vehicular traffic and poor maintenance on the road. The aim of study to know the pattern of injury in terms of severity and outcome in patients with head injuries admitted in trauma unit of a tertiary care Centre in Bihar region.

Materials and Methods

This study included 500 patients admitted at Department of General Surgery, Government Medical College, Bettiah, Bihar, India for one year. There after a complete history of all patients of head injury sustained due to RTA or fall was taken after taking written & informed consent. Those with poly trauma and others not attending the OPD for check-ups timely were eliminated from study. After admission in head injury unit, physical examination was performed in all subjects.

In needy subjects resuscitation measures were done before referring the subjects for CT scan brain. Patients were divided into severe (GCS 3-8), moderate (GCS 9-13) and mild head injury (GCS 14-15) based on GCS level. CT scan brain with bone window was done for all patients to confirm their diagnosis. Glasgow Coma Scale (GCS) was used for categorizing the subjects with head injury into mild (GCS 14-15), moderate (GCS 9-13) and severe injury (GCS 3-8). All subjects went for CT scan brain with bone window for confirmation of diagnosis.

The outcomes at follow up of patients after traumatic head injury were observed through Glasgow outcome scale. The outcomes observed were categorized as; 1. Death, 2. Persistent vegetative state (minimum responsiveness), 3. Severe disability (subject is conscious, disabled and dependent), 4. Moderate disability: subject is disabled but independent (can work in sheltered settings) and 5. Good recovery: minor deficits with resumption of normal life.

A printed proforma was used to collect the data and this included the biodata of subjects as name, age gender, manner of trauma, neurological condition at arrival, type and outcome of treatment. The subjects and/or their relatives were explained about disease prognosis and the requirement of any type of medical or surgical treatment during the course of management. For the avoidance of bias or confusing issues, exclusion criterions were followed strictly.

Regarding statistical Analysis; data was entered and analyzed in statistical software (SPSS-20). Frequency and percentages were computed for categorical variables like age groups, gender, diagnosis, GCS, and surgical outcome including Glasgow outcome scale. Mean and standard deviation confidence interval were computed for quantitative measurement like age.

Results

Table 1: Age & Sex wise distribution of Head injury cases

Age inyears	No. of cases		Total	%
	Males	Females		
0-10	00	00	00	00
11-20	15	00	15	3
21-30	110	20	130	26
31-40	120	00	120	24
41-50	95	15	110	22
51-60	75	5	80	16
61-70	20	5	25	5
71-80	15	5	20	4
>81	00	00	00	00
TOTAL	450 (90%)	50 (10%)	103	100

It was observed that incidence of head injury was more in males than the females. Out of 500 cases, 450 (90%) victims were males and 50 (10%) cases were females. Out of 500 cases, maximum incidence of head injury was found in the age group of 21-30 years comprising 130 (26%) cases, followed by 31-40 years 120 (24%) and 41-50 years 110 (22%). The age group 51-60 yrs comprised of 80 (16%) cases. The other affected groups were 61-70 years and 71-80 years group comprising of 25 (5%) cases and 20 (4%) cases respectively.

Table 2: Distribution of cases according to cause of head injury and according to survival time

Cause of HeadInjury	No. of Cases	%
Road traffic accident	350	70
Fall from height	90	18
Assault	50	10
Others	10	2
Survival period		
Within 24 hours	300	60
1-2 days	75	15
2-3 days	50	10
3 – 7 days	50	10
> 7 days	10	5

It was observed that road traffic accident was the commonest cause of head injury seen in 350 (70%) cases. This was followed by fall from height 90 (18%) cases and assault 50 (10%) cases. The other causes like fall of tree or wall over-head were seen in 2% cases. It was seen that most of the cases 300 (60%) died within 24 hours of admission to the hospital. 75 (15%) cases survived for 1-2 days. 50 (10%) of cases survived for 2-3 days. 50 (10%) cases survived for 3-7 days and about 10 (5%) of cases survived for more than 7 days. Thus the most fatal period was first 24 hours.

Table 3: Distribution of cases according to type of skull fracture

Type of skullfracture	No. ofcases	%
Linear (Fissured)	200	40
Depressed	75	15
Comminuted	45	9
No fracture	180	36

It was evident that linear fracture was observed in 200 (40%) cases followed by depressed fracture in 75 (15%) and comminuted fracture in 45 (9%) cases. Thus the linear fracture was the most common skull fracture encountered at autopsy examination.

Table 4: Distribution of cases according to location skull fracture

Location of skullfracture		No ofcases	%
CranialVault	Temporal	200	40
	Parietal	110	22
	Frontal	50	10
	Occipital	30	6
Base ofskull	Anterior Cranial Fossa	50	10
	Middle CranialFossa	30	6
	Posterior Cranial Fossa	30	6

It was seen that temporal bone was involved in skull fracture accounting for 200 (40%) cases followed by parietal bone 110 (22%) cases, frontal bone 50 (10%) and occipital bone 30 (6%) cases. Thus temporal bone was the most common bone involved in fracture of skull in the present study. Regarding the base of skull, anterior cranial fossa is involved in 50 (10%) cases followed by middle cranial fossa in 30 (6%) cases and posterior cranial fossa in 30 (6%) cases.

Table 5: Distribution of cases according to type of intracranial hemorrhage and brain injury

Type of Intracranial Hemorrhage and brain injury	No. of cases	%
SDH	475	85
SAH	410	82
EDH	90	18
ICH	50	10

IVH	25	5
Contusion	240	48
Laceration	115	23
Cerebral edema	170	34

It was observed that subdural haemorrhage was the most common type of haemorrhage detected in 475 (85%) cases closely followed by subarachnoid haemorrhage (SAH) in 410 (82%) cases, extradural haemorrhage (EDH) in 90 (18%) cases, intracerebral haemorrhage (ICH) in 50 (10%) cases and intraventricular Haemorrhage (IVH) in 25 (5%) cases. 8% expired after treatment.

Table 6: Glasgow Coma Scale (GCS) Score

GCS score	No. of patients	Improved	Expired
15	430	430	-
13-14	40	20	5
8-12	15	10	10
< 8	15	-	25
Total	500	460	40

Discussion

Head injury is a significant public health problem worldwide and is predicted to surpass many diseases as a major cause of death by 2020. There is some data to indicate that majority of traumatic brain injury cases (60%) are as a result of road traffic accident, followed by falls (20-30%), and violence (10%). [11] Traumatic head injury is a leading cause of death and disability in children and adults in their most productive years. The morbidity and mortality due to head injury is on the rise and is one of the prime importance in today's medical practice. [12] Craniocerebral injury or Head injury is defined by National Advisory Neurological Diseases and Stroke Council as "a morbid state, resulting from gross or subtle structural changes in scalp, skull, and/ or the contents of the skull, produced by mechanical forces". Here, the forces are restricted to those that are applied externally to the head, thus excluding the surgical ablations and internally acting forces such as increased intracranial pressure resulting from oedema, hydrocephalus and mass occupying lesions without any antecedent trauma to the head. [13]

It was observed that incidence of head injury was more in males than the females. Out of 500 cases, 450 (90%) victims were males and 50 (10%) cases were females. Out of 500 cases, maximum incidence of head injury was found in the age group of 21-30 years comprising 130 (26%) cases, followed by 31-40 years 120 (24%) and 41-50 years 110 (22%). The age group 51-60 yrs comprised of 80 (16%) cases. The other affected groups were 61-70 years and 71-80 years group comprising of 25 (5%) cases and 20 (4%) cases respectively. Our findings are consistent with the study done by the other authors. [14-18] This age group (21-40 years) is the most vulnerable group involved in head injury cases. The obvious reason was that they are the main working group. This age group is most active phase of life physically and socially. People in this age group are constantly mobile for work, education or recreational activities. Hence prone to road traffic accident, falls, assaults which are one of the major causes of head injuries.

It was observed that road traffic accident was the commonest cause of head injury seen in 350 (70%) cases. This was followed by fall from height 90 (18%) cases and assault 50 (10%) cases. Similar observation was made in studies done by other authors. [19,20] The other causes like fall of tree or wall over-head were seen in 2% cases. A common perception is that a large number of subjects injured in accidents especially motor vehicle, with TBI are young adult males. Although the majority of such injuries are related to motor vehicle accidents, but the type of injuries across various areas are different. It is observed that in developed nations motor vehicle owners usually present with TBI, on the other hand in middle or low socio-economic nations subjects with TBI are usually due to the road traffic users motorcyclist, cyclist and pedestrians. This rising frequency of TBI subjects in middle or low socio-economic nations could be due to increasing motorization, insufficient traffic related knowledge and slow accomplishment of traffic safety rules. [21]

It was seen that most of the cases 300 (60%) died within 24 hours of admission to the hospital. 75 (15%) cases survived for 1-2 days. 50 (10%) of cases survived for 2-3 days. 50 (10%) cases survived for 3-7 days and about 10 (5%) of cases survived for more than 7 days. Thus the most fatal period was first 24 hours. It was evident that linear fracture was observed in 200 (40%) cases followed by depressed fracture in 75 (15%) and comminuted fracture in 45 (9%) cases. Thus the linear fracture was the most common skull fracture encountered at autopsy examination. It was observed that subdural haemorrhage was the most common type of haemorrhage detected in 475 (85%) cases closely followed by subarachnoid haemorrhage (SAH) in

410 (82%) cases, extradural haemorrhage (EDH) in 90 (18%) cases, intracerebral haemorrhage (ICH) in 50 (10%) cases and intraventricular Haemorrhage (IVH) in 25 (5%) cases. 8% expired after treatment. In critical care medicine it is a main challenging issue of management in subjects with an score between 3 to 8 with severe brain injury related to trauma, and in the past two decades there is has been much improvement in managing the subjects with severe head injury. [22] The acute management, throughout the "GOLDEN HOUR", i.e. duration from the time of injury to the initiation of decisive care which includes the strict ICU monitoring, should be in accordance with Head injury trauma guidelines. [23] Majority of patients admitted in our unit were with moderate to severe head injury. There is a solid relationship between the severity of injury and the results as noted by studies. Therefore, extreme safety measures should be taken which also includes treatment given at site of operation along with immediate transport of such patients to trauma units in ambulances well equipped to deal with such casualties. There is higher risk of post injury longstanding impairment of everyday tasks in children who have severe brain injury due to trauma especially in early child hood. [24] There is also a higher risk of longstanding impairment of routine work several years post injury especially in families who are coping poorly. [25]

Conclusion

The study showed that most head injury victims brought to a tertiary care hospital, were due to road traffic accidents and males are more prone to get Head injury. So it warrants the urgency to establish good pre-hospital care and provision of efficient and prompt trauma services at Road side to prevent mortality aroused from RTA. RTA remains the most common cause for Head injury and demands good neurosurgical care for such patients. By the compiling the records of these traumas at national level or international level can underline risk factors involved in these accidents, will be extremely helpful in the policy building and making the decisions for health promotion and health building at national or international level. This study thus proved that Good outcome is observed in patients who are properly treated by continuous monitoring & timely surgical intervention if required in a tertiary care hospital. By improving outcome in such patients with head injuries we will decrease socioeconomic burden on developing country like ours.

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