

# Study of Craniocerebral injuries in Chitradurga Region

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## ABSTRACT

Cranio-cerebral damage has been recognized since ages. Head injury as defined by the national advisory neurological diseases and stroke council, "is a morbid state, resulting from gross or subtle structural changes in the scalp, skull, and or the contents of the skull, produced by the mechanical forces". Of all the regional injuries, Craniocerebral-injuries are the most important in Forensic practice, as the incidence and severity of head injuries are increasing with burgeoning industrialization and more rapid methods of transportation. Head injury is a major public health problem and has attained epidemic proportions in India<sup>2</sup>. The present study includes data over a period of 3 years (2 years retrospective and 1 year prospective). This study includes 338 cases (118 prospective cases and 220 retrospective cases) of head injury. In retrospective analysis data were collected from the medical records. Road traffic accidents 256(75.74%) constitute the majority followed by 60(17.75%) are due to falls. 68(26.56%) of road traffic accident victims had history of alcohol consumption before the incident. 316(93.49%) cases survived and 22(6.51%) cases were dead. Head injuries due to assault were 20(5.92%) of which use of blunt weapon is more common 17(85%) cases followed by sharp weapon constitute 15% cases. Intracranial hemorrhages more common in road traffic accidents followed by falls from heights. Subdural hemorrhage was the commonest with 96(28.40%) cases followed by subarachnoid hemorrhage in 91(26.92%) cases. Extradural hemorrhages stand next with 72(21.30%) cases.

**Keywords:** Road traffic accidents, Motorcycle riders, Subdural hemorrhage, Skull fractures

## INTRODUCTION

Cranio-cerebral damage has been recognized since ages<sup>1</sup>. Head injury as defined by the national advisory neurological diseases and stroke council, "is a morbid state, resulting from gross or subtle structural changes in the scalp, skull, and or the contents of the skull, produced by the mechanical forces". Of all the regional injuries, Craniocerebral-injuries are the most important in Forensic practice, as the incidence and severity of head injuries are increasing with burgeoning industrialization and more rapid methods of transportation<sup>1</sup>. Head injury is a major public health problem and has attained epidemic proportions in India<sup>2</sup>. Injuries to the head are particularly important because of the brains vital role

in sustaining the life of individual<sup>5</sup>. Traumatic brain injury(TBI), in which severe head injury plays a major role in over 50% cases, remains the leading cause of death in person below 45 years of age and overall the third leading cause of death responsible for 8% of all deaths<sup>4</sup>. Falls and motor vehicle accidents are the primary cause of TBI, while sports, assaults and gunshot wounds also contribute to these type of injuries. TBI is one of the leading causes of death and disability worldwide, including the developing world<sup>3</sup>. In India, road traffic injuries projected to become the second leading cause of death by the year 2020<sup>4</sup>. Head injury due to fall is the second most common cause of cranio-cerebral trauma leading to death<sup>5</sup>. An assault leading to scalp injuries is mostly homicidal in nature, and is generally produced by blunt weapons and occasionally by cutting instruments<sup>2</sup>. This study was undertaken as this problem needs serious attention for the prevention of unnatural deaths, which requires a worldwide epidemiological, medicolegal and clinical study on such victims. The

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present study was therefore conducted to ascertain age, sex wise distribution, cause of head injury, pattern of head injuries, skull fractures, brain injuries, intracranial hemorrhages and outcome in head injury cases.

### AIMS AND OBJECTIVES

The Traumatic brain injury is a medico-legal, epidemiological and social problem and one of the leading causes of mortality in the world more so in our country. To counter this problem in a given area various aspects of demographic profile of TBI is necessary. With this broad view in mind this study was carried out involving the data obtaining from cases of traumatic brain injury with the following aims to determine causes of head injuries, age, sex, time & place of occurrence, distribution of victims according to nature of hurt, consumption of alcohol in relation to head injuries, outcome and period of survival of victims and pattern of causes of head injuries

### MATERIALS AND METHOD

The present study was conducted in Basaveshwara hospital and District hospital, Chitradurga. The study includes data over a period of 3 years (2 years retrospective and 1 year prospective). This study includes 338 cases (118 prospective cases and 220 retrospective) of head injury. In retrospective analysis data were collected from the medical records. The cases where history was incomplete were discarded from the preview of the present study.

### RESULTS AND OBSERVATIONS

In the present study total 338 head injury cases, road traffic accidents 256(75.74%) constitute the majority followed by 60(17.75%) are due to falls. Males comprised the majority with 271(80.18%) compared to females 67(19.82). Age of the victims varied from 1-87 years with the peak incidences occurred between the age group of 21-30 years comprising 96(28.40%) cases. 68(20.12%) belonged to age of 31-40 years. 61(18.05%) belonged to the age of 41-50 years. Thus 66.57% belonged to the age group of 21-50 years. Most of the incidents occurred between 5-10PM with 164(48.52%) cases. More number of road traffic accidents 74(28.91%) occurred between 5-8PM. More number of falls from height 7(14.28%) occurred between 5-7PM. Among 338 cases, 170(50.30%) cases belonged to rural areas and 168(49.70%) belonged to urban areas. 68(26.56%)

of road traffic accident victims had history of alcohol consumption before the incident. 316(93.49%) cases survived and 22(6.51%) cases were dead.

Among 256 road traffic accident cases death occurred only in 16(6.25%) cases. Survival of the victim varied from 3 hours to 20 days. Most of the deaths, 10(45.45%) cases occurred between 3-5 days and 5(22.73%) deaths occurred between 3-13 hours. Most of the incidents occurred with the motorcycle riders 142(55.47%) followed by motorcycle occupants and pedestrians were equally involved in 42(16.41%) cases. Bicycle rider injured in only 1(0.39%) case. Most commonly involved vehicle is two wheeler 38(29.69%) cases followed by four wheelers in 28(21.88%) cases and three wheelers in 21(16.41%). Out of 42 victimized pedestrians, most commonly hit by two wheeler 15(35.71%) cases followed by four wheeler in 11(26.19%) cases. Most common mechanism is skid and fall from bike in 103(40.23%) cases followed by hit by vehicle occurred in 93(36.33%) cases. Collision was the mechanism in 39(15.23%) cases. Among head injuries due to falls, fall from height was more common involving 49(81.67%) cases of which 34(69.39%) occurred in home followed by 10(20.41%) occurred in fields.

Head injuries due to assault were 20(5.92%) of which use of blunt weapon is more common 17(85%) cases followed by sharp weapon constitute 15% cases. In present study the commonest type of scalp injury is contusion 244(72.19%) followed by laceration 188(55.62%). Contusion is the commonest scalp injury in RTA followed by laceration. In falls from height, contusion is the commonest scalp injury followed by laceration. In cases of assaults the commonest type of scalp injuries contusion and laceration followed by abrasion. Skull fractures were seen in 137(40.53%) cases. It was observed that frontal region was the commonest region involved in vault fractures in 60(17.75%) cases followed by temporal region in 50(14.79%) cases. Vault fractures commonly seen in frontal region in RTA whereas in temporal region in falls from height. In case of assaults, vault fractures commonly seen in the frontal region. Out of 97 cases of basal skull fractures, the commonest site is anterior cranial fossa 59(17.46%) followed by middle cranial fossa 54(17.46%). The commonest type of skull fracture is linear fractures in 120(35.50%) followed by comminuted fractures in 13(3.85%) cases. Intracranial hemorrhages more common in road traffic accidents

followed by falls from heights. Subdural hemorrhage was the commonest with 96(28.40%) cases followed by subarachnoid hemorrhage in 91(26.92%) cases. Extradural hemorrhages stand next with 72(21.30%) cases.

## DISCUSSION

**Mukul kumar saxena** et al<sup>6</sup> studied traumatic brain injury from Andhra Pradesh during 2008, observed that road traffic injuries as the leading cause (60%) of traumatic brain injuries followed by falls (20-25%) and violence (10%) which are consistent with our study. **Ashok Parchani** et al<sup>7</sup> studied traumatic brain injuries in Doha, Qatar between 2004-2008 and observed that common mechanisms were motor vehicle crash (69%) followed by falls from height (27%) which are consistent with our study. **Mohd kaleem khan** et al<sup>2</sup> observed out of 2850 cases 2442 (85.68%) were males while 408 (14.31%) were females. These findings are consistent with present study. **Lalith Kumar** et al<sup>8</sup> studied head injury cases from Dehradun, india, during 2011-2013 and observed that common age group involved in head injury was of 21-40 years. the peak incidence was observed in the age group 21-30 years comprising of 45% of the cases. It was also observed that 21% belonged to the age group 31-40 years. Thus 66% of cases belonged to the age group of 21-40 years in the study. Individuals in the age group of 0-10 years were the least affected i.e. in 4.2% of total cases. these findings are consistent with our study. **Akhade S P** et al<sup>4</sup> studied pattern of fatal vehicular accidents involving head injuries in Maharashtra during 2010-2012 and observed that most of the incidents occurred between 6pm to 9pm. These findings are consistent with our study. **Tejus Prajapati** et al<sup>9</sup> studied pattern of head injury cases in Ahmedabad and observed that the frequency of head injury cases and especially RTA cases are seen almost equally in urban areas (51%) and rural areas (49%). These findings are consistent with our study. **Shamsuddin R. Kakeri** et al<sup>10</sup> studied pattern of injuries and death sustained by the occupants of the two wheeler during road traffic accidents in Karnataka during 2005-2008 and observed that 6(4%) cases were under the influence of alcohol at the time of death and all of them were males. these findings are consistent with our study. **Amit M Patil** et al analysed period of survival in head injury cases, it is evident that 16.90% of the victims died on the spot. Of the remainder, 27.76% died within 24 hours of sustaining injury, 6.34% within 1-3 days, and 47.70% within 3-15

days. Only 5.3% survived for more than 15 days. Falls causing fatal blunt head injury (whether accidental or suicidal) had occurred in 24.9% cases. Falls from heights were responsible in 48.9%, slipping in bathrooms in 31.9% and from staircase or ladders in 19.2%. These findings are consistent with our study. **Akhilesh Pathak** et al<sup>11</sup> observed that incidence of deaths due to RTA were maximum (49.37%) in two wheeler riders followed by pedestrians in 32.91% cases. Four wheelers were involved in 15.19% cases and bicyclists in only 5.53% cases. These findings were consistent with our study. **Harish S Gauda** et al<sup>12</sup> studied about pattern of skeletal injuries in victims of fatal road traffic accident shows linear fracture (54.83%) was the most common type of skull fracture followed by comminuted (32.25%), depressed (10.48%) and sutural (2.43%) fractures. these findings are consistent with our study. **Akhilesh Pathak** et al<sup>11</sup> studied the pattern of road traffic accidents and head injury in Jaipur during 2003-2004 shows that the incidence of subdural hemorrhage was the maximum in 94.94% cases followed by subarachnoid hemorrhage in 20.25% cases and extradural hemorrhage in only 10.13% cases. These findings are consistent with our study.

## CONCLUSION

The commonest cause of head injury was road traffic accidents (75.74%) followed by fall from height (14.50%) and assault (5.92%). Head injuries were more in males (80.18%) compared to females (19.82%) with male: female ratio of 4:1. The commonest age groups are adults between 21-40 years. the most common age group in road traffic accident was 21-40 years. Fall from height was common in 21-40 years with peak incidence at 40 years. The most common age group in assault was 31-40 years about 30%. The peak time of head injuries was in the evening between 5-10pm (48.52%). More number of road traffic accidents occurred between 5-8pm and falls from height between 5-7pm. The incidence of head injuries are almost equal in both rural (50.30%) and urban (49.70%) areas. Most of hospital deaths (45.45%) due to head injury were occurred between 3-5 days of hospital stay. Death among cases of head injuries was more common in fall from height (12.24%) followed by road traffic accidents (6.25%). Two wheelers (85.98%) were the commonest vehicle involved in road traffic accidents and most common mechanism of accident was skid and fall from bike (40.23%) and the commonest victims were motorcycle

riders (55.47%). And 7.75% victims were below the age of 18 years. This is because of not following the traffic rules, fast and careless driving, drunk and driving and driving without license, instability of two wheelers. Pedestrians and motorcycle occupants were equally involved. Motor vehicle occupants victimized in 7.81% cases, followed by motor vehicle driver in 3.52% cases. Lack of knowledge on traffic rules and carelessness in crossing roads are reasons for the pedestrians being victimized in road accidents. Home was the common place of incidence of fall from height and ground level falls. In old people who spend more time at home and age related disability are the main reasons. Blunt weapons used to cause head injury for assaults more commonly and majority of them were seen on streets. The commonest type of scalp injury was contusion followed by laceration and abrasion. Abrasions are less as the scalp is protected by hair. Linear fracture was the commonest type of skull fracture present in 35.50% cases followed by comminuted fractures in 3.85% cases and depressed fractures in 3.25% cases. Among intracranial hemorrhages, subdural hemorrhages (28.40%) was the commonest followed by subarachnoid hemorrhage (26.92%). SDH is commonest in road traffic accidents (28.12%).

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