

Fatal Head Injuries in Road Traffic Accidents in and around Davangere: A Prospective Study

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Abstract

Background: Deaths due to fatal head injuries in road traffic accidents is commonest occurrence in day to day public life as most people use automated vehicle as a means to travel. The present study aimed to know the nature of head injuries and the patterns of skull fractures in fatal road traffic accidents in this part of India. **Material & Methods:** The present study was conducted in the mortuary attached to District General Hospital, Davangere during July 2005 to June 2007. **Results:** Deaths due to RTA were reported in 408 cases. Among 408 cases of RTA, fracture of skull was observed in 164 cases (40.1%), maximum number of skull fracture occurred between the age group of 21 - 30 years (31.1%). The males were preponderantly (81.6%) over females. It was seen that maximum number of RTA was reported between 6.00 am to 12.00 pm (38.41%). Maximum victims of skull fractures succumbed to death on the spot (23.8%) and within 6 hours (24.3%). The motorcyclists were most common victims. Linear fracture was commonest (38.9%) pattern of fracture in RTA. **Conclusion:** Implementation of effective road safety measures reduces these fatalities.

Keywords: Road traffic accidents; Skull fracture; Intracranial Haemorrhage.

Introduction

Accident is defined as "an occurrence in a sequence of events, which usually produces unintended injury, death or property damage". A WHO advisory group in 1956 defined accident as an "unpremeditated event resulting in recognizable damage [1]. The alarming increase in morbidity and mortality owing to road traffic accidents (RTA) over the past few decades is a matter of great concern globally. Fatal road accidents have become a serious health hazard throughout the world by killing and crippling thousands of persons each year. Young and middle aged male is more likely to

die from the injuries received in RTA than from any other cause and motor vehicle accident is a single most leading cause of death in them. The head is the vital organ and most vulnerable part of the body to receive an injury which is usually associated with fracture of skull. These injuries are common in RTA as well as in cases of domestic accidents. RTA account for major epidemiological problems in developing countries like India and others. This necessitates widening the spectrum of study with respect to head injury involving skull fractures in RTA.

Objectives

- To know the
- Incidence and patterns of skull fractures in cases of RTA.
- Co-relation of skull fractures with other intracranial lesions.
- Survival period of the deceased.

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(Received on 14.01.2012, accepted on 25.01.2012)

Methodology

The present study "Incidence and patterns of skull fractures in fatal cases of accidents with special reference to Road Traffic Accidents" was a cross-sectional study. The study material comprised victims of RTA, autopsied in the autopsy block (mortuary) of Chigateri General Hospital Davangere, during 1st July 2005 to 30th June 2007 for a two year period. Detailed information regarding the deceased and various factors regarding the circumstances of the accident, like type of victim, type of offending vehicle, time of the accident and other relevant information were gathered from all possible sources like police records, hospital records and also by direct interrogation with the investigating officer, eye witnesses (if available), relatives and friends of the deceased. In addition to these X-ray, CT scan, MRI reports (whenever a patient admitted) were examined for the presence or absence of fracture before commencing the autopsy. In each case, a thorough external and internal examination was conducted using standard autopsy techniques. The data thus obtained was recorded and analysed later. The age groups of victims were categorized in an interval of 10 years. The cases were divided into 4 time slots as to the time of accident i.e. morning (6.00 am to 12 noon), afternoon (12.00 pm to 6.00pm), evening (6.00 pm to 12 midnight) and night (12.00 am to 6.00 am).

The victims were categorized into pedestrian, pedal cyclist, motorcyclist, occupant of a motor vehicle and others. The offending vehicles were divided into pedal cycle, motorcycle, motor vehicle and others. After recording the history and details of the accidental death, external examination was done and injuries were noted. Scalp injuries were also noted. Fractures of the skull and intracranial haemorrhages were studied.

Results

The present study was conducted during the period of July 2005 to June 2007. Deaths due to

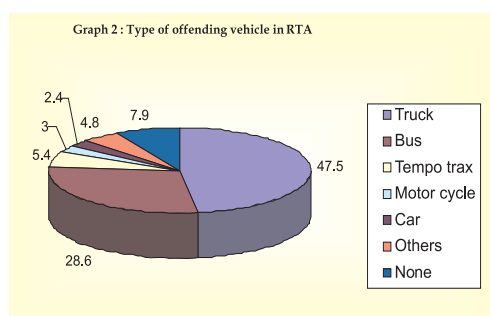
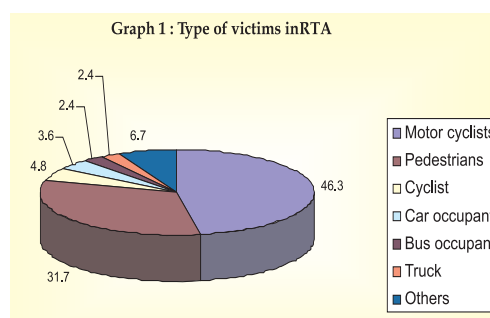
RTA were reported in 408 cases. Among 408 cases of RTA, the fracture of the skull was observed in 164 cases (40.1%), maximum

Table 1: Age wise distribution of victims

| Age group | RTA |
|-----------|------------|
| 0 – 10 | 7 (4.2%) |
| 11 – 20 | 15 (9.1%) |
| 21 – 30 | 52 (31.7%) |
| 31 – 40 | 37 (22.5%) |
| 41 – 50 | 29 (17.6%) |
| 51 – 60 | 13 (7.9%) |
| 61 – 70 | 10 (6.0%) |
| 71 – 80 | 1 (0.6%) |

number of skull fracture occurred between the age group of 21 – 30 years (31.1%) (Table-1). There was preponderance of males (81.6%) over females.

The graph 1 & 2 shows different type victims/vehicles involved in RTA. It was observed that the motor cyclists formed the major part of victims of skull fractures (46.3%),



followed by pedestrians (33.5%) and cyclist accounts about 4.9% of cases. The other vehicles like bullock carts, auto rickshaws, road rollers and etc accounted for 6.7% of RTA cases studied.

It was seen that maximum number of RTA were reported between 6.00 am to 12.00 pm (38.41%). Maximum victims of skull fractures succumbed to death on spot (23.8%) and within

Table 2: Survival period of the victims

| Survival period | RTA |
|-----------------|-------------|
| Spot death | 39 (23.8%) |
| 0 – 6 hrs | 40 (24.3%) |
| 6 – 24 hrs | 30 (18.2%) |
| 1 – 5 days | 32 (19.55%) |
| >5 days | 23 (14%) |

6 hours (24.3%) (Table-2).

Linear fracture (38.8%) was the commonest fracture followed by Communitated fracture (27.7%) and depressed fracture (11.1%). Fracture base of the skull was seen in 30 cases (15.1%). The temporal bone (48.1%) was commonest bone involved in skull fracture followed by parietal bone (42%). Unilateral

Table 3: Pattern of skull fractures in accident victims

| Type of accidents | Linear | Depressed | Communitated | Base | Sutural |
|-------------------|------------|------------|--------------|------------|-----------|
| RTA | 77 (38.8%) | 22 (11.1%) | 55 (27.7%) | 30 (15.1%) | 14 (7.0%) |

fractures of skull were more common than bilateral skull fractures (Table 3).

Table 4: Sexwise pattern of skull fractures

| Sex | Skull Fractures | | | | |
|--------|-----------------|------------|--------------|------------|----------|
| | Linear | Depressed | Communitated | Base | Sutural |
| Male | 67 (37.2%) | 31 (17.2%) | 43 (23.9%) | 29 (16.1%) | 10 (5%) |
| Female | 16 (38%) | 5 (11.9%) | 12 (28.6%) | 5 (11.9%) | 4 (9.5%) |

It is observed that there was no significant difference in the pattern of skull fractures amongst the male and female (Table 4).

Discussion

The results of our study on the pattern of skull fracture due to RTA were analysed and compared with other studies. Total 454 cases of death due to accidents were autopsied at

Chigateri hospital mortuary during the period, July 2005 to June 2007. Deaths due to RTA were reported in 408 cases. Among 408 cases of RTA, fracture skull was observed in 164 cases (40.1%) [2-3]. Maximum number of skull fractures occurred in the age group 21 – 30 (31.7%) followed by age group 31 – 40 (22.5%) [3, 4], the reason being that young adults are prime bread earners of the family and remain outdoors during most of the day.

In our study we observed that there is a preponderance of males (82.3%) as compared to females (17.7%) [2, 3,5, 7] as male population is involved in most of the outdoor activities. Maximum number of RTA was reported between 6.00 AM to 12 PM (38.41%) followed by time interval 6 PM to 12 AM (28 %). Maximum number of accidents in the morning hours [6,7] is probably due to heavy traffic and urgency to reach work place, inadequate traffic control.

In our study it was observed that altogether 25.8% of the victims had succumbed within 6 hours [7,8], followed by 21.6% of victims who died on the spot. The period of survival has not shown any improvement despite the advancement of medical facilities due to inadequate network of hospitals. It was observed that motorcyclists accounted for 46.3%, [6,9] formed the major part of victims of skull fractures followed by pedestrians (31.7%).

A recent increase in availability of powerful motorcycles, rash and negligent driving by the younger population might have caused the increase in number of motorcyclist fatalities. Moreover there also increases in the incidence of drunken driving among them. In our study it was observed that heavy vehicles [10] particularly trucks were the common offending vehicle in 47.5% of victims and bus in 28.6% followed by tempo tracks in 5.4%. Involvement of heavy vehicles in accidents can be attributed to their high speed, congested roads, fatigability, intoxication etc.

In our study we observed that majority of skull fractures due to accident cases were associated with lacerations [4, 11] (46.8%) followed by contusions (32.1%). A linear

fracture (38.8%) was the commonest [7,12], followed by comminuted fracture (27.7%) in deaths due to RTA. In the present study it was observed that vault fractures were commoner than the base of the skull. The temporal bone (48.1%) [13] was the commonest bone to fracture followed by parietal bone (42%).

In our study it was observed that linear fracture [7, 11,12] was commoner in the age group 21 – 30 years, i.e. 24 cases followed by comminuted fracture is 21 cases and SAH [11,12] was found in 39.6% of victims, followed by SDH in 29.3%. Similar results were observed in the study conducted by Yavuz S. In victims of RTA, skull fracture was associated with mainly thoracic injury (31.6%). These results were in accordance with the study conducted by Singh H [6], Srivasthsava AK [9], Scalea T [14] & Sanjeev L [15].

Conclusion

The aim of this study was to know the incidence and patterns of skull fractures in RTA, to co-relate skull fractures with other intracranial lesions and also to know the period of survival of the victims. A sum total of 408 cases of skull fatal RTA deaths was studied, skull fracture were seen in about 40.1% cases. The majority of the victims belonged to the male population in the age group of 21-40 yrs. Most of the victims sustained accidents during morning hours and most of them died on the spot or within 6 hours after the accident. Motorcyclists were commonest victims, with heavy vehicles (trucks and buses) being the major offenders. Scalp laceration was commonly associated with skull fractures and in about ten cases showed skull fractures without any external injury to scalp. Fissure or linear fracture was the commonest fracture. In vault fractures, temporal bone was commonest bone involved and in fracture base of skull, middle cranial fossa was commonest site. In general the commonest intracranial haemorrhage was SAH. The thoracic injuries were commonest injuries to be associated with skull fractures.

Suggestions and recommendations

Reduce exposure to road traffic

- Plan communities so that people need not travel long distances every day.
- Plan road networks so that different types of traffic are channeled along different roads specifically designed for each type.
- Provide safe crossings and separate paths for pedestrians and cyclists.

Reduce the occurrence accidents

- Improve the visibility of roads, road signs during both day and night.
- Enforce laws that set maximum blood alcohol content levels for drivers.
- Control speed with traffic calming road design such as roundabouts and enforce speed limits consistently.

Reduce harm done when crashes occur

- Since seat belts are especially effective in motor vehicles travelling at low speeds. On urban roads, attention should be paid to the enforcement of seat belt laws on the roads.
- Helmets should be made compulsory for all riders of bicycles, motorcycles and mopeds.

Reduce post crash harm

- Detect and respond to crashes in a timely manner with good network systems.
- Provide appropriate first aid at the scenes of crashes, appropriate medical care in emergency rooms and appropriate post emergency medical care and rehabilitation [16].

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