Epidemiological Pattern of Head Injuries in Road Traffic Accident Victims Presenting to a Tertiary Care Hospital in South India

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Abstract

Introduction: In 2017, Karnataka registered 10,609 deaths due to Road Traffic Accidents (RTAs). Among all injuries, head and especially brain injuries were responsible for significant mortality and morbidity. RTAs account for a significant proportion of brain injuries. **Materials and Methods**: Of 1035 cases of head injuries visiting the trauma center of a tertiary care teaching hospital in south India, 650 head injuries were attributable to RTAs during the period between August 1, 2017 to July 31, 2018. Retrospective data was obtained from patient records taken from the medical records. After obtaining ethical approval, the records were analyzed in terms of age group variables, sex, time, day, season, accident event, means of transport, the practice of protective devices usage such as a helmet for 2 wheeler RTA victims and safety belt for 4 wheeler RTA victims, insurance status, type of head injury: external or internal and diagnosis**. Results**: The incidence of RTAs was higher in males (77.3%), younger age group: 20 to 30 years (30.15%), drivers (48.31%), rainy season (40%), afternoon hours (38%) and weekdays (69.23%). Usage of protective devices was low (13.54%).

Key words: *Epidemiological Pattern, Head Injuries, Road Traffic Accident, RTA, South India.*

Background

1,50,000 fatalities and 5,00,000 injuries were reported in 2016.[1,2,3] More than 87% of these deaths are in the working age group.[4] India sees 400 deaths due to RTAs every day. Uttar Pradesh accounts for the largest number of fatal accidents among the states. Karnataka ranked 4th among all the states of India for RTAs in 2017 with 10,609 deaths.[5] Among all types of injuries, especially the head and brain are chief cause of debility and loss of lives.[6] 50 percent of brain injuries are from RTAs. It is expected that traumatic brain injuries will account for the highest number of deaths and physical disabilities by 2020.[7,8,9,10,11]

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Materials and Methods

The study was designed to evaluate the epidemiological pattern of injuries of the head on patients traumatized by road accidents attending a hospital in a tertiary care teaching hospital in south India. The data collection period was from 10 October 2018 to 1 May 2019. Retrospective data was collected from all patient records for the one-year period, which includes all records of victims with serious injuries who visited the

hospital between 1 August 2017 and 31 July 2018.

Exclusion criteria were incomplete medical records, dead on arrival and discharge against medical advice patients. 650 patient records were analyzed for age, sex, time, day, mode of transport, usage of protective devices such as helmets for 2 wheeler users and seat belts in 4-wheelers. Statistical analysis was done with version 7.2 of Epi Info. The qualitative variables were expressed as a percentage. The quantitative variables were expressed in terms of average or median and standard deviation or categorized and expressed as a percentage. To test the difference between two media in the present study, Student's t-test was used. The significance level was set at 0.05.

Results

Out of over-all 1035 cases of head injuries, after applying the inclusion and exclusion criteria, 650 head injuries were analyzed. Of the 650 cases, women were 22.62% and men 77.38% with a ratio of 1: 3.48. This indicates that men are more vulnerable to RTA head injuries. Figure 1 shows that the average age of the subjects was 37.65 ± 16.30 years, with a maximum of 80 years and a minimum of 18 years.

69.23% of patients reported to the hospital on a weekday. The maximum number of head injury causing RTAs occurred in the rainy season (40%), followed by the winter season (35.85%) and the summer season (24.15%). 48.31% were drivers, 36% were passengers and 15.54% were pedestrians. 2 wheelers accounted for 65.38% followed by 4 wheelers 14.46%. 4.92% of subjects reported being under the influence of alcohol. Only 13.54% of subjects were using a helmet or seat belts at the time of the accident. 58.92% were minor head injuries, 19.85% were moderate head injuries and 21.23% were severe head injuries.

Laceration (60.46%), wounds to the head in 14.92% and abrasions in 10.15%. CT scan findings showed Sub Dural Hemorrhage in 16.46%, Sub Arachnoid Hemorrhage in 7.69%, bruising in 9.23%, 3.54% had widespread axonal damage and 9.08% had Epidural Hemorrhage. 73.08% were treated on an inpatient basis and 26.92 % were treated on an outpatient basis. 43.54% of patients visited the hospital directly while 56.46% were referrals from other hospitals. 90.15% of patients were discharged alive. 423 (65.08%) of the RTA patients had no insurance coverage and 227 (34.92%) had insurance coverage. The Median out of pocket expenditure (OOP) for those with insurance was 81,142.67 INR. Median OOP for those without insurance was 77,569.34 INR. P value is 0.5067: the difference is not statistically significant.

450 (69.23%) of the RTA patients arrived at the hospital on weekdays. 200 (30.77%) arrived on weekends. The season wise distribution of RTAs was 157 (24.15%) in the Summer season (Feb to May); 260 (40%) in the rainy season (June to September) and 233 (35.85%) in the Winter season (October to January). At the time of the RTA, 314 (48.31%) were drivers, 234 (36%) were passengers and 101 (15.54%) were pedestrians. 425 (65.38%) of the RTA victims were on 2 wheelers, 26 (4%) were on 3 wheelers, 94 (14.46%) were on 4 wheelers, 4 (0.62%) were on a cycle and 100 (15.38%) were pedestrians. 88 patients (13.54%) were using a protective device at the time of the RTA. 561 (86.31%) were not. 383 (58.92%) of the head injury cases were classified as mild, 129 (19.85%) were classified as moderate and 138 (21.23%) were classified as severe.

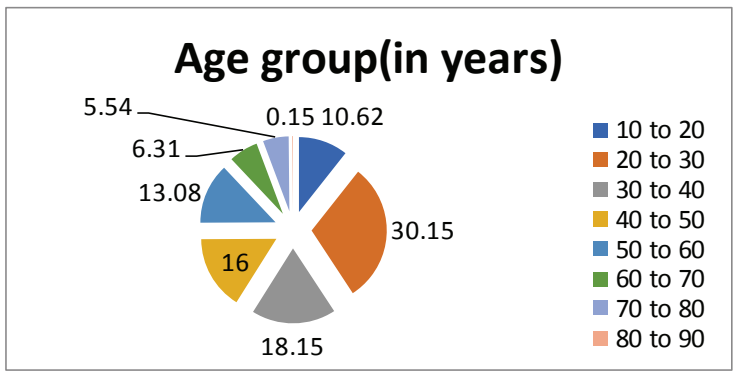

Figure 1. Age distribution of subjects

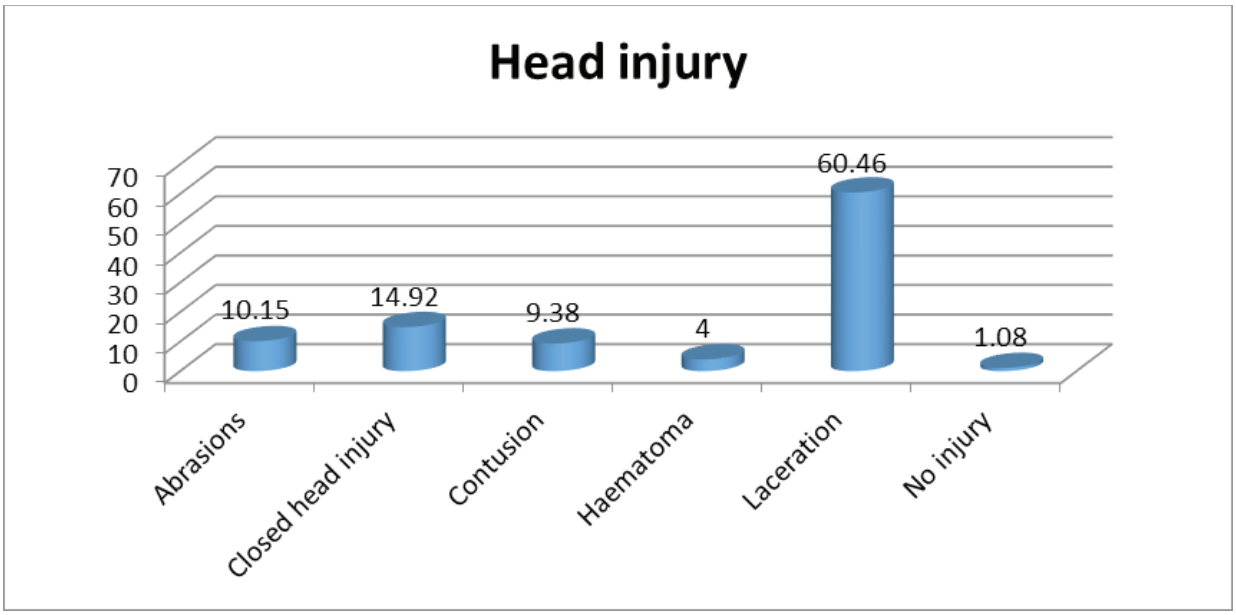

Figure 2. Distribution of types of external head injury

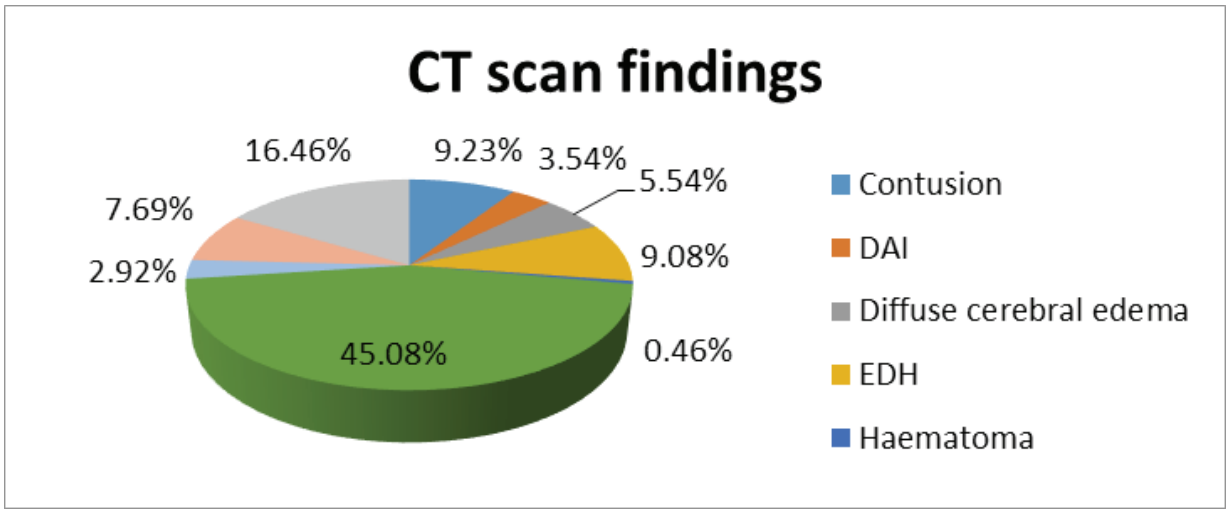

Figure 3. CT scan findings to assess the type of internal head injury

Table 1. Distribution of study subjects based on hospital arrival mode

Hospital arrival mode	Frequency	Percentage
Ambulance	26	4.00
Bystander	20	3.08
Police	2	0.31
Relative	602	92.62
Total	650	100

Table 2. Distribution of study subjects based on the time of arrival.

Time of arrival	Frequency	Percentage
Midnight 12.00 to 5.59 am	56	8.62
6 am to 11.59 am	158	24.31
12 noon to 5.59 pm	189	29.08
6 pm to 11.59 pm	247	38.00
Total	650	100.00

Table 3. Type of skull Fracture

Fracture	Frequency	Percent
Basilo Frontal	1	0.15%
Communited	5	0.77%
Depressed	10	1.54%
Frontal Bone	50	7.69%
Maxilla	3	0.46%
Nasal	4	0.62%
Normal	495	76.15%
Occipital	11	1.69%
Orbital	1	0.15%
Parietal	15	2.31%
Spinous	8	1.23%
Temporal Bone	35	5.38%
Zygomaticomaxillary complex	1	0.15%
Zygoma	11	1.69%
TOTAL	650	100.00%

Discussion

In this study, an overall of 650 retrospective data was analyzed based on the epidemiological model of road accident injuries. In the study of retrospective findings, there were 77.38% of men and 22.62% of women. A female: male ratio of 1: 3.42 observed in cases of maximum incidents. In this study, the maximum, ie 30.15% of the cases were in the age -group of 21-30 years, then by 18.15% of the age group of 31-40 years. The high sex ratio found can be documented to the fact that the percentage of men compared to women is higher in cases of injuries of the head, in road accidents. In India, men are bread generators for the family and, therefore, participate in outdoor activities exposing themselves to the risk of accidents. These results were similar to other studies.[12,13,14] The WHO World Report on Road Safety[15] showed that injuries due to road accidents were the major cause of lives lost amongst young aged 15 to 29 years. Jha S et al[16] noted that there was a maximum number of lives lost in the age group of 21-30 years with a ratio of women to men were 1:3.53. It was witnessed that the majority of cases of traffic accidents on the road, most of the patients were drivers (48.31%) followed by the passenger by category and about 15.54% were pedestrians. These results are like some other studies.[17,18]

This study discovered that only 4.9% of patients had history of alcohol consumption while driving. Drunken driving is a significant cause of RTAs.[19,20,21]. Government data puts the percentage RTAs and RTA deaths because of alcohol/drug use at 5.6 and 6.4% respectively. 48.31% of RTA patients were drivers (48.31%); 15.54% were pedestrians. 2 wheeler riders accounted for 65.38% of all RTAs, followed by 4 wheeler occupants (14.46%), which is similar to previous findings.[24,2526] The "WHO global report on road safety" (2009)[20] says pedestrians, cyclists, motorcyclists and their passengers accounted for 46% of life lost in world traffic. In the present study, 86.31% of RTA victims did not use protective devices (helmet for two wheelers and safety belts for 4 wheelers), similar to findings in other studies.[27,28,29] In the present study, 73.08% patients were treated on an inpatient basis and 26.92% of patients were treated on an outpatient basis. 56.46% of patients were referrals. 43.54% were direct admissions.

In this study, laceration (60.46%) was followed by closed head injuries (14.92%) (including internal fracture and internal bleeding), abrasions (10.15%), bruises (9.38%) and hematoma (4 %) respectively. Internal head injuries: SDH (16.46%), HSA (7.69%), bruises (9.23%), diffuse axonal lesion (3.54%), EDH (9.08%).

Frontal bone fracture (7.69%), temporal bone fracture (5.38%) and parietal bone fractures (2.31%). The results of detailed head injuries are present in very few studies, especially in living patients.[29,30] 58.92% were minor injuries, 21.23% were serious injuries and 19.85% were moderate injuries. 90.15% of patients survived. 9.85% of patients died.

40.62% paid between 10,000 to 50,000 INR; 17.85% paid between 0.00-5,000 INR, 16.46% paid between 50,000-1 lakh INR, 13.54% between 5,000-10,000 INR and 11.54% over 1 lakh INR. 34.92% were covered by insurance. 65.08% had no insurance coverage.

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Conflict of Interest : Nil

Ethics approval: Taken from university ethics committee

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