Original Article

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Autopsy Based Study on Pattern and Distribution of Head Injuries in Victims of Fatal Road Traffic Accidents in A Rural Tertiary Care Centre

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Abstract

Background: Road Traffic Accidents (RTA) is increasing globally and India is no exception to it. RTA affects young males commonly. Head injury was the most common site to be injured in RTAs. Road traffic accident is a preventable cause of death. Objective was to determine the pattern and distribution of head injuries in victims of fatal road traffic accidents in a rural tertiary care centre. *Material and Methods:* Retrospective record based study in rural tertiary care centre among 345 head injury subjects for the duration of 5 years was carried out. Data was analysed using SPSS 17 version software. Chi-square test was the test of significance for qualitative data. p value of <0.05 was considered as statistically significant. *Results:* 260 subjects (75.4%) were males and 85 subjects (24.6%) were females. Majority of subjects were in the age group 31 to 40 years (28.11%), followed by 21 to 30 years (19.13%). 42.61% had Frontal injury, 24.64% had parietal injury, 18.84% had temporal injury and 13.91% had occipital injury. Contusion was seen in 38.55%, Abrasion was seen in 31.01% and Lacerations of the scalp were seen in 30.43% cases. *Conclusion:* Road traffic accidents in India are on rise and deaths due to head injuries are also increasing proportionately. Males and Middle age persons are dying in RTA due to head injury. This can bear a irreparable damage to the family and its members. Most of the head injuries in the study were found to be fatal.

Keywords: Head Injuries; Road Traffic Accidents; Intracranial Hemorrhage; Contusion of Brain.

Introduction

Road Traffic Accidents (RTA) is increasing globally and India is no exception to it. RTA affects young males commonly. According to an estimate, one RTA occurs in every four minutes in India, claiming atleast 25,000 lives every year. RTA not only affects primary victims but it has got innumerable secondary victims in the form of family and relatives who suffer financially, psychologically and socially though morbidity does not reckon with these social aspects of this problem [1].

Head injury is the most common site to be injured in RTAs [2]. Road traffic accident is a preventable cause of death. The exponentially increasing number of automobile vehicles, poor adherence to traffic rules and regulations such as maintaining lane discipline, driving in zigzag patterns by public, poorly maintained and congested roads, abuse of alcohol, and lack of awareness about helmets and new generation of high speed vehicles are altogether responsible for accidents. The mechanical forces like shearing, strains and biophysical motion that occur during accidents to the head are responsible for patterns of injuries [3,4]. This study was carried out to determine the pattern and distribution of head injuries in victims of fatal road traffic accidents in a rural tertiary care centre.

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Material and Methods

This study was carried out in rural tertiary care centre, Department of Forensic medicine and Toxicology, Sri Devaraj Urs Medical College, Tamaka, Kolar. The medical college is the sole source for fatal road accidents in National Highway 75, and located 70 Kms away from Bangalore. Record based retrospective study was done from 2012 to 2017 for a period of 5 years. Sample size was estimated by using the proportion of commonest type of scalp injury was contusion 66% from the study Sreekanth S Nair et al. [4] using the formula $N = Z\alpha p (100-p)/d2$ [5], p = 66, 100 – p = 34%, d = 5. Substituting the above values minimum sample size required was 345 subjects with head injuries associated with scalp injury and fractures of skull. Institutional ethical clearance was obtained prior to the start of the study. Data was analysed using SPSS 17 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square test was the test of significance for qualitative data. p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests [6].

Results

In the study 345 autopsies were included, 260 subjects (75.4%) were males and 85 subjects (24.6%) were females. Majority of subjects were in the age group 31 to 40 years (28.11%), followed by 21 to 30 years (19.13%). There was no significant difference in age and gender distribution (Table 1). 42.61% had Frontal injury, 24.64% had parietal injury, 18.84% had temporal injury and 13.91% had occipital injury. There was significant association between site and type of scalp injury (Table 2). Contusion was seen in 38.55%, Abrasion was seen in 31.01% and Lacerations of the scalp were seen in 30.43% cases. Skull fractures was seen in 259 (75.07%) of subjects. Of them 43.24% had depressed fractures, 27.41% had linear and 29.34% had communited fractures. There was significant association between site and type of skull fractures (Table 3). In the present study 53.62% had

Table 1: Age and sex distribution of Head Injury Victims

Age (yrs)	Males		Females		Total	
	Count	%	Count	%	Count	%
0-10	14	5.38	8	9.41	22	6.37%
11-20	30	11.53	16	18.82	46	13.33%
21-30	46	17.69	20	23.53	66	19.13%
31-40	84	32.30	13	15.29	97	28.11%
41-50	38	14.61	12	14.12	50	14.49%
51-60	15	5.769	6	7.06	21	6.08%
61-70	23	8.84	5	5.88	28	8.11%
> 70	10	3.84	5	5.88	15	4.34%
Total	260	75.36	85	24.64	345	100%

÷ 2 = 13.4, df = 7, p = 0.0062

Table 2: Association between Site and type of Scalp injuries among Head injury subjects

	Contusion		Abrasion		Laceration		Total#	
	Count	%	Count	%	Count	%	Count	%
Frontal	66	49.62	47	43.93	34	32.38	147	42.61
Parietal	40	30.08	28	26.17	17	16.19	85	24.64
Temporal	19	14.29	13	12.15	33	31.43	65	18.84
Occipital	8	6.02	19	17.76	21	20.00	48	13.91
	133	38.55%	107	31.01%	105	30.43%	345	100%

÷ 2 = 31.63, df = 6, p <0.001*

Table 3: Association between Site and type of skull fractures among Head injury subjects

	Frontal		Parietal		Temporal		Occipital		Total #	
	Count	%	Count	%	Count	%	Count	%	Count	%
Depressed	63	52.07	27	67.50	8	20.00	14	43.75	112	43.24
Linear	31	25.62	18	45.00	17	42.50	5	15.63	71	27.41
Comminuted	27	22.31	21	52.50	15	37.50	13	40.63	76	29.34
	121	46.72	40	15.44	40	15.44	32	12.36	259	100%

÷ 2 = 67.16, df = 6, p <0.001*

Table 4: Intracranial injuries in the victims of RTA Intracranial Injury

	Number of Victims#	%
Subarachnoid haemorrhage	185	53.62
Contusions	31	8.99
Subdural haemorrhage	66	19.13
Intracerebral haemorrhage	43	12.46
Extradural haemorrhage	14	4.06
Lacerations	6	1.74
Total	345	

Combination of sites and types of were not included in tables

subarachnoid haemorrhage, 8.99% had Contusions, 19.13% had subdural haemorrhage, 12.46% had intracerebral haemorrhage, 4.06% had extradural haemorrhage and 1.74% had lacerations (Table 4).

Discussion

In the study head injuries were seen in majority among males (75.4%), middle aged subjects (31 to 40 years). This distribution suggests that males are predominantly occupied in outdoor activities to earn the livelihood of the family. Similar observations were made by Sreekanth S Nair et al. [4], in their study observed that 92.5% were males and 7.5% were females. The findings were also consistent in the studies done by Sonawane [7], Ngo Anhl [8] and Dovom [9].

Middle aged (21 to 50 years) individuals were most common age group with head injuries (61.73%) in the present study. Similar findings were made by Nair et al. [4], 64.3% were in the age group b/w 21 to 50 years. Similar observations were made by Sinha and Sengupta [10] and Salgado [11]. Age distribution in the study reconfirms the risk behaviour of males and middle aged people due to outdoor exposure for various reasons and hence more prone for Road traffic injuries with head injuries. Also restricted use of helmets can lead to exponential increase in head injuries especially among two wheelers. In our study there was no significant difference in gender and age distribution of head injury.

Most common site of scalp injury was Frontal site in 42.61%, 24.64% parietal, 18.84% temporal and 13.91% occipital. 38.55% had contusion, 31.01% had abrasion and 30.43% had laceration. Similarly Nair [4] observed that most common anatomical site of scalp injury was frontal, temporal, parietal and occipital region respectively. These findings were also consistent in the studies done by Kakaeri SR [12], Shivakumar BC [13] and Pothireddy S [14]. There was significant association between site and type of scalp injury in the present study.

Contusion was seen in 38.55%, Abrasion was seen in 31.01% and Lacerations of the scalp were seen in 30.43% cases. Skull fractures was seen in 259 (75.07%) of subjects, out of them 43.24% had depressed fractures, 27.41% had linear and 29.34% had communited fractures. There was significant association between site and type of skull fractures. In the study by Nair et al. [4], 75% had skull fractures and similar findings were made by Fimate [15]. Nair [4] found that most common type of fracture in the base of skull was linear fracture (77%) and Comminuted fracture of the base of skull was seen on 23%.

In the present study 53.62% had subarachnoid haemorrhage, 8.99% had Contusions, 19.13% had subdural haemorrhage, 12.46% had intracerebral haemorrhage, 4.06% had extradural haemorrhage and 1.74% had lacerations. In the study by Nair [4], Subarachnoid haemorrhage was noted in 90 (84.9%) cases, Subdural haemorrhage was seen in 79 (74.5%) cases, 35 cases (33.01%) showed intravertebral haemorrhage. Intraventricular haemorrhage was seen in 19 (17.92%) cases followed by extradural haemorrahage in 18 (16.98%) cases.

Conclusion

Road traffic accidents in India are on rise and deaths due to head injuries are also increasing proportionately. Males and Middle age persons are dying in RTA due to head injury. This can bear an irreparable damage to the family and its members. Most of the head injuries in the study were found to be fatal. This highlights the need for measures to ensure the safety of vehicle riders and pedestrians. Road traffic policies such as pedestrian paths, separate lanes for light motor vehicles and heavy motor vehicles, and strict

implementation of traffic rules and regulations may decrease the incidence of road traffic accidents and its fatalities. Reinforcement of Awareness regarding the importance golden hour and prompt transportation of victims to specialized trauma centres among public will be helpful in long run.

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