

Patterns of Cranio Cerebral Injuries in Fatal Vehicular Accidents in Jammu Region- J&K State

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Abstract

Victims of vehicular accidents receive different types of injuries, of which, cranio-cerebral injuries are more fatal than any other kind of injury. The present study was carried out to know the patterns of cranio-cerebral injuries in victims of fatal vehicular accidents in Jammu region - J&K State. Deaths due to road traffic accidents constituted 39.6%, out of which deaths due to cranio-cerebral injuries were seen in 63.45% of cases. Our study shows that maximum number of cases were in the young and middle age groups 21-40 years with a male preponderance (85.5%). 57.10% cases belonged to the peripheral and rural areas of Jammu region. The most common injury observed was intracranial hemorrhage with subdural hemorrhage as the commonest type either in isolation or in combination in other type of hemorrhages (64.01%). Fracture of the vault of skull was the commonest type of skull fracture, along with the fracture of temporal bone. Among the associated cerebral injuries contusion of the brain was present in 63.9% of the cases.

Key Words

Cranio-cerebral injuries, Fatal, Vehicular accidents, Intracranial hemorrhage, Skull fracture, RTA - Road Traffic Accident

Introduction

Road traffic accidents are the commonest cause of morbidity and mortality in the fast growing era of urbanization. The developing countries bear a large share of burden and about 85% of the deaths are due to road traffic accidents which is still on rise. India accounts for about 10% of road accident fatalities worldwide (1).

The increasing rate of vehicular accidental deaths are mainly due to rapid urbanization, increase in fast traffic despite poor condition and congestion of roads, steady rising vehicular density and traffic rules violation (2). 16 lives lost every hour, India's roads were deadliest in 2014, with a 3% rise in fatalities in 2014 over 2013 (3). Head injuries are mostly caused by traffic accidents, assaults, fall from heights, industrial accidents etc with accidental vehicular head injuries contributing the major share. Severe head injuries are the commonest cause of death and/or disability up to the age of 45 years in developing countries (4). Cranio-cerebral injuries are the cause of immediate death in 25% of acute trauma victims and > 50% cases are due to RTA (5).

Fatal head injury occurring in some age groups and at certain places poses an immense threat to the society with loss of valuable lives and shattering of families. Out of 36.4% of unnatural accidental deaths due to vehicular accidents in India, in high accident prone areas, Jammu & Kashmir state accounts for 63.5% of accidental deaths due to Road traffic accidents (6). Jammu & Kashmir state being a hilly state with harsh weather conditions has a poor condition of roads, traffic congestion and lax traffic rules poses a great burden due to vehicular accidents. The number of accidents and the number of persons injured or killed is on a steady rise during the past few years. Jammu district alone has recorded the highest number of accidents in the year 2013, 1667 accidents with 213 fatalities (7). The present study was conducted to know the patterns of Cranio-cerebral injuries in fatal vehicular accidents in Jammu region, Jammu & Kashmir state and to provide awareness to the Government agencies for improvement of the condition of existing roads, laying of new roads for better

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connectivity, strict implementation of traffic rules with emphasis on safety and preventive measures such as wearing of helmets and seatbelts. Also there is requirement for upgradation of the existing health infrastructure and provision of facilities for management and treatment of such trauma patients who require intensive and timely medical aid to avoid loss of precious lives and trauma and burden to the society.

Material and Methods

The present study was carried out in the Department of Forensic Medicine and Toxicology, Government Medical college Jammu, Jammu & Kashmir state, a tertiary health care hospital of the state. The study is retrospective and comprised of medicolegal autopsies conducted in the mortuary of Government Medical College Jammu on the cases of vehicular accidents who died of cranio-cerebral damage for a period of two years from January 2013- Dec. 2014. The study included all cases of cranio-cerebral injuries and cranio-cerebral injuries with other associated injuries, who were either brought dead to the emergency, Government Medical College Jammu or were referred from the peripheral and rural areas of Jammu region for advance treatment, admitted in causality and later succumbed to their injuries. Out of a total of 625 autopsies done on victims of vehicular accidents, 422 fatalities were due to head injuries. The relevant data was collected from the postmortem records available in the Department of Forensic Medicine and Toxicology, which included the data of causality records, medicolegal record, admission and treatment record and also the records from the police personals which had been put in the postmortem reports at the time of conducting autopsies. The data compiled was then analyzed with respect to various epidemiological features and injuries sustained in cranio-cerebral damage.

Results

The total number of autopsies done in the year 2013-2014 were 1679, in which deaths due to RTA were 325 and 340 respected. Deaths due to Cranio cerebral Injuries comprised of 197 and 225 in the year 2013 and 2014 (63.45%)

The age wise distribution of the cases in fatal vehicular deaths due to Cranio cerebral Injuries show maximum number of cases in the age group of 21-30 years (27.7%) followed by 31-40 years (14.69%). Lowest number of cases were seen in the age group more than 80 years (1.18%). In the deaths due to Cranio cerebral Injuries the males outnumbered the females comprising about 85.5% and females 14.5% in the present study.

In the present study out of total of 422 cases deaths due to Cranio cerebral Injuries 241 (57.1%) cases were

from peripheral and rural areas and 170 cases (40.28%) were from urban areas. In 11 cases (2.62%) the place could not be determined.

The cases who died instantaneously on the spot or on their way to the causality Government Medical College Jammu and were declared brought dead were 188 (44.55%). The cases which were admitted, received minor, observational or definitive surgical treatment and later on succumbed to their injuries comprised 234 cases (55.45%). Among 422 cases studied, fracture of vault of skull was seen in 256 (60.65%), Base of skull in 30 (7.10%) and combined fracture of vault and base of skull was seen in 52 (12.32%) cases. No fracture was seen in 84 (19.92%) cases. The commonest bone fracture was temporal 122 (35.1%), parietal bone fracture was seen in 109 cases (27.4%), frontal 99 (24.93%) and occipital in 67 (16.87%) cases. Combined fracture of parieto-temporal bones was seen in 178 (44.8% of cases)

The commonest type of intra cranial hemorrhage seen in the study was subdural hemorrhage (SDH) whether taken in isolation or in combination (64.01%). Other type of hemorrhages seen were subarachnoid hemorrhage (SAH) (50.31%), extra dural hemorrhage (EDH) (24.75%) and Intra Cerebral Hemorrhage (ICH) (15.28%) However most of the victims suffered from a combination of SDH and SAH (25.8%) followed by other types of Intra cranial hemorrhage. Contusion was the most common type of brain injury seen in 270 cases (63.9%) followed by brain oedema in 40 cases (9.47%) and laceration in 15 cases (3.55%). In rest of the cases no associated brain injury was present (23.08%).

Discussion

In the present study deaths due to craniocerebral injuries in fatal vehicular accidents were 63.4% which is similar to a comparative study conducted by Sharma BR, *et al.* who concluded that head injury was responsible for 63% of road traffic fatalities in Jammu region (8).

Maximum number of cases studied were in the age group of 21-30 years (28.2%) followed by 31-40 years (15.55%). The results are in consonance with a study done by Gupta S, *et al* (9). in North Bengal, in which the most susceptible age group was 21-30 years (23%) followed by 31-40 years (19%) (9). S.Gouda H, also recorded the maximum number of deaths due to cranio cerebral Injuries in 21-30 years (21.6%) (10).

Males outnumbered the females in our study with 85.5% males as compared to 14.5% of females. Sanjay K, Singh RKP in their study of pattern of craniocerebral Injuries in fatal vehicular accidents in Patna observed a male preponderance with 82 males and 18 females (11). Similar trend was also observed by Jha S, *et al* (12) with

Table 1 Year Wise Distribution of Deaths Due to Cranio Cerebral Injuries

Year	Total No. of Autopsies	Deaths due to RTA	Deaths due to Cranio cerebral Injuries	Percentage
2013	822	325	197	60.61%
2014	857	340	225	66.17%
	1679	665	422	63.45%

Table 2 Age Wise Distribution of Cases

Age (Years)	No. of cases in year 2013	Percentage	No. of cases in year 2014	Percentage
0-10	10	5.07	12	5.33
11-20	20	10.15	20	8.88
21-30	52	26.39	65	28.28
31-40	27	13.70	35	15.55
41-50	24	12.18	30	13.33
51-60	24	12.18	27	12
61-70	24	12.18	28	12.44
71-80	12	6.09	6	2.66
>80	3	1.51	2	0.88

Table 3 Sex Wise Distribution of the Cases

Year	Male	Percentage	Female	Percentage
2013	168	85.27%	29	14.7%
2014	193	85.7%	32	14.2%

Fig 1. Area Wise Distribution of the Cases

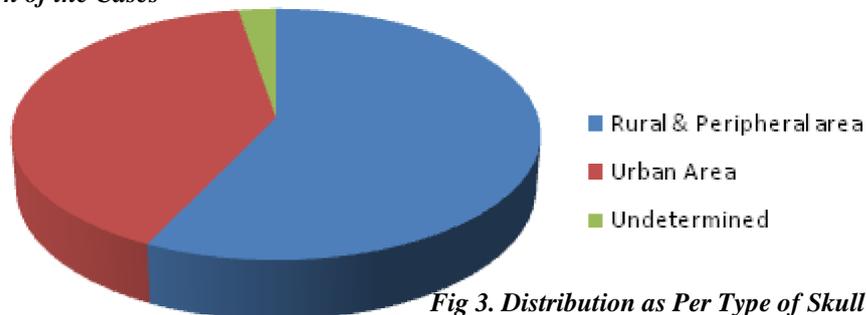


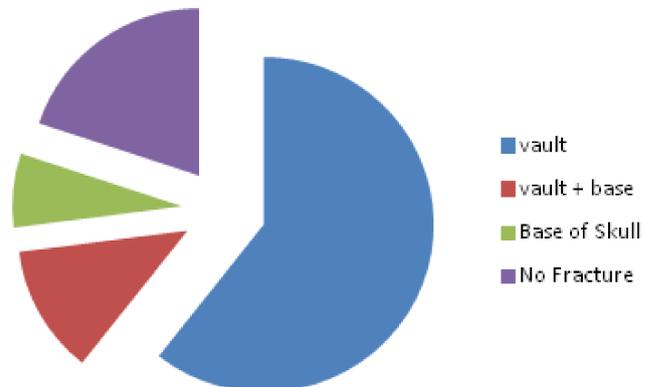
Fig 2. Distribution of Cases as Brought Death and Admitted



78 % of victims to be males and 22% of females in their study (12).

Thus the above findings show that the young and the middle age group males are more exposed to vehicular accidents and thus to fatal head injury as this is the most active period of the life, they are more on roads, the young

Fig 3. Distribution as Per Type of Skull Fracture



because of their craze for speed, disregard for traffic rules and safety measures and the middle aged in

Fig. 4. Distribution as Per Type of Intracranial Hemorrhage

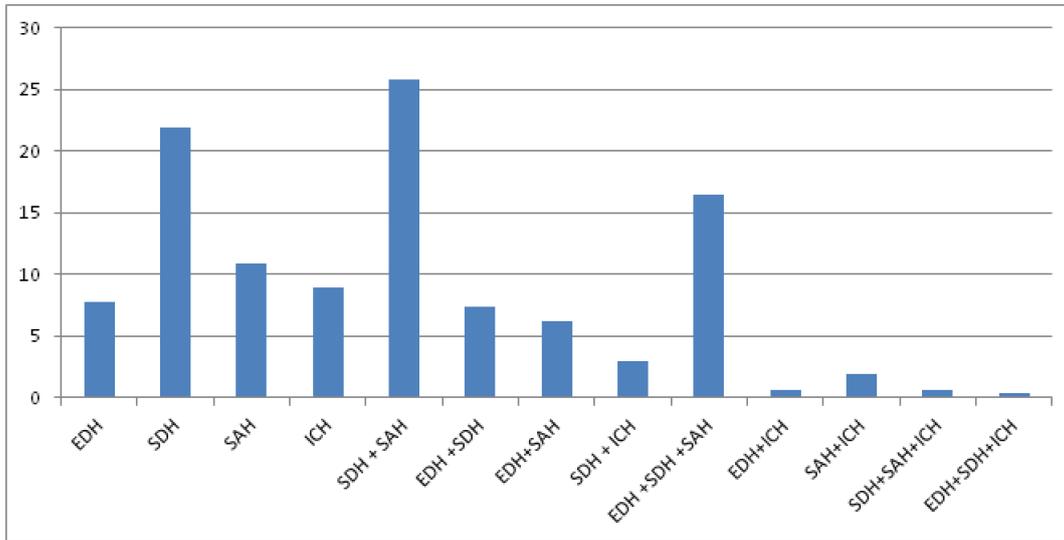
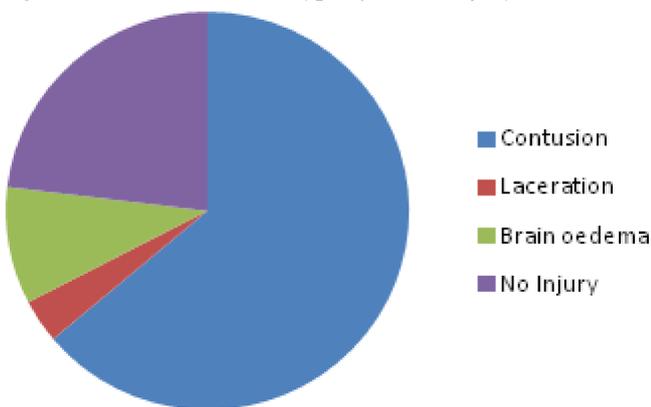


Fig. 5. Distribution as Per Type of Brain Injury



our country are mostly the sole breadearners.44.4% of the cases were declared brought dead to the causality, GMC Jammu, who had either died instantaneously on the spot or succumbed to their injuries while reaching the causality. 55.45% cases were admitted, who received immediate, minor surgical, observational, and even definitive surgical treatment but later on died either due to severity of the injuries or the complications associated. The trend in our study is higher as compared to the study conducted by Kumar S, in which instantaneous death was seen in 30% of the cases (11). Chavali KH, in the study of head injury concluded that 31% of the victims of RTA due to craniocerebral damage were found to have died on spot, brought dead to the hospital or died within an hour of the accident.(13)

In the study conducted 57.10% of the cases belong to peripheral or rural areas of Jammu region as compared to 40.20% to urban areas. Prajapati T, however reported

an equal distribution of head injury cases and especially RTA with rural(49%) and urban (51%) (14).

The more number of cases in the present study from peripheral and rural areas of Jammu region are because of the fact that topographically these areas are on a hilly terrain with poor condition of roads, fair weather roads, frequent landslides and sinking of roads due to harsh weather conditions, shortage of transport facilities, overloading and overcrowding of vehicles, lax traffic rules resulting in frequent road mishaps. Moreover due to limited medical facilities in these places for treating such injuries and early transportation of the injured to specialized and tertiary centres is often delayed, with heavy loss of precious lives.

Among craniocerebral injuries studied, fracture of skull was present 80.09% of cases. Fracture vault was present in 60.66% of cases, fracture base of skull was present in 7.10% of cases and both vault and base of skull was present in 12.32% of cases. Dev Raj Patil in his study concluded that 77.5% of cases had fracture of skull of which 51.50% had fracture of vault and base whereas 47.5% had fracture of the vault only.(15)

The commonest bone fracture seen in the study was temporal 35.1% followed by parietal bone. The findings are in consonance with that of Sibal Gupta et al. who reported temporal bone fracture in 45% of the cases.(9) A higher percentage of temporal bone fracture was concluded by a study conducted by Chandra et al. (58.6%)(16).

Subdural hemorrhage was the commonest type of intracranial hemorrhage seen in the study 64.10% cases, in isolation or in combination with other type of

hemorrhage followed by subarachnoid hemorrhage. Similar trend of intracranial hemorrhage was seen by Jha *et al.*, Menon *et al.*, Sharma *et al.* (9,17,18)

Combination of subdural and subarachnoid hemorrhage was seen in 25.8% of the cases. Similar trend of combination was also observed in a study carried out by S Gouda *et al.* who revealed a combination of subdural and subarachnoid hemorrhage in 33% of the cases. The finding in our study are also inconsonance with a study conducted by Tandle *et al.* (10,19) Fracture of the skull and subdural hemorrhage was also the most frequent observation reported by Sumnagala *et al.*(20)

Contusion was the commonest type of associated brain injury in fatalities due to vehicular accidents seen in 63.9% of the cases in the present study. Contusion was the commonest type of brain injury reported by different authors in similar type of studies carried out by them.(10,12)

Conclusion

From the above study it can be opined that injuries to the skull and brain are the main contributory factors in causation of fatalities due to vehicular accidents and prevention of these can reduce the mortality and morbidity to a great extent. Measures should be taken for improved construction and maintenance of the roads, strict traffic rules and better traffic monitoring and also prevention of drunken driving and strict punishment for those breaking the rules. Awareness programmes should be regularly held regarding use of proper protective and safety measures and increased road traffic sense in road users. More stringent laws should be laid down and amendment in already existing sections as 279 RPC/IPC and 304A RPC/IPC should be made, for dealing with such cases. Last but not the least better trauma care facilities for such patients with proper transportation along with upgradation of health infrastructure at all levels of health care system should be instituted in all the regions of the state.

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