DOI Number: 10.37506/v20/i1/2020/mlu/194282

An Autopsy Study of Cranio-Cerebral Injuries Due to Road Traffic Accidents

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Abstract

Cranio-cerebral injuries are a morbid state, resulting from gross structural changes to the scalp, skull and the contents of the cranium. In present scenario, accidents are now considered as one of major contributing factors of Non-Communicable Diseases which have become major health problems of developing countries like India. According to the national crime bureau statistics In India, over 1,46,133 people were killed in various road traffic accidents during 2015 and the count raised to 1,50,785 in 2016. Information on the contributing factors is mandatory to reduce this burden. A prospective study of all Road Traffic accidents coming for autopsy at Government Medical College, Anantapuram. Majority of victims were male in the age group between 31-40 years. Most of them had Linear fractures of the skull along with Sub dural haemorrhage. Two Wheeler riders were the most common victims. Most of the victims died due to Cranio-Cerebral Injury. Most of the times, it is the negligence, which results in an accident. The negligence may be on the part of the victim or may be there on the part of other person who occupied the second vehicle. Sometimes innocent pedestrians are also victimized to these deaths. An accident for all practical purposes is preventable, provided if it is anticipated and proper precaution and preventive measures are adopted.

Key words : *Road traffic accidents, Intracranial Hemorrhage, Skull fractures, Pedestrian*

Introduction

Road traffic accidents (RTA) can be defined as ‘’ An accident that occurred on a way or street open to public traffic; resulted in one or more persons being killed or injured and at least one moving vehicle was involved. Thus RTA is collisions between vehicles, between vehicles and pedestrians; between vehicles and animals; or between vehicles and geographical or architectural obstacles[1] .” Road Traffic Accidents (RTA) are increasing in alarming ways. Globally nearly 1.2 million people killed in RTA during the year 2002. Developing and underdeveloped countries accounted for 80% of these deaths and 21% of total injury projected estimations reveals that fatalities due to RTA will be the 3rd leading cause of death by 2020 moving from its present 9th position [2] .Developing countries are very different from the industrialized countries with regard to the environment and mix of vehicles in the traffic stream [3] . Number of ‘Traffic Accidents’ in the country have been increased by 3.1% (from 4,81,805 in 2014 to 4,96,762 in 2015) during 2015 compared to 2014.[4] Road Traffic Accidents (RTAs) are an important public health problem requiring urgent attention in developing countries such as India, which has the highest proportion of deaths due to RTAs in South East Asia. One of the main causes of death and disability is road traffic injuries, with an unequal number of incidences in developing countries.[5]. In 2000, RTA were the ninth leading cause of disability-adjusted life years lost and are projected to become third by 2020.[6] Every year, more than 20 million people are injured or disabled and 1.17 million are killed because of RTAs.[6] In developing countries, more than 85% of the deaths and nearly 90% of the

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disabilities are caused by RTAs globally.[7] In India, of the mortality of 2,123.60 from all causes, 1,463 are caused by RTA. The World Health Organization (WHO) report on Global Status Report on Road Safety, which is the first of its type, states that, with more than 130,000 deaths annually, India has overtaken China and now has the worst RTA rate worldwide.[8]

Materials and Method

All the post-mortem examinations conducted in Ananthapuram medical college mortuary on deaths due to road traffic accidents during 2016 year were analysed. The data regarding pattern of injuries leading to death, blood alcohol levels in the dead victims, age group affected, statistics of deaths among pedestrians and two wheeler drivers were collected for analysis. The study was conducted with the permission and help of medical records section and autopsy surgeons who have done post-mortem examination in various cases of deaths due to road traffic accidents. All cases of head injuries and injuries over other parts of the body due to RTAs are taken for the study. Decomposed bodies are not included in the present study. A total number of 234 cases were studied during the year 2016. This study included detailed history regarding the incident and complete clinical history including operative procedures, if any and detailed external and internal examination of the body.

Observation and Results

The current study conducted on 234 deaths due to road traffic accidents for which autopsy done in mortuary of Anantapuram government medical college, Andhra Pradesh during the year of 2016.

Out of 234 deaths **majority victims were** males. Males accounted to 150 (64%) and females were 84 (36%). As per age wise observation 73 deaths(males 45, females 28) occurred in the age group of 31-40 years. In the age group of 41 to 50 years the number of deaths were 58 (males 37, females 22). Next age group is 21 to 30 years in which 40 deaths (males 25, females 15) occurred; in the age group of 51 to 60 years 25 deaths(males 15, females 10) occurred; in the age group of 10 to 20 years 19 deaths (males 16, females 3) occurred; 14 people (males 8, females 6)more than 61 years are also died. Whereas 4 children (males 4 and no females) less than 10 years also died. If we take up the graph the peak is rising towards 31 to 40 years age group both in males and females.

During study of distribution of injuries to other body parts, Maximum number of victims had injuries associated with other body parts (159 cases) followed by head injuries(75 cases).

In our study different types of extra cranial injuries either alone are in combination were found. Among those abrasion was found in (134) followed by contusion (94), laceration(83), fractures(31), crushing injury (8) incised(6), penetrated(4) injuries respectively.

Out of 234 cases studied, 18 were intact without any fracture of the skull. 216 cases had skull fractures. Among them linear/fissure fractures topped the list of skull fractures (112), followed by , Communited fractures (58), Depressed (20), combined (15), sutural separation (9), crush injuries (expressed fractures) (9) and the least being the ring fractures (2) and no gutter fractures seen and these fractures found either individually or in combination with each other

After opening the skull cavity the different kinds of intra cranial haemorrhages were observed in the study group. The type of intracranial haemorrhages found either individually or in combination with each other. Among these, Subdural haemorrhage either singly or in combination with others was found in 103 head injury cases. Next comes subarachnoid haemorrhage and it was found in 93cases, followed by intra cerebral haemorrhage(14), Extra dural haemorrhage(12) intra ventricular haemorrhage(5), Pontine haemorrhage (5) Cerebellar haemorrhage(2).

It was observed in current study the cranio cerebral injury was the leading cause of death in most of the victims that is in173deaths. Followed by haemorrhagic shock in 47 victims then neurogenic shock.

Table: 1. Age and Sex wise distribution cases of fatal RTAs

S.No	Age	Male		Female		Total	
		No of cases	%	No of cases	%	No of cases	%
1	<10	4	1.71	0	0	4	1.71
2	11-20	16	6.84	3	1.28	19	8.12
3	21-30	25	10.68	15	6.41	40	17.09
4	31-40	45	19.23	28	11.97	73	31.20
5	41-50	37	15.81	22	9.40	59	25.21
6	51-60	15	6.41	10	4.27	25	10.68
7	>60	8	3.41	6	2.56	14	5.97
	Total	150		84		234	100

Table:2. Head injury association with other body part injury

S.no	Item	No Of Cases	Percentage
1	Head injury with other body parts injuries	159	67.95
2	Only head injury	75	32.05
3	Total	234	100

Table:3. Types of extra cranial injuries

s.no	Type of injuries Associated with headinjuries.	Total	Percentage(%)
1	Abrasion	134	57.26
2	Contusion	94	40.17
3	Laceration	83	35.47
4	Incised injury	6	25.64
5	Penetrated injury	4	17.09
6	Crushing injury	8	34.19
7	Fractures	31	13.25

Table 4: Frequency of different types of fracture

s.no	Types of fracture	Total	Percentage(%)
1	Linear/ fissure	112	47.87
2	Communited	58	24.78
3	Depressed	20	08.54
4	Gutter	0	0
5	Ring	2	0.86
6	Sutural separation	9	3.84
7	Combined	15	6.42
8	No fracture	18	7.69
9	Total	234	100

Table:5. Distribution of the Intracranial haemorrhages with respect to site in cases of fatal RTA

s.no	Type of Hemorrhage	Number of cases	Percentage (%)
1	Extra Dural Hemorrhage (EDH)	12	5.13
2	Sub Arachnoid hemorrhage(SAH)	93	39.74
3	Sub Dural hemorrhage(SDH)	103	44.02
4	Pontine hemorrhage	5	2.13
5	Intra cerebral hemorrhage(ICH)	14	5.98
6	Cerebellar hemorrhage	2	0.85
7	Intraventicular Hemorhage(IVH)	5	2.14

Table:6. Different causes of Death in cases of fatal RTA

s.no	Cause of death	Number of cases	Percentage(%)
1	Cranio cerbral Injury(CCI)	173	73.93
2	Neurogenic Shock(NS)	9	38.46
3	Hemorrhagic Shock(HS)	47	20.09
4	Septic Shock(SS)	5	2.14
5	Total	234	100

Discussion

Head Injuries are more prone in road traffic accidents. These are due to the exchange of force between the body parts which are moving and the stationary hard objects present on and around the road. Or the human body may be stationary and the moving object come and hit the person wherein there is an exchange of force which results in the deformity of the body parts and the result is the injuries spread over the body surface or internal organs of the body.

The results of our study on the cranio cerebral injury due to RTA were analyzed and compared with other studies conducted at various places in India and abroad.

Table:1 in our present study maximum number of head injury victims were males in the age group of 31-40 years. The reason could be that the males of in this age group are prime earners of the family and remain outdoors during most of the day, risk taking behavior, Male dominance is explained by the fact that, males are more exposed to hazards of road. Similar results were observed in the various studies [9,10,11] while study by shamim monga et al[12] contrasts our finding where the common age group was between 21-30 years.

Table:2 In our study injuries to other body parts also has happened along with head injury, similar finding found in study by Shobhna et al (13). As most of the victims are from two wheeler accidents and pedistrians, victims had involvement of other body parts after hitting was more common.

Table:3 In present study grazed abrasion was most common associated injury either single or in combination with other injuries. Similar findings were observed in study conducted by Oberoi et al [14] . However study conducted by Shobhna et al [13] laceration was most common associated injury. Whenever there is a road traffic accident there is blunt force acting on the victim so it causes injuries like abrasion, contusion, lacerations.

Table:4 In regards to fracture of skull bone, we found that linear fracture was most common, similar findings were observed in studies conducted by Wankhede et al [15], Menon et al [16], Shobhna et al [13]. Type of fracture occurring after vehicular accident depends on various factors e.g. speed, safety measures used, ground over which fall occurs. In severe accidents combination of fractures is observed. In another study which was carried out by kuchewar et al[17], almost 79.87% of victims were with skull fracture . Fracture of the vault of skull was more common than the base of the skull and most common type of fracture was linear. These results are similar to the results of our study.

Table:5 In current study, most common type of haemorrhage was subdural (either alone or with combination) which is similar to study conducted by Ravikumar et al (18) and Arvind kumar et al (19) while study by Wankhede et al[15] contrasts our finding where Sub Arachnoid Haemorrhage was most common.

Table:6 in our study the commonest cause of death was Cranio Cerebral Injury, it is consistant with the study conducted by B. Srinu Naik et al.[20]

The findings in the present study most of the vulnerable group road users are, two wheeler riders, and pedestrians . Similar findings observed in the study by Gururaj et al.[10] . These groups of road users form the major bulk on Indian roads, and hence, their exposure is higher. Unlike occupants in cars and other heavy vehicles, these road users are directly exposed to the traffic environment,

Summary and Conclusion

The present study can be summarized and concluded as, head injury deaths due to road traffic accidents are occurring in significant number in day to day medicolegal autopsies. Among Highest number of deaths belonged to age group of 31 to 40 years with male preponderance. Majority Of Head injuries are associated with other body parts injuries and abrasion being the commonest. Linear fracture was most common type of skull fracture, and the Sub Dural Haemorrhage was the leading type of intracranial haemorrhage. Cranio cerebral injury being the commonest cause of death and two wheeler riders being the most vulnerable group of affected road users.

Conflict of Intrest: Nil

Source of Funding: Self funding.

Ethical Clearance: Ethical clearance from the institutional ethical committee obtained for the study.

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