ORIGINAL RESEARCH

Pattern of Injuries in Fatal Road Traffic Accident – An Autopsy based Retrospective study

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ABSTRACT
Road Traffic accident is a global tragedy with ever-rising trend. It is one of the major causes ofdeath and injuries across the globe. Thereby it poses itself as a major epidemiological and medicolegal problem. With increasing use of vehicles, injuries due to them are so common nowadays that it is necessary to be able to assess the injuries, the mechanisms by which they are caused and the cause of death.
Hence, the present study was conducted to know, pattern of injuries in victims of fatal RTAs, victim's age and sex and survival period. Post-mortem reports and clinical records of victims of RTA were observed and analyzed retrospectively in a Teaching and Tertiary care hospital in the North Delhi between November 2013 to October 2014. Out of 205 medico-legal autopsies conducted during the study period RTA contributed to 105 cases resulted in fatal injuries.
Commonest age group was between 21 to 40 years involving 49 (46.6%) cases. In addition, an attempt was also made to know the cause of death.
Keywords: Fatal RTA, Pattern of injury, Cause of death.

INTRODUCTION

Road Traffic accidents are amongst the major causes of death globally. Head injury is the known leading cause of death in Road Traffic Accidents. With the increase in population density of India, there has been a definite impact on the road traffic density, which showed concomitant rise in the Road traffic Accidents. Amongst all traffic accidents, road traffic accidents claim largest toll of human life and tend to be world's most serious health related problems. As elsewhere in the world, the causes of road accident are faulty vehicles, uneven roads, careless/reckless driving, speeding, drunk driving, inadequate sleep, alcohol and otherdrug effect and many more.
As per WHO, Road traffic crashes result in the deaths of approximately 1.3 million people around the world each year and leave between 20 and 50 million people with non-fatal injuries(1).
According to WHO data for 2002, road traffic injuries accounted for 2.1% of all global deaths and ranked as the 11th leading cause of death. Furthermore, these road traffic deaths accounted for 23% of all injury deaths worldwide (2)
According to the latest report of National Crime Reports Bureau, the total annual death due to road traffic accidents has crossed 1.18 lakh. In India rate of RTA is 7.5 accidents per 1000 vehicles. (3)
In the present day situation it is imperative to know the pattern of injuries caused due to these accidents. Therefore the present study is undertaken to know the pattern of injuries in fatal roadtraffic accidents cases.

METHOD & MATERIAL

The study material comprised of 105 victims of RTA cases, who were admitted and died in a teaching and tertiary Hospital, North Delhi and subsequently autopsied at the same center during the period between November 2013 to October 2014.
The key variables such as age, sex, pattern of injuries, profile of victim, survival time, time of death etc were produced from various sources such as Post mortem reports, police inquest papers and hospital records.
The clinical data and cause of death were ascertained from the hospital records. Information and various other inputs relating to the time of incidence, manner of incidence, profile of victims etc of road traffic

accidents gathered from the police. All these observations were later corroborated with the post-mortem findings to facilitate the overall process of analysis.

OBSERVATIONS

105 cases fatal road accidents constituted 51.2 % of total medicolegal deaths autopsied (205) during same period. The findings obtained in the present study were tabulated as below.

TABLE1- AGE DISTRIBUTION

AGE	CASES	PERCENTAGE (%)
0-10	5	4
11-20	12	11.4
21-30	28	26.6
31-40	21	20
41-50	18	17.1
51-60	12	11.4
>61	9	8.5

Maximum numbers of victims were in the age group21 - 30 years comprising of 28 cases (26.6%), followed by 21 cases (20 %) in age group 31-40 yrs and 18 cases (17.1 %) in age group 41-50 yrs. Minimum victims were found in the age group less than 10 years comprising of 5 cases (4 %).
Youngest victim was 4 years old male child and eldestwas 68 years old male.

TABLE 2- SEX DISTRIBUTION

AGE	MALE	FEMALE	TOTAL
0-10	4	1	5
11-20	10	2	12
21-30	23	5	28
31-40	15	6	21
41-50	14	4	18
51-60	10	2	12
>61	8	1	9
TOTAL	84 (80 %)	21 (20 %)	105

Out of 105 cases, 84 (80%) were males and 21 (20%) were females indicating that a large majorityof victims were male. Male to female ratio was 4.

TABLE 3 - PROFILE OF VICTIMS

PROFILE	CASES	PERCENTAGE (%)
PEDESTRIAN	28	26.6
MOTORCYCLIST	39	37.1
CYCLIST	20	19
LIGHT VEHICLE	14	13.3
HEAVY VEHICLE	4	3.8
TOTAL	105	

Majority of the victims who died due to road traffic injuries were motor cycle (two-wheeler) occupants comprising of 39 cases (37.1%) followed by pedestrians comprising of 28 cases (26.6 %) and pedal cyclists of 20 cases (19 %). Occupants of light motor vehicle were made up to 14 cases (13.3 %) while least cases were of heavy motor vehicle occupants seen in 4cases (3.8 %). Most of the two-wheeler occupants were riding the motorcycle.

TABLE 4 - SURVIVAL PERIOD

SURVIVAL PERIOD	CASES	PERCENTAGE (%)
SPOT DEATH/BD/< 1HR	42	40
1-6 HR	24	22.8
6-24 R	28	26.6
24 HR- 1 WK	7	10.4
>1 WK	4	3.8

In the present study, 94victims (89.4%) died within 24 hours after the accident, 7victims (10.4%) died after 24 hours but within one week. The number ofcases decreased with increase in survival period. Only 4 victims (3.8 %) survived for more than one week.

TABLE 5- PATTERN OF EXTERNAL INJURY

TYPE OF INJURY	CASES	PERCENTAGE (%)
ABRASION	91	86.6
LACERTION	87	82.8
CONTUSION	45	42.8
INCISED WOUND	16	15.2
STAB/PENETRATING WOUND	00	00
CRUSH INJURY	12	11.4

In our present study external injuries included abrasions, lacerations, contusions and crushinjury.
Maximum was abrasions (86.6%) followed by lacerations (82.8%), contusions (42.8%), incisedwounds(15.2 %) and crush injury(11.4 %) respectively.

Table 6 – PATTERN AND DISTRIBUTION OF SOFT TISSUES/ ORGAN INJURIES

TYPE	CASES	PERCENTAGE (%)
HEAD & NECK	36	34.2
BRAINICH	56	53.5
THORAX	37	35.2
LUNGS	5	4.7
HEART DIAPHRAGM	3	2.8
LARGE VESSELS	14	13.3
ABDOMEN	11	10.4
STOMACH/INTESTINELIVER	27	25.7
SPLEEN	12	11.4
KIDNEY	6	5.7
PELVIS	7	6.6
BLADDER GENITAL ORGANS	2	1.9

In the present study, soft tissue/organ injuries were classified as head & neck, thorax, abdomen& pelvis. In head & neck, brain injuries were seen in 36 cases (34.2 %) and brain hemorrhages was seen in 56 cases (53.5 %). In thorax, lung injuries were seen in 37 cases (35.2%), heart injuries in 5 cases (4.7%) and major large vessels were injured in 14 cases (13.3%). In abdomen, Liver injuries were seen in most cases (27) comprising 25.7 %, followed by injuryto spleen in 12 cases (11.4 %) and then stomach, intestine and kidneys. In pelvis, bladder is injured in 7 cases (6.6%) and genitalia in 2 cases (1.9%).

TABLE 7- PATTERN OF BONE FRACTURE

TYPE	NUMBER
SKULL	56
RIBS	48
THORACIC WALL	16
THORACIC VERTEBRAE	7
PELVIC BONE	12
LONG BONES	35

In our present study, Skull fracture was seen in 56 cases. Ribs fracture was seen in 48 cases.
Thoracic wall (clavicle and sternum) fracture was present in 16 cases. Thoracic vertebrae fracture was seen in 7 cases. Pelvic bone fracture was seen in 12 cases and long bone fracturewas seen in 35 cases.

TABLE 8 – PROFILE OF CAUSE OF DEATH

CAUSE OF DEATH	CASES	PERCENTAGES(%)
INTRACRANIAL INJURY	56	53.3
HEMORRHAGIC SHOCK	38	36.1
RESPIRATORY INSUFFICIENCY	9	8.5
THROMBOEMBOLISM	2	1.9
TOTAL	105	

In the present study, maximum cause of death was intracranial injuries (53.33%) followed byhemorrhagic shock (36.1%), respiratory insufficiency(8.5%) and thrombo-embolism (1.9%). Most of thedeaths due to hemorrhagic shock are due to bluntthoraco-abdominal injuries.

DISCUSSION

In recent years, deaths due to RTAs are increasing at an alarming rate throughout the world.

This is largely due to the tremendous increase in the number of motorized vehicles, high speed technology along with other contributing factors like poor infrastructure of roads, intoxicating influence of alcohol or drugs, inexperienced drivers without proper driving license, ignorance or intentional violation of traffic rules, lack of safety engineering measures etc. Victims in RTAs sustain large varieties of injuries, external as well as internal. External injuries may be abrasions, lacerations, contusions etc. Internal injuries may be fractures, rupture of viscera, destruction of major arteries etc.

Out of 105 cases, 84 (80%) were males and 21 (20%) were females indicating that a large majority of victims were male. Male to female ratio was 4. Maximum numbers of victims were in the age group 21 - 30 years comprising of 28 cases (26.6%) & the findings are consistent with the studies done by Ranjit M. Tandle et al (4), Birendra Kumar Mandal et al(5), Jakkam Surender (6) and Umesh SR et al (9).

In the present study, 94 victims (89.4%) died within 24 hours after the accident, 7 victims (10.4%) died after 24 hours but within 1 week. The number of cases decreased with increase in survival period similar to the study done by Jakkam Surender (6). Majority of the victims whodied due to road traffic injuries were a motor cycle (two-wheeler) occupants comprising of 39 cases (37.1%) in accordance with studies done by Ranjit M. Tandle et al 4 & Dr. Dhaval J. Patel 7, and Umesh SR et al (9)

In our present study external injuries included abrasions (86.6%) followed by lacerations(82.8%), contusions (42.8%),incised wounds (15.2 %) and crush injury (11.4 %) respectively. The findings of our study were similar to the study done by Birendra Kumar Mandal et al 5 & Dr. K.K. Agarwal et al 8 and Umesh SR et al (9) The internal injuries were classified like soft tissue/ organ injuries and bone fracture. In head &neck, brain injuries were seen in 36 cases (34.2 %) and brain hemorrhages was seen in 56 cases (53.5 %). In thorax, lung injuries were seen in 37 cases (35.2%), heart injuries in 5 cases (4.7%) and major large vessels were injured in 14 cases (13.3%).

In abdomen, Liver injuries were seen in most cases (27) comprising 25.7 %, followed by injury to spleen in 12 cases (11.4 %) and then stomach, intestine and kidneys. In pelvis, bladder is injured in 7 cases (6.6%) and genitalia in 2 cases (1.9%).The findings of the present study were similar to the study done by Birendra Kumar Mandal et al 5, Jakkam Surender 6, Dr. K.K. Agarwal et al 8 and Umesh SR et al (9).

In bone fracture ,skull fracture was seen in 56 case followed by Ribs fracture that was seen in 48 cases, followed by Thoracic wall, Thoracic vertebrae, Pelvic bone and long bones fractures in

decreasing order. This is similar to study done by Ranjit M. Tandle et al 4 & Birendra Kumar Mandal et al 5 and Umesh SR et al (9).

In the given study, maximum cause of death was intracranial injuries (53.33%) followed by hemorrhagic shock (36.1%), respiratory insufficiency (8.5%) and thrombo-embolism (1.9%). This is consistent with the findings in the study done by Ranjit M. Tandle et al4, Jakkam Surender 6 & Dr. K.K. Agarwal et al 8 and Umesh SR et al (9).

CONCLUSION

Road Traffic Accidents constitute a complex phenomenon. Road traffic accident accounts for major epidemiological, medical and medico legal problem in developing countries like

India. The deaths due to RTAs accounted for 51.2 % of total medico legal autopsies conducted. All the victims of fatal RTAs had injuries of one or other system. Majority of the victims were males and more than 60% of the victims were between the age group 21 to 50 years who are atthe most active phase of life both physically and socially.

This study shows that most of the deaths in road traffic accidents (89.4%), brought to the hospital took place within 24 hours after sustaining multiple injuries which is very alarming and highlights the need for taking urgent steps for establishing best provision of emergencytrauma services.

Intracranial injuries cause alone was responsible for death in 53.3% of cases, followed by haemorrhagic shock (36.1%), respiratory insufficiency (8.5%) and thrombo-embolism (1.9%).

This shows that intracranial injuries are the predominant cause leading to or contributing death in motorcyclist and pedestrian. Intracranial hemorrhage was the most common internal injury (53.5 %) contributing to death.

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CONFLICT OF INTEREST

Nil

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ETHICAL CLEARANCE

Not applicable

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