

Head Injury in Road Traffic Accidents - A Study from North East India

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ABSTRACT

Introduction: India is undergoing major economic and demographic transition with increased urbanization, industrialization, construction projects and motorization. Head injury is the result of variety of mechanisms including motor vehicle and motor cycle accidents, pedestrians being struck by motor vehicles, falls from heights, occupational hazards, assaults, riots and bomb blasts. India has second highest reported mortality rate of 29.2 per 100000 people from road traffic injuries. Injuries are reported to be the seventh leading cause of death (11% of all deaths) in India, with road traffic injuries making up to 78% of them (WHO, 1999). Current research aimed to study pattern of Head Injury in Road Traffic Accidents from North East India.

Material and Methods: This study was conducted on medico legal cases coming for autopsy in Department of Forensic Medicine, Guwahati Medical College and Hospital, Guwahati during the period of 1st August, 2009 to 31st July 2010. During this period a total 2474 autopsies were performed in our department with 815 cases had head injuries. After obtaining the necessary and relevant information about the victim, a thorough and complete autopsy was performed on the dead body, recording the findings on the proforma.

Result: Our findings are similar to above studies and also to the studies of Sevitt S (1973), Chandra J et al (1979), Tyagi AK (1986), Motto L (1988) and Basu R et al (1992), Dandona and Mishra (2004), Menon A and Nagesh KR (2005). Most common cause of head injury is Road side accident (21.26%), most commonly occurring during office hours (6-9am) (25.45%) with 4 wheelers being most common offending vehicle(49.39%).

Conclusion: Road are like arteries of country. Vehicles must run for development of country and necessities of life. Injuries on head and other parts of body due to road traffic incidents are unavoidable but with scientific data, we can minimize the loss of life and misery due to death and injury. We should design our interventions based on these data and studies.

Keywords Head Injury, Road traffic Accidents, North East Region

INTRODUCTION

India is undergoing major economic and demographic transition with increased urbanization, industrialization, construction projects and motorization. Weapons are easily available especially in this part of country (NE Region), legal as well as illegal. All these have increased rate of trauma, of which, head trauma is amongst commonest, vital and inescapable consequence.¹ Correct interpretation of head injuries is vital for reconstruction of events for forensic medicine as well as for providing correct data to

policy makers.² Autopsy findings may also help for proper understanding of head injuries and their treatment by medical fraternity.³

Because a head injury occurs every 15 seconds and a patient dies from head injury every 12 minutes, a day does not pass that an emergency physician is not confronted with a head injured patient.^{4,5}

Head injury is the result of variety of mechanisms including motor vehicle and motor cycle accidents, pedestrians being struck by motor vehicles, falls from heights, occupational hazards, assaults, riots and bomb blasts.^{6,7} Penetrating injury is most often due to gunshots but sometimes other types of blunt objects can violate the skull. Most commonly, traumatic brain injury occurs in the presence of additional injuries to other major organ systems but it can also occur in isolation. In today's world with more opportunities, people are travelling more by road, rail and airways.

India has second highest reported mortality rate of 29.2 per 100000 people from road traffic injuries. Injuries are reported to be the seventh leading cause of death (11% of all deaths) in India, with road traffic injuries making up to 78% of them (WHO, 1999).

According to a report of the Ministry of Home Affairs, Government of India, one accident occurs every two minutes, and one suicide every five minutes in India, with the accident rate corresponding to 45 per 100 000 population. India has 1% of vehicles in the world; but it accounts for about 6% of the total cases of unintentional injuries.

Every 4 minutes, a person killed or injured in India due to RTA. Head injuries account for one quarter to one third of all accidental deaths, and for two thirds of trauma deaths in hospitals. Road traffic injures account for 2.1% of global mortality. India accounts for about 10% of road accident fatalities worldwide.⁸

Assam with 914000 total registered motor vehicles reported 4262 cases of road traffic accidents, 1721 deaths in road traffic accidents with accidental death rate of 1.9 per 1000 vehicles in year 2008. Assam falls in less accident prone

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zone with 13.6 deaths per 1 lack population national average being 29.6. (NCRB 08)

Railway is the second largest transport system for the public as well as goods since its inception in 1853 from Mumbai to thane. Indian railway is the largest public transport system in world. A total of 445468 'Traffic Accidents' were reported during year 2008 comprising of 415855 'Road accidents', 2134 'Rail-Road Accidents' and 27479 'Other Railway Accidents'. These accidents caused 118239, 2222 and 24126 deaths respectively during year 2008). Current research aimed to study pattern of Head Injury in Road Traffic Accidents from North East India

MATERIAL AND METHODS

This study was conducted on medico legal cases coming for autopsy in Department of Forensic Medicine, Gauhati Medical College and Hospital, Guwahati during the period of 1st August, 2009 to 31st July 2010. During this period a total 2474 autopsies were performed in our department with 815 cases had head injuries.

Criteria for selection of cases

1. All cases of head injuries which have a definite history of trauma would be taken for the study.
2. All the cases which show multiple injuries to the body along with head injuries would be taken for study.
3. Cases in which bleeding in brain was ruled to be due to some disease process and not due to trauma were excluded.

Material used

1. Head injury victims coming for medico legal autopsy.
2. Documents received from police like forwarding letter, inquest report and dead body challan.
3. Cases summary in cases which were admitted in some hospital before death.
4. Autopsy table and instruments.
5. Magnifying lens and measuring tape.
6. Photographic equipment.
7. Post mortem reports

Methods

Data relating to trauma incident and victim were collected from the records of investigating police officers like forwarding letter, inquest report and dead body challan. Facts regarding the event were obtained from accompanying relatives, friends of the deceased, eye witness etc. if found reliable. If the victim was treated in some hospital or nursing home before death, hospital records, if available, were reviewed to gather relevant information for present study.

After obtaining the necessary and relevant information about the victim, a thorough and complete autopsy was performed on the dead body, recording the findings on the proforma.

RESULTS

Cases during Study (Table 1)

Out of total number of cases, 526 were present with road traffic accidents with 352(14.22%) patients with head injury as cause of death.

Cases	Numbers	Percentage
Total Cases	2474	100
Head injury	815	32.94
Road traffic Accident(RTA)	526	21.26
RTA with head injury	352	14.22

Table-1: Cases during Study Period in Dept. of Forensic Medicine, GMCH Gauhati

Type of Events	No. of cases	% age
Road traffic accident	352	43.19
Blunt force impact	335	41.1
Homicide	55	6.75
Railway accident	56	6.87
Fall from height	6	0.74
Bomb Blast	3	0.37
Others	8	0.98
Total	815	100

Table-2: Type of incidence leading to head injury

Time of Occurrence (hr)	No. of cases	% age
0-3 hr	5	1.82
3-6 hr	10	3.63
6-9 hr	70	25.45
9-12 hr	47	17.1
12-3 hr	32	11.64
3-6 hr	42	15.3
6-9 hr	42	15.3
9-12 hr	24	8.73
Total	275	100

Table-3: Time of occurrence in relation to autopsy with Head injury

Type of Victim	No. of cases	% age
Pedestrian	119	35.63
Bike	111	33.23
Occupant	49	14.67
Bicycle	32	9.58
Driver	23	6.88
Total	334	100

Table-4: Type of victim in Road traffic incidence cases

Vehicle involved	No of cases	% age
4 wheeler	163	49.39
6 wheeler	82	24.85
2 wheeler	76	23.03
Others	9	2.73
Total	330	100

Table-5: Type of vehicle involved in RTI victims

Type of Incidence (Table 2)

352 (43.19%) case of head injury are due to road side accidents which is most common cause followed by blunt force impact, homicide and railways accidents respectively.

Time of occurrence in relation to autopsy with Head injury (Table 3)

Maximum number of road traffic accidents occurred from 6am to 9am (25.45%). 17.1% cases occurred during 9 am to

Scalp Injuries	No. of cases	% age
Contusion	186	48.56
Laceration	64	16.71
Stitch wound	58	15.14
Crush	35	9.14
Haematoma	25	6.52
Abrasion	15	3.91
Puncture wound	0	0
Incised wound	0	0
Chop wound	0	0
Total	383	100

Table-6: Scalp injuries in head injuries cases.

Type of Skull Fracture	No. of Cases	% age
Fissure	75	39.47
Depressed	41	21.58
Crush	34	17.89
Depressed comminuted	11	5.79
Comminuted	11	5.79
Suture	6	3.15
Base	7	3.68
Perforation	0	0
Non specific	5	2.63
Total	190	100

Table-7: Types of skull fractures in head injury cases

Intracranial haemorrhages/Brain injuries	No of cases	%age
Extra dural	40	7.23
Subdural	279	50.45
Subarachnoid	55	9.94
Cerebral contusion	8	1.45
Cerebral laceration	76	13.74
Intra cerebral haemorrhages	35	6.33
Cerebellum injuries	7	1.27
Brain stem lacerations	4	.723
crush	30	5.42
Intra ventricular h'age	19	3.43
Total	553	100

Table-8: Types of intracranial haemorrhages and brain injuries

12 noon. Minimum cases occurred in morning hours, 1.82% between 0-3 hrs and 3.63% from 3-6 hours.

Others in which time is not known are excluded from this parameter of study (77 cases)

Types of victims in RTI cases- (Table 4)

Type of victim could be elicited only in 334 victims (100%). In our study we found that 119 victims were pedestrians (35.63%), 111 bike riders (33.23%), 49 occupants (14.67%), 32 bicycle riders (9.58%) and 23 victims were drivers (6.88%).

Type of vehicle (Table 5)

Most common vehicle involved is 4 wheeler (49.39%) followed by 6 wheeler (24.85%), 2 wheelers (23.03%) respectively.

Scalp injuries- (Table 6)

In the present study scalp injuries were present in 772 cases

(94.72%) out of total 815 cases. Among RSA with Head injury, Contusions 186 (48.56%) were commonest scalp injury followed by lacerations and stitch wounds which were present in 64 (16.71%) and 58(15.14%) cases respectively. Crush injury was present in 35 cases (9.14%), haematoma in 25 cases (6.52%), abrasion in 15 cases (3.91%).

Skull fractures- (Table 7)

Skull fractures were present in 190cases. Fissure fracture is most common skull fracture (39.47%) followed by depressed fracture in 41 cases (21.59%), crush in 34 cases (17.89%), depressed-comminuted fracture in 11 cases (5.79%), comminuted in 11 cases (5.79%), suture fracture in 6 cases (3.15%), and in 5 cases (2.63%) type of fracture was not described. Fractures base of skull were present in 7 cases (3.68%).

Intracranial haemorrhages and brain injuries-(table 8)

In present study most common haemorrhage was subdural which was present in 553 cases (67.85%). Subarachnoid haemorrhage was present in 279cases (50.45%) and extradural haemorrhage in 40 cases (7.23%). Intra cerebral haemorrhage was found in 35 cases (6.33%).

Cerebral lacerations were present in 76 cases (13.74%) and contusions in 8 cases (1.45%). Injuries to cerebellum were found in 7 cases (1.27%). In 4 cases (0.7%) brain stem was lacerated. Intra ventricular h'age present in 19 cases and in 30 cases (5.42%) crush injury is present.

DISCUSSION

People involved in business and service need to travel for their work. Students are using two wheelers to go to their school or college. So, they are involved commonly in accidents. Also chance of people in business and students being involved in altercation is more.

Majority of head injuries were caused by road traffic incidents, 352 cases (43.19%). 335 cases (41.1%) were due to blunt force impact, 56 (6.87%) railway incidents, 55 (6.78%) homicides, 6 (0.74%) falls from height, 3 (0.37%) bomb blasts and 8 cases (0.98%) were caused by other causes.

Freytag E (1962) in her study found that 41% of the cases of head injuries were due to fall and 23% were due to road traffic accidents.¹³

Liko O et al (1996) found that 49% cases were due to traffic accidents and 17% from fall from height.¹⁴ Findings of above studies except Freytag are consistent with our study. Study of was conducted in 1962 and it was a 10 years study. Number of vehicles has increased since then and ours is only one year study. Maximum number of head injuries occurred during the month of December. However head injury cases were evenly distributed throughout the year.

In our study we found that maximum number of road traffic incidents occurred between 6AM-9AM (25.45% cases) followed by 9AM-12Noon (17.1% cases). 15.3% cases occurred between 3PM-6PM and 15.3% between 6PM-9PM. Our findings are similar to the findings of Norman LG (1962), Singh H and Dhatarwal SK (2004).¹⁵ Findings of our study

are in variance with the studies of Biswas G et al (2003)¹⁰ and Menon A and Nagesh KR (2005)¹¹ who found that maximum number of mishaps occur in evening hours. This is because in our study, time of occurrence of all cases of road traffic incidents was not known. Also traffic from all over north east comes to Guwahati in morning hours and students also go to school and colleges in morning hours.^{9,10,11,12}

In present study we observed that most common offending vehicles are 4 wheelers with 163 cases (49.39%). In 82 cases (24.85%) offending vehicle were 6 wheelers, 76 cases (23.03%) 2 wheelers and in 3 cases (2.73%) 3 wheelers were involved.

Guwahati city is a big business and education center of North East India. So, lots of people travel to and from the city for business and educational purposes. City has increasingly high number of 4 and 2 wheelers with same roads. Parking facilities are lacking, so vehicles are parked on already stressed roads. National highway passes through the outskirts of the city with lots of heavy vehicles. Construction activities are on rise due to economic growth with lots of laborers coming and going to work from home on foot or bicycles. These explain high number of 4 wheelers and bike riders involvement in accidents.

The reason for the heavy vehicle involvement was that the condition of vehicles is generally not good. The drivers of the offending vehicles were lacking in traffic sense due to lack in training and standardization in the license process.

In this study, pedestrians (119 cases) were most common (35.63%) victims in RTI cases. 111 cases (33.23%) were bike riders, 49 (14.67%) occupants of 4/6 wheelers, 23 (6.88%) drivers and 32 (9.58%) were bicyclists.

Dikshit (1979) found that most common victims were pedestrians constituting 50% of total cases followed by motorcyclists constituting 18.28% of total cases. Among the offending vehicles he found that trucks were responsible for accidents in 28.09% cases followed by cars in 22.99% of cases and bus in 17.14% of cases.¹⁶

Salgado (1988) said 51.4% of total cases were pedestrians. Moto (1988) observed that 83% were pedestrians and 3% were pedal cyclists.¹⁷ Andy Harris said that drivers of motor vehicles accounted 37% of total victims. Passengers in motor in 26.3% drivers of motor cycle 10.1%, pedestrians 19% and pedal cyclist 5%.⁸ Sathiyasekaran (1991) said a total of 29.2% of victims were cyclist and 28.1% were pedestrian and were found to be most venerable group.¹⁸

CONCLUSION

Road are like arteries of country. Vehicles must run for development of country and necessities of life. Injuries on head and other parts of body due to road traffic incidents are unavoidable but with scientific data, we can minimize the loss of life and misery due to death and injury. We should design our interventions based on these data and studies.

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