Original Article

Pattern of Skull Fracture in Road Traffic Accident Victims in Gurugram, Delhi NCR: An Autopsy Based Study

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Abstract

Introduction: There exists a proportional relationship between urbanisation and incidences of Road Traffic Accidents (RTA) and Gurugram, part of Delhi NCR is no exception to this. The civil hospital mortuary at Gurugram witnessed 640 cases of RTA deaths in a year (June 2017 to May 2018) out of total 1480 cases in that period. *Aim & objectives:* To find demographics and patterns of skull fractures in death due to head injury in cases of RTA. *Method:* A retrospective observation study was carried out based on the autopsy reports of the 150 victims of head injury due to RTA autopsied at Gurug ram Mortuary. *Result:* We observed maximum incidence of death due to head injury in 3rd decade of life with male preponderance in ratio of 3:1. About 88 (59%) cases suffered skull fracture and most common type of fracture was Linear fracture. *Conclusion:* Incidence of RTA and deaths due to RTA are very high especially fatal head injuries.

Keywords: Skull Fractures; Road Traffic Accidents ; Linear fracture

Introduction

India accounts for about 10% of road accident fatalities worldwide[1]. Road traffic accidents (RTA) have emerged as a major global public health problem of this century and are now recognised as "veritable neglected pandemic"[2]. The developing countries bear a large share of burden and account for about 85% of the deaths as a result of road traffic crashes[3]. The head being the most vulnerable part of the body is involved frequently and is major cause of morbidity and mortality in RTAs[4]. Head injury has been defined as "a morbid state, resulting from gross or subtle structural changes in the scalp, skull, and/orthe contents of the skull, produced by mechanical forces"[5]. It has also been defined as physical damage to scalp, skull or brain produced by external forces. Introduction of helmet in view of protecting head from crashes following motorcycle accidents dates back to 1885, when the first helmet was used. It was crude compared to modern helmets and offered very little protection. This led to introduction of helmets in 1931. Professor C. F. Lombard created helmet which would absorb the impact of crash. The ultimate function of a motorcycle helmet is to protect the skull from a type of fractures and to provide a cushion that will deaccelerate a rider's head during impact resulting in decreased force that is placed on the rider's skull[6]. Thus we undertook this dissertational study with aim to find demographics and patterns of skull fractures in death due to head injury in cases of RTA in Gurugram city of Delhi NCR.

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Material and Methods

This retrospective observation study was carried out in Civil Hospital Mortuary, Gurugram among the 150 postmortem cases of RTA victims over the period of one year from 1st June 2017 to 31st May 2018. The detailed analysis of these cases was based upon inquest reports, medical admission records if any and evaluation of autopsy reports. Study included all known cases of alleged history of death due to RTA and excluded unknown dead bodies, decomposed bodies, other cases such as rail accidents, operated cases, fall from height etc.

Results:

We observed that most affected age group our study was between 21-30 years having total 46 cases (30.6%), followed by 31-40 years having 29 cases (19.3%). All age groups were dominated by males with maximum sex differentiation in 21-30 years' age group. In the present study, Males (n=114, 76%) outnumbered females (n=36, 24%) significantly with male to female ratio of nearly 3.16:1 (Table 1).

In 150 RTA victims of death due to head injury, skull fracture was found in 59% cases (Table 2). In 88 cases with skull fractures, we noted that most common type of skull fracture was fissured fracture (54.5%), followed by depressed (13.6%). In cases of multiple fractures, common fractures were combinations of fissured + sutural (9%) and comminuted + depressed (5.6%) (Table 3). Bony involvement was maximum at frontal bone (44.3%) followed by temporal bone (30.6%) (Table 4).

Table 1: Demographics of RTA Head Injury Victims

Age Range	Males	Females	Total
< 10 years	1	2	3
11-20 years	15	7	22
21-30 years	38	8	46
31-40 years	20	9	29
41-50 years	22	6	28
51-60 years	15	3	18
61-70 years	3	1	4
Total	**114**	**36**	**150**

Table 2: Showing fatal RTA victims with Head Injury with or without skull fracture

Skull Fracture incidence	No. of cases (n=150)	(%)
RTA without skull fracture	62	41
RTA with skull fracture	88	59

Table 3: Pattern of skull fractures in fatal RTA victims

Types of skull fracture	No. of cases (n=88)	(%)
Fissured	48	54.55
Depressed	12	13.64
Comminuted	11	12.50
Sutural	0	0
Comminuted + Depressed	4	4.55
Fissured + Comminuted	5	5.68
Fissured + Sutural	8	9.09

Table 4: Distribution of location of skull fractures in fatal RTA victims

Regions of skull fracture	No. of cases (n=88)	(%)
Frontal	39	44.32
Temporal	27	30.68
Parietal	3	3.41
Occipital	5	5.68
Frontal+ Temporal	2	2.27
Parieto+ Occipital	1	1.14
Fronto+ Parietal	3	3.41
Parieto+ Temporal	8	9.09

Discussion

In present study, out of 150 cases of head injury in RTA deaths, skull fracture was present in 88 cases accounting for 59% cases whereas in the rest of the cases, cause of death was cerebral damage.

Most common type of skull fracture observed was fissured fracture (53.4%) followed by depressed fracture (12.5%)

followed by comminuted fracture (11.4%). Pathak A et al[7] too observed similar findings with dominance of fissured fracture (43.4%) followed by depressed fracture (13.5%) followed by comminuted fracture (13%).

Another study from Maharashtra by Tandle & Keoliya[8], recorded a similar finding in their study wherein fissured fracture of skull with basal fracture was commonest type seen in (24.21%) of total cases followed by comminuted (16.84%) followed by depressed fracture (14.74%) cases.

In our study, maximum deaths were in the age group of 21-30 years (30.6%) followed by 31-40 years (19.3%) and least in the age group of 0-10 years (2%) and above 60 years (4%). Similar results were observed by Manish K et al[9], Arvind Kumar et al[10] and Pardeep Kumar et al[11]. Similar studies by Shivendre Jha et al[12]& Munish Kumar et al[13] also noted maximum fatalities in the age group of 21-30 years followed by 31-40 years.

Present study observed male preponderance over females with 114 male victims (76%) and 36 female victims (24%). These findings are consistent with BC Shivakumar et al[14] who observed ratio of M:F =7.33:1. Study by Munish Kumar et al[13] and Ravikumar et al[15] which entirely focused on the patterns of head injuries in fatal accidents, most of the victims were males (90.48 and 87.75% respectively). Our results are also in accordance with HC Kyada et al[16].

Our study had maximum fractures on frontal bone followed by temporal bone. These findings are similar with findings of Honnunger RS et al[17] and Tandle RM et al[8].

Conclusion

Incidence of RTA and deaths due to RTA are very high especially fatal head injuries. A sincere legislative efforts made in this direction can reduce the incidence as well as mortality and morbidity. Mandatory helmets, penalising drunken driving, strict implementation of traffic laws, and road safety awareness programmes may probably reduce these fatalities.

Conflict of Interest: Nil.

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Ethical clearance: Obtained from the Institutional Ethical committee.

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