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Original Research Article

Pattern of Skull Fracture in Fatal Road Traffic Accident Victims: An Autopsy Based Study

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Abstract: Head injuries are the most serious injuries in the term of morbidity and mortality. This study was conducted in Government Medical College mortuary among the 200 post mortem cases of road traffic accident victims over the period of one year from 1st October 2014 to 30th September 2015. All the cases coming during the study period were included in the study. The objective is to find out pattern of skull fracture in fatal road traffic accident victims. Linear fracture was found in 56.14% cases. In the present study it was observed that most of the fractures were present on Frontal bone alone i.e. 46 (40.35.0%) followed by Temporal bone alone (n=33; 28.94%), in combine Parieto-temporal bone fracture (n= 7.89 %) was most common followed by Fronto – Parietal bone fracture (n=4; 3.50%). Linear fracture alone most common among skull fractures and sutural fracture were least common. Frontal bone was most common site of skull fracture.
Keywords: Accidents, Autopsy, Death, Fractures, Injuries, Skull

INTRODUCTION

In medico-legal practice blunt head injuries are most frequently caused by traffic accident, fall from height, assault, train accident etc. Head injury has been defined[1] as "a morbid state, resulting from gross or subtle structural changes in the scalp, skull, and/or the contents of skull, produced by mechanical forces". It has also been defined as physical damage to the scalp, skull or brain produced by an external force. However, such force/impact, responsible for the injury needs not be applied directly to the head. Injury to bicyclist if caused by an automobile injury may be similar to those sustained by a pedestrian except that the impact will be lower on the body or only against to some part of bicycle itself. The secondary injuries may be more severe due to greater distance to fall. When a person travels by bicycle and get hit by a vehicle then fracture of bone, severe soft tissue injuries and bicycle spoke injury is produced particularly in children. Injuries due to running over may be present. Injuries to motorcyclist usually occur by running in front of a vehicle from one side to other. The cycle is hit and the person is thrown violently on the ground. At times they are thrown beneath a vehicle and crushed like any pedestrian. These result in most of the cases from being struck with a motor vehicle. The primary and secondary impact injuries are seen similar to the pedestrian being hit by a vehicle. Secondary injuries will occur from striking the ground and on occasions being dragged with the vehicle. The same type of injuries was found in pillion passengers. Classical injury in motor cyclist and pillion passengers is fracture of skull usually from secondary impact on the ground. Temporal and parietal bone fracture, fracture of base of skull and countre-coup injury to the brain are seen. Temporo-parietal fractures are common which usually extends across the base of skull through pituitary fossa. Crash helmet reduces friction of head against the ground and although the head injuries may be less, there will be other effects such as broken neck or fractured ribs or limbs with internal visceral injuries. One type of injury peculiar to motorcyclists and scooter rider in collision with the rear of the truck when the vehicle will pass underneath the back but the head of rider impacts against the tailboard [2].

MATERIAL AND METHODS

This study was conducted in Mahatma Gandhi Memorial Medical College and M.Y. Hospital Indore Mortuary, among the 200 post mortem cases of road traffic accident victims over the period of one year from 1st October 2014 to 30th September 2015. Inquest

papers and other relevant documents of police, magnifying glass and measuring tape, photographic equipment, autopsy table and instruments. Study tool was used for schedule based data collection and observation based study at time of autopsy. Study included all known cases and having alleged history of death due to RTA and excluded unknown body, decomposed body, deceased having alleged history of sustaining other injury along with RTA injuries, other cases such as rail accidents, operated cases, fall from height etc. Data was collected and analysed by using Microsoft office excel 2010.

RESULTS

In this study most affected age group was between 21-30 years having total 65 cases (32.5%), followed by 31-40 years (19.0 %). All age groups are dominated by males with maximum sex differentiation in 21-30 years age group. (Table 1)In the present study males (n=156, 78.0%) outnumbered females (n=44, 22.0 %) significantly with male to female ratio of nearly 3.54:1. (Table 2) In RTA cases skull fracture was found in 57% cases and most common type of skull fracture was linear fracture alone (n=64; 32.0%) followed by depressed (n=19; 9.5%) and least common sutural fracture alone, in combine linear with sutural fracture were most common i.e. (n=10; 5.0%), least common was comminuted with linear fracture (n=1; 0.5%)(Table 3, 4). In the study it was observed that most of the fractures were present on frontal bone i.e. 46 (23.0%) followed by temporal bone (n=33; 16.5%) and least common on over combine area (Frontal + Temporal, Occipital + Parieto-Temporal, Parieto – Occipital, Temporal + Frontal) i.e. (n=1; 0.5%). (Table 5).

Table 1*:* Showing distribution of cases of RTA according to age and sex. (n=200, either sex)

Age in years	Female (%)	Male (%)	Total
Less than 10 years	1 (2.3)	1 (0.6)	2(1.0)
11 – 20	8 (18.2)	19 (12.2)	27(13.5)
21 – 30	11 (25.0)	54 (34.6)	65(32.5)
31 – 40	11 (25.0)	27 (17.3)	38(19.0)
41 – 50	9 (20.5)	28 (17.9)	37(18.5)
51 – 60	4 (9.1)	21 (13.5)	25(12.5)
61 – 70	0	6 (3.8)	6(3.0)
Total	44 (100)	156 (100)	200(100.0)

Table 2*:* Showing distribution of cases of RTA according to sex.

Sex	No. of cases	Percentage (%)
Female	44	22.0
Male	156	78.0
Total	200	100.0

Table 3*:* Showing fatal road traffic accident victims with or without skullFracture

Road traffic accidents	No. of cases	Percentage (%)
RTA Cases without skull fracture	86	43
RTA Cases with skull fracture	114	57

Table 4: Pattern of skull fracture in fatal road traffic accident victims

Types of skull fracture	No. of cases	Percentage (%)
Linear	64	56.14
Depressed	19	13.19
Comminuted	12	10.52
Sutural	00	00
Comminuted + Depressed	3	2.63
Comminuted + Linear	1	0.87
Depressed + Comminuted	2	1.75
Linear + Comminuted	3	2.63
Linear + Sutural	10	8.77

Table 5: Showing distribution of cases of skull fractures according to regions

Regions of skull fracture	No. of cases	Percentage (%)
Frontal	46	40.35
Temporal	33	28.94
Parietal	5	4.38
Occipital	9	7.89
Frontal + Temporal	1	0.87
Fronto – Parietal	4	3.50
Occipital + Parieto-Temporal	1	0.87
Parieto – Occipital	1	0.87
Parieto –Temporal	9	7.89
Parieto – Temporal + Parieto-Occipital	2	1.75
Temporal + Frontal	1	0.87
Temporal + Fronto-Parietal	2	1.72

DISCUSSION

In this study out of 200 cases skull fracture was present in 114 cases; accounting for 57.0% cases with cause of death was craniocerebral damage.In this study it was observed that most common type of skull fracture was linear fracture alone (32.0%) followed by depressed (9.5%). This is conceded with other studies where most common type of skull fracture was linear fracture [3].

Fissured fracture was the most commonly observed fracture (57%) in this study. Similar finding was observed in the study of Pathak A *et al.;* [4] the dominant type of skull fracture found was the linear (fissured) fracture in 43.04% cases followed by basilar fracture in 17.73% and least commonly depressed fracture in 3.78% cases. Cranial vault was involved in 38%, base of skull in 34%, and both vault and base in 28% of cases. Middle cranial fossa, parietal bone and temporal bone were the commonly involved areas in fracture, which corresponds to 26%, 22% and 20% respectively. Least involved area in fracture was the occipital bone (12%).The study of Gupta S *et al.;* [5] shows that the incidences of fracture of various skull bones was, Temporal: 30 cases (45%), Pari*et al.;* 26 cases (39.3%). Frontal: 5 cases (7.5%), Occipital: 4 cases (6.06%). Fissure type of fracture was the commonest type followed by depressed comminuted fracture.Menon A *et al.;* [6] tells that skull fractures were present in 88.88% of the cases, fractures of the vault were found in 88%, base of the skull in 35.97% and combination of both in 35% of cases.

Similarly in the study of Tandle RM *et al.;* [7] linear fracture of skull with basal fracture was the commonest type seen 23 (24.21%) of the total cases, followed by linear fracture only (16.84%) and least common was the depressed fracture, observed in 14.74% of the total cases. Skull vault fracture was seen in 80 of the total cases, out of which linear fracture was the commonest.In study of Pothireddy S *et al.;* [8] skull was fractured more (69%), among which fissured fractures (65%) followed by comminuted (18%) and depressed fractures (12%) were observed. Right Pari*et al.;* part of skull was commonly involved (36%). Pari*et al.;* (n=58) and temporal (n=50) bones were fractured more commonly than frontal (n=33) and occipital bones (n=27).Kumar S *et al.;* [9] study mentioned that 71% cases had fracture of the skull bones. Fracture vault of skull was found in 61.97% cases and in 29.58% cases both vault and base were involved. Fissured fracture was found in 63.64% cases and comminuted type in 16.89% of cases. Temporal region had highest number (50) of fractures.

In the study it was observed that most of the fractures were present on frontal bone followed by temporal bone. This is consistent with study of Honnunger RS *et al.;* [10] frontal bone fracture was the most common bone fractured in the head (69.01% of cases) and Tandle RM *et al.;* [6] temporo-parietal region was involved predominately in 16 (20%) cases, followed by fronto-parieto-temporal region (17.50%).

Government and public encourage enforcement of traffic safety laws and regulations and campaign for firm and swift punishment for traffic offenders. Government and public have responsibly by:- Abiding by the speed limit on roads, never driving when over the legal alcohol limit, always wearing a seat-belt and properly restraining children, even on short trips, wearing a crash helmet when riding a two-wheeler. Government will plan safe and efficient transport systems that accommodate drivers as well as vulnerable road users, such as bicyclists and pedestrians [11].

REFERENCE:

1. Vij K; Textbook of forensic medicine and toxicology. 2nd ed. India: Churchil livingstone; 2002, 521
2. Dikshit PC; Textbook of forensic medicine and toxicology, 2nd ed. India, PEEPEE, 2014; 180-9.

3. Menon A, Nagesh KR; Pattern of fatal head injuries due to vehicular accidents in Manipal. J Indian Acad Forensic Med 2005; 27(1): 19-22,
4. Pathak A, Desania NL, Verma R; Profile of road traffic accidents & head injury in Jaipur (Rajasthan). J Indian Acad Forensic Med 2008; 30(1): 6-9.
5. Gupta S, Deb PK, Moitra R, Chhetri D; Demographic study of fatal cranio- cerebral road traffic injuries in North Bengal region. J Indian Acad Forensic Med 2007; 29(1): 25-7.
6. Menon A, Pai VK, Rajeev A; Pattern of fatal head injuries due to vehicular accidents in Mangalore. J Forensic Leg Med. 2008; 15(2): 75-7.
7. Tandle RM, Keoliya AN; Patterns of head injuries in fatal road traffic accidents in a rural district of Maharashtra- Autopsy based study. J Indian Acad Forensic Med 2011; 33(3): 228-31.
8. Pothireddy S, Karukutla N; Pattern of injuries to motorcyclists in fatal road traffic accidents. Journal of Bioscience and Technology 2013; 4(2): 513-8.
9. Kumar S, Singh RKP; Pattern of craniocerebral injuries in fatal vehicular accidents in Patna (Bihar). J Indian Acad Forensic Med 2014; 36(2): 125-9.
10. Honnungar RS, Aramani SC, Vijay Kumar AG, Ajay Kumar TS, Jirli PS; An epidemiological survey of fatal road traffic accidents and their relationship with head injuries. J Indian Acad Forensic Med 2011; 33(2): 41-3.
11. World report on road traffic injury prevention, conclusions and recommendations, W.H.O. Geneva 2004; chapter 5, p.159-0. Available URL:siteresourdbank.org/EXTTOPGLOROASAF/ Resources/WHO_full_report_en.pdfces.world.