Original Article

Indian Journal of Forensic Medicine and Pathology
Volume 11 Number 3, July - September 2018
DOI: http://dx.doi.org/10.21088/ijfmp.0974.3383.11318.7

Profile of Fatal Head Injuries in and Around Jamnagar Region

Rahul A. Mehta[1], Alpesh B. Bambhaniya[2]

Abstract

Background: Head is the vital part of the body. So any injury to head may be fatal in the form of neurogenic shock, fracture or intracranial haemorrhage which is caused by mostly blunt object and some time it may be due to firearm injury. *Aims:* To study the epidemiological aspect of fatal head injuries. *Material and Method:* In this study 150 cases of fatal head injuries studied for their various aspect. *Results:* Most cases are of road traffic accident (RTA). Most of them are young male between 20-40 years of age. Though majority of them died within in 1hrs, on the spot or on the way. Most of them are in the form any form of skull fracture or intracranial haemorrhage. *Conclusion:* Most of the fatal head injuries are of fracture of the skull followed by any of intracranial haemorrhage which were due to any form of road traffic accident.

Keywords: Neurogenic Shock; Intracranial Haemorrhage; Cranium.

Introduction

Head injuries are common during any form of accidents and most of them are fatal even if they get immediate treatment. 20-25% traumatic accidents leads to head injuries and road traffic accidents are of 75% of it [1,2]. They are in the form of coup and contrecoup injury. It is due to mechanical force and acceleration and deceleration force [3]. Head is easily accessible by assaultant and its minor degree of trauma may be fatal so head is targeted during homicidal attack.

It is rising day by day due to urbanization, modernization, increase transport, fast life style, drinking habit and increase use of mobile and devises during driving. In some areas due to seasonal variation due to fog or rain may have higher rate of accidents. Death rate is increasing in developing countries due to head injury where pedestrians, motorcyclists and passengers are especially vulnerable. These deaths are not truly accidental death as accidents are due to men made factors which can t be prevented by taken care during the driving and transportation [4].

Authors Affiliation: [1]Associate Professor [2]Assistant Professor, Department of Forensic Medicine, M. P. Shah Govt. Medical College, Jamnagar, Gujarat 361008, India.

Corresponding Author: Alpesh B. Bambhaniya, Assistant Professor, Department of Forensic Medicine, M. P. Shah Govt. Medical College, Jamnagar, Gujarat 361008, India.
E-mail: dralpeshb@gmail.com

Received on 18.08.2018, **Accepted on** 31.08.2018

Material and Method

The present prospective study was conducted in Department of Forensic Medicine, M. P. Shah Govt. Medical College from 01-01-2014 to 31-12-2014. During that period out of 1166 autopsies, 150 cases of fatal head injuries were selected for the present study.

Accompanying person of the victims of the head injuries and accompanying police were asked for the general information like age, sex, address, occupation, personal habits, socioeconomic status, time and date of head injury. The information about the incident of head injuries collected consisted whether road traffic accident, railway injury, firearm, assault, etc were asked, if vehicular accident the position of victim during road traffic accident whether driver, pedestrian or occupant. The nature of injury, type of skull fracture, intracranial haemorrhage, manner of injury and other body injury are noted. The data and post mortem finding were collected and filled in the performa and analyzed.

Observations & Results

Followings were the observation of this study. Majority of the victims of head injury were male (74.6%), with maximum number (32.6%) in 21-30 years of age group followed by 31-40 (20.6%) and 41-50 (15.3%) years [Table 1]. More than one third of the cases of head injury were died on the spot or within an hour of the accident. Only 10% cases survived for more than 2 day then died [Table 2]. Amongst the head injuries, road traffic accident was the most common cause (57.3%) followed by injuries by railway injury (12%), fall from height (8.6%) & fire arm. (2.6%); Amongst the RTA four wheeler (36.5%) followed by two wheeler (34.6%) were responsible for more than two-third of the fatalities. Majority (73.3) of the head injury cases were accidental followed by homicidal (11.3%) and suicidal (8%). The manner of death could not ascertain in 7.3% of the cases [Table 3]. Superficial injury like lacerated wounds (70%) was the commonest form followed by, abrasion and contusion (17.3%) , deep injury was in the form of scalp hematoma (90.6), fracture (92%), crush injury (14%) while incised wound in 8%, firearm wounds were seen in 2.6% in form of penetrating wound. Injuries were not seen on scalp in 4.6% cases. Amongst the fractures, linear fracture was the commonest (45.3%) followed by comminuted fracture (22.6%), depressed (11.3%) and diastatic fractures (8.6%). Fracture in form of penetrating on the skull areas also found in 2.6% . [Table 4] Skull vault fracture were seen in almost (92%) of the cases , mostly on the vault (51.3%) followed by both vault& base of skull in 23.3% cases. The base of skull alone was fractured in 17.3% and no fracture seen in 8% cases of head injury [Table 5]. Regarding fracture of part of the skull bone temporal bone was involved in (65.8%), parietal bone was involved in

Table 1: Distribution of cases according to Age and Sex

Sr. No.	Age (Yrs)	Cases		Sex			
			%	Male	%	Female	%
1	<10	6	4	5	3.3	1	0.7
2	11-20	14	9.3	12	8	5	1.3
3	21-30	49	32.6	35	23.3	14	9.3
4	31-40	31	20.6	22	14.6	9	6
5	41-50	23	15.3	19	12.6	4	2.6
6	51-60	16	10.6	11	7.3	5	3.3
7	>60	10	6.6	8	5.3	2	1.3
	Total	150	100%	112	74.6	38	25.4

Table 2: Distribution of cases according to Survival period

Sr. No.	Survival Period	Cases	%
1	Spot Death/<1hrs	57	38
2	1-6hrs	34	22.7
3	6-24hrs	23	15.3
4	24-48hrs	21	14
5	>2day	15	10
	Total	150	100%

Table 3: Distribution of cases according to Mode & Manner of injuries

Sr. No.	Mode of injuries	Cases	%	Manner of Injury			
				Accident	Homicide	Suicide	Uncertain
1	RTA	86	57.3	86	-	-	-
2	Railway injury	18	12	9	0	6	3
3	Assaults other than firearms	14	9.3	-	14	-	0
4	Fall from height	13	8.6	8	0	5	0
5	Firearms (Gunshot)	4	2.6	-	3	1	-
6	Industrial	9	6	7	0	0	2
7	Others	6	4	0	0	0	6
	Total	150	100%	110(73.3%)	17(11.3%)	12(8%)	11(7.3%)

(56.4%), frontal bone in (31.2%) and occipital bones only in (25.9%) cases of which parieto-temporal involvement was the commonest. (21.3%) [Table 6]. Intracranial haemorrhages were seen in 94% cases of fatal head injuries, of which majority (48.5%) of them were mixed, either any of extradural, subdural & subarachnoid haemorrhages. Individually subdural, alone was in (24%) and combination, with other haemorrhages were the commonest. (53.2%). [Table 7] Beside head injury other parts of body were involved in most (66%) of the cases. Chest involvement (26%), followed by abdomen (18%) and multiple (12.6%). Extremities were affected in (8.7%) cases [Table 8].

Table 4: Distribution of cases according to Type of injury

Sr. No.	Type of injury		Cases	%
1	Superficial injuries	Abrasion/ Contusion	26	17.3
		Laceration	105	70
		Incised	12	8
		No injury	7	4.6
2	Scalp hematoma		136	90.6
3	Fracture*	Linear	68	45.3
		Depressed	17	11.3
		Comminuted	34	22.6
		Diastatic	13	8.6
4	No fracture	-	12	8
5	Crush injury	-	21	14
6	Penetrating	-	4	2.6

*= Multiple response

Table 5: Distribution of cases according to Part of skull involved

Sr. No.	Part	Cases	%
1	Skull Vault	77	51.3
2	Skull Base	26	17.3
3	Skull Vault and Base	35	23.3
4	No Skull injury	12	8
	Total	150	100

Table 6: Distribution of cases according to Fracture bone involved

Sr. No.	Skull bones fracture	Cases	%
1.	Frontal alone	6	4
2.	Parietal alone	9	6
3.	Temporal alone	11	7.3
4.	Occipital alone	11	7.3
5.	Frontal & Parietal	13	8.6
6.	Frontal & Temporal	16	10.6
7.	Parietal & Temporal	32	21.3
8.	Temporal & Occipital	9	6
9.	Frontal, Parietal & Temporal	12	8
10.	Parietal, Temporal & Occipital	19	12.6
11	No Fracture	12	8
	Total	150	100

Table 7: Distribution of cases according to Intracranial haemorrhage

Sr. No.	Injury/ Haemorrhage	Cases	%
1	Extradural	16	10.6
2	Subdural	36	24
3	Subarachnoid	11	7.3
4	Intracerebral	5	3.3
5	ED & SD	13	8.6
6	ED & SA	29	19.3
7	SD & SA	31	20.6
8	No Haemorrhage	9	6
	Total	150	100

Table 8: Distribution of cases according to Body parts

Sr. No.	Part	Cases	%
1	Only Head	51	34
2	Head & Chest	39	26
3	Head & Abdomen	28	18.7
4	Head & Limb	13	8.7
5	Head & Multiple	19	12.6
	Total	150	100

Disccussion

Majority, cases (74.6 %), were males since they are more into outdoor activities like driving vehicles, working outdoors hence more prone to accidents whereas females succumbed mainly to either accidental falls at their residence or due to RTA, they being pillion riders without headgear. This is consistent with Bhatt SB et al., Shankar UB et al., Kumar RB et al., Kumar S et al., Hemlatha N et al. [5-9].

The vulnerable age group was the 21-30years (32.6%), followed by age group of 31-40years (20.6 %). The reason may be that they form the work group, and hence are prone to injuries due to RTA, falls, assaults, etc. This is probably males & people of young age group are more exposed to RTA & other type of injuries. This is consistent with most of the study [5-9].

In our study More than 50% of the cases of head injury were died within 6hours of the casualty of which 38% died either on the spot or within an hour of the accident similar results are seen in studies by Bhatt SB et al., Rastogi AK, Tandel RM et al. [5,10,11].

Amongst the head injuries, road traffic accident is the single largest cause (57.3%) followed by injuries by railway (12%), fall from height (8.6%) & firearm. (2.6%); which is cinsistant RB,Kumars et al., Hemlatha N et al., Tandel RM et al., Honnungar RS et al.[8,9,11,12]. Accidental injury (73.3%) was most common followed by homicide (11.3%) which is consistant with Bhatt SB et al., Rastogi AK, Tandel RM et al. [5,10,11].

Laceration was the most common type of scalp injury, more commonly seen over bony prominences in parietal and frontal regions. Similar results were drawn in studies by Bhatt SB et al., Rastogi AK, Tandel RM et al. [5,10,11] where scalp laceration was noticed in 70 cases (38.7%) followed by scalp abrasion & contusion in 39 cases (21.5%).

Among the skull fractures , linear fracture 68 cases (45.3%) was the commonest, followed by comminute fracture - 34 cases (11.3 %). Similar results were found in study by Bhatt SB et al., Rastogi AK, Tandel RM, Honnungar RS et al., Arvind K et al. [5,10,11,12,13] where about half (49.6 %) of skull vault fractures (91.3%) were linear fractures, followed by communicated and depressed fractures. In contrast, a study done by Shankar UB et al., Menon A et al. [6,14] concluded that comminuted fracture (35.4%) was the commonest, followed by linear fracture (30.4 %). While Bhatt SB et al. and Pathak A et al. [5,15] had observed that fracture of skull was found in 56.3% and in 42.6% of the cases respectively, and fissure type of fracture was the most common type, followed by depressed comminuted fracture (45%). Incised wounds and punctured wounds were exclusively seen in males, as they are involved more commonly than females in assaults.

On considering the site of skull vault fracture, temporal bone was involved in (65.8%) as it is the thinnest bone and more prone to fractures, followed by parietal and frontal bones, (56.4%) and 20 cases (31.2%), respectively. Least involved area in fracture was occipital bone in (25.9%). Consisting with most of the study [5,6,9].

On considering the site of skull base fracture, majority of cases involved middle cranial fossa, (18%), due to thinness and larger area of impact as compared to anterior and posterior cranial fossa. In studies by Yattoo et al. [16] parietal bones and bones of middle cranial fossa were commonly involved areas. In contrast, Honnungar RS and et al., Pathak A et al., [12,17] had noted frontal bone (56%) and posterior cranial fossa involvement in (46%) being the commonest sites respectively.

In our study, subdural and subarachnoid haemorrhage (20.6%) was found to be the commonest intracranial haemorrhage associated with head injuries. This was consistent with Shankar UB et al., Kumar RB, Kumar S [6,7,8] while in contrast with studies done by , Equabal Z et al.,Yattoo et al. [16,17] intracranial haemorrhage found was subarachnoid followed by subdural haemorrhage (31%).

Beside injuries to skull other parts of body were involved in most (66%) of the cases of head injury which is consisting with Shankar UB et al. and Kumar RB, Kumar S et al. [6,7,8] while Yattoo et al.[17] noticed 40% cases involving other body parts along with head injury.

Conclusion

Majority victim of the head injury were male, of adult and middle age group died due to road traffic accidents in form of vehicular accidents. These can be prevented by life style modification like use of helmets, seat belts, don't drink and drive follow the traffic rules, don't use mobile device during driving and air bags. Apart from this few cases were due to injuries from heavy blunt/sharp cutting weapon and fire arm. Such cases were usually homicidal in nature which are not preventable. Fracture of skull and intracranial haemorrhage were seen in most of the cases. Among the fracture temporo-parietal bone were involved most often and intracranial haemorrhage were in the mixed form however subdural haemorrhage was the commonest. Most of the victims were died on the spot or on the way to hospital.

References

1. Reddy KSN. The Essentials of Forensic Medicine and Toxicology. 29th ed. Hyderabad: K. Suguna Devi;2 010.pp.118-19.
2. Modi J P. Modi's medical jurisprudence & toxicology. 22nd edition. New Delhi: Lexis Nexis Butterworth; 2004.pp.421-24.
3. Saukko P, Knight B. Knight's Forensic Pathology.3rd ed.London: Arnold; 2004.p.227.
4. Park K. Park's Texbook of Preventive and Social Medicine. 17th ed.Jabalpur: Banarasidas Bhanot; 2002.pp.271-72.
5. Bhatt SB, Gupta BD, Jani CB. Study of Pattern & Profile of Road Traffic Accident in Saurashtra Region, Gujarat. J Indian Acad Forensic Med. 2017;39(4): 361-65.
6. Shankar UB, Chandra GYP, Harish S. Pattern of Scalp Injuries and its Correlation with Injuries to Skull and Brain amongst Autopsies Conducted at a Tertiary Care Centre. J Indian Acad Forensic Med.2017;39 (2):141-48.
7. Kumar RB, Jaiin A, Yadav J, Dubey BP. Pattern and Distribution of Head Injuries in Fatal Road Traffic Accidents in Bhopal Region of Central India J Indian Acad Forensic Med. 2015;37(3):242-45.
8. Kumar S, Singh RK.Pattern of Craniocerebral Injuries in Fatal Vehicular Accidents in Patna (Bihar). J Indian Acad Forensic Med. 2014;36(2):125-29.
9. Hemalatha N, Singh OG. Patterns of Cranio-intracranial injuries In Fatal Head Injury Cases. Indian Academy of Forensic Medicine (IAFM), 2013;35(2):106-08.
10. Rastogi AK, Agarwal A, Srivastava AK, Kumar A, Shandil A. Demographic Profile of Head Injury Cases in Agra Region J Indian Acad Forensic Med. 2012; 34(2):117-19.
11. 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):128-31.
12. Honnungar RS, Aramani SC, Kumar VA, Jirli PS. An Epidemiological Survey of Fatal Road Traffic Accidents and their Relationship with Head Injuries J Indian Acad Forensic Med. 2011;33,(2):135-37.
13. Arvind K, Sanjeev L, Deepak A, Ravi R, Dogra TD. Fatal road traffic accidents and their relationship with head injuries: An epidemiological survey of five years. Indian Journal of Neurotrauma (IJNT) 2008;5(2): 63-67.
14. Menon A, Pai VK, Rajeev A. Pattern of fatal head injuries due to vehicular accidents in Mangalore. J For. Leg Med 2008;15:75-77.
15. Pathak A. Profile of Road Traffic Accidents & Head Injury in Jaipur (Rajasthan), JIAFM. 2007;30(1):6-9.
16. Yattoo GH, Tabish A. The profile of head injuries and traumatic brain injury deaths in Kashmir. J. Trauma Manag Outcomes. 2008;2(1):5-7.
17. Pathak A, Vyas P C, Gupta B M. Autopsy finding of pattern of skull fractures and intra-cranial hemorrhages in cases of headtrauma: A prospective study. Journal of Indian Academy of Forensic Medicine, 2006;28(4):187-90.