Study of Skull Fractures and its Associated Features Due to Injury in Central Gujarat Region: A Retrospective Study

Kalpesh Kotaria[1], Dushyantkumar Barot[2], Rajendra Kharadi[3], Saumil Merchant[4]

[1]Associate Professor, Department of Forensic Medicine and Toxicology, Narendra Modi Medical College, Ahmadabad, Gujarat - 380008, [2]Associate Professor, Department of Forensic Medicine and Toxicology, Banas Medical College and Research Institute, Moriya, Palanpur, Gujarat - 385001, [3]Assistant Professor, Department of Forensic Medicine and Toxicology, Dr. N. D. Desai Faculty of Medical Science and research, Nadiad, Gujarat - 387001, [4]Professor and Head, Department of Forensic Medicine and Toxicology, Narendra Modi Medical College, Ahmadabad, Gujarat - 380008.

How to cite this article: Kalpesh Kotaria, Dushyantkumar Barot, Rajendra Kharadi et. al., Study of Skull Fractures and its Associated Features Due to Injury in Central Gujarat Region: A Retrospective Study. Medico-legal Update 2023;23(1).

Abstract

Background: Among all the traffic accidents fractures of the skull has significant role because brain of the human being is in semi-liquid form and more prone to be affected. It has co-ordinating and controlling whole body movements. It may cause sudden death or person becomes disabled throughout life.

Method: 141 cases of different age group head injuries dead bodies broughtfor post-mortem examination, V.S General Hospital, Ahmedabad, Gujarat-380006were studied. Types of skull fractures and associated features were studied.

Results: Out of 141, 130 (92.1%) cases had contusion / haematoma, 68 (48.2%) had laceration, 59 (41.8%) had contusion and laceration, 3 (2.1%) had abrasion and 3 (2.1%) had abrasion and contusion. In addition to skull fractures 44 (31.2%) had limbs, 36 (25.3%) abdomen, 33 (23.4%) face and neck, 26 (18.4%) had chest injuries. Types of fractures included, 72 (51%) had linear / fissure, 37 (26.3%0 multiple / communicated, 33 (23.6%) were depressed, 16 (11.3%) had base of skull fracture, 12 (8.33%) had suture separation, 4 (2.83%) had linear and depression, 88 (62.5%) had single fracture.

Conclusion: Present pragmatic post-mortem study will be helpful toMedico-legal expert, Neuro-surgeon and Neuro physicianto predict the fatality of persons who had different types of skull fractures

Keywords: Scalp, haematoma, laceration, contusion, depression, linear.

Introduction

Head injury can be defined as a morbid state resulting from gross or subtle structural changes in the scalp, skull and / or contents of skull, produced by mechanical forces[(1)]. Unintentional injuries contribute 66% of all injury deaths and 70% of injuries leads to disabilities in under developed countries like

Corresponding Author: Dushyantkumar Barot, Associate Professor, Department of Forensic Medicine and Toxicology, Banas Medical College and Research Institute, Moriya, Palanpur, Gujarat - 385001.

E-mail: dushyantfmt@rediffmail.com

Cell No: +91 8488885901

India. Young people aged from 15-30 years are more victim to road traffic injuries (RTI). Due to rising vehicle density, high velocity technologies, along with congestion of roads and traffic rules violation are the major causes of head injuries.India has just 1% of total vehicles in the world but it contributes to 6% of the global road traffic cases [(2)]. It is estimated that major cities like Delhi, Calcutta,Chennai, Bengaluru, Hyderabad, Ahmedabad had highest number of accidents due to high velocity of driving and density of vehicles [(3)(4)].

Unintentional high velocity head injuries associated with different parts to the crania like meninges, scalp base of the skull, brain substance too, sometimes other parts of the body including limbs, chest, abdomen hence attempt was made to evaluate associated features of skull injuries because certain injury cause sudden death and majority of skull fractures leave the people disabled, dependent throughout the life which cause socio-economic burden to the middle class families because majority of India has lower middle socio-economic society.

Material and Method

141(one hundred forty-one) dead bodieshaving skull fractures were brought for post-mortem examinationto forensic and toxicology department, V. S. General Hospital Ahmedabad, Gujarat -380006wasstudied.

Inclusive Criteria: Skull fractures due to road trafficaccident injury cases aged between 18 to 65 years were selected for study.

Exclusion Criteria: Skull fractures other than 18 -65 years age, homicide or suicide cases were excluded from the study.

Method: Every casewas studied the mode of accident time of accident information was collected from investigating officer, inquest panchnama, relatives or attenders. Apart from this detailed history of patients regarding his habits like alcohol. Smoker, tobacco chewers, occupation was also noted.

Types of skull fractures and associated features like base of skull fractures involvement of meninges, and Brain substance was also studied.

Duration of study was from February-2014 to May-2017 (Retrospective study)

Statistical analysis: Different types of injuries of skull were classified with percentage. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1.

Observation and Results

Table 1: Study of distribution of cases of scalp injury 130 (92.1%) had contusion / Hematoma, 68 (48.2%) laceration, 59 (41.8%) contusion and laceration, 3 (2.1%) had abrasion and abrasion with contusion.

Table 2: Study of distribution of injury cases associated with other body injuries 44 (31.2%) limb (upper and lower limb), 36 (25.3%) abdominal, 33 (23.4%) Face and Neck, 26 (18.4%) chest

Table 3: Study of distribution of skull fractures 72 (51%) linear / Fissure, 37 (26.3%) multiple / communicated, 33 (23.6%) depressed, 16 (11.3%) Base of the skull, 12 (8.33%) suture separation, 4 (2.83%) linear + depression, 88 (62.5%) single fracture.

Table 4: Study of distribution of cases having cerebral haemorrhage 35 (24.8%) subdural haemorrhage, 8 (5.6%) subarachnoid haemorrhage, 3 (2.1%) extradural haemorrhage, 49 (34.7%) EDH + SDH+SAH, 46 (32.6%) had SDH+SAH

Table 5: Distribution of cases having Brain substance injury 89 (63.1%) had Laceration, 26 (18.4%) contusion, 26 (184%) intra-cranial haemorrhage.

Table 1: Study of distribution of cases having scalp injury

Sl. No	Types of Injury	Number of cases	Percentage (%)
1	Contusion / Hematoma	130	92.1
2	Laceration	68	48.2
3	Contusion and laceration	59	41.8
4	Abrasion	3	2.1

Sl. No	Types of Injury	Number of cases	Percentage (%)
5	Abrasion and contusion	3	2.1
	Total	141	100

Table 2: Study of distribution of head injury cases associated with other parts of the body injuries

Sl. No	Site of injury	No. of cases	Percentage (%)
1	Limb a – Upper limb b – Lower limb	44	31.2
2	Abdominal	36	25.3
3	Face and Neck	33	23.4
4	Chest	26	18.4

Table 3: Study shows distribution cases having skull fractures

Total No. of cases: 141

Sl. No	Types of Injury	No. of patients	Percentage (%)
1	linear / fissure	72	51.0
2	Multiple / communicated	37	26.3
3	Depressed	33	23.6
4	Base of skull	16	11.3
5	Suture	12	8.33
6	Linear + depression	4	2.83
7	Single + fracture	88	62.5
8	Total	141	100

Table 4: Study of distribution of cases having cerebral haemorrhages

Types of haemorrhage	No. of cases	Percentage (%)
Subdural haemorrhage	35	24.8
Subarachnoid haemorrhage (alone)	8	5.6
Extradural haemorrhage (alone)	3	2.1
EDH + SDH + SAH	49	34.7
SDH + SAH	46	32.6

Table 5: Distribution of cases having brain substance injury

Types of Injury	No. of cases	Percentage (%)
Laceration	89	63.1
Contusion	26	18.4
Intra-cranial haemorrhage	26	18.4
Brain stem haemorrhage	-	0

Discussion

The present study of skull fractures of cadavers and its associated features due to injury in population of Central Gujarat Region. 130 (92.1%) cases had contusion / haematoma, 68 (48.2%) laceration, 3 (2.1%) had abrasion, 3 (21.1%) had abrasion and contusion (Table-1). 11 (31.2%) limbs (upper limb and lower

limb), 36 (25.3%) had abdominal, 33 (23.4%) had face and neck, 26 (18.4%) chest injuries apart from skull fractures (Table-2). 72 (51%), 37 (26.3%) multiple / communication, 33 (23.6%) depressed, 16 (11.3%) Base of skull, 12 (8.33%) suture separated, 4 (2.83%0 linear + depression, 88 (62.5%) single fracture (Table-3). 35 (24.8%) had subdural haemorrhage, 8 (5.6%) had subarachnoid haemorrhage, 3 (2.1%0 had extra-dural haemorrhage, 49 (34.7%) had EDH+SDH+SAH, 64 (32.6%) had SDH+SAH (Table-4). 89(63.1%) had laceration, 26 (18.4%) had contusion, 26 (18.4%) had Intra-cranial haemorrhage (Table-5). These findings are more or less in agreement with previous studies [5][6][7].

It was observed that, the victim is more vulnerable in frontal collision, side collision and hit if hit by heavy motor vehicle. Head injury also caused by the assault as a common reason and pattern of injuries depends upon type of weapon [8]. Clinical features of skull fractures are loss of consciousness or headache, nausea and vomiting, ear bleed, vertigo, papillodema. Likelihood of skull feature is directly associated with severity of injury and vault is involved three times more often than the base. Subdural haematoma (SDH) was most common intracranial lesion resulting from head injury [9]. Contusion and lacerations of the brain often seen in vehicular accidents and fall from height cases. These may occur with or without external injuries to the scalp and fractures of the skull [10]. Linear fractures may lead to cerebra cortical contusion or intra-cranial haematoma 80% of death was observed due to skull fractures and frequency of haematoma is higher in the cases with skull fractures. Linear fractures were located to frontal temporal and parietal bones in decreasing order. The depressed fractures are located to frontal, parietal and temporal bones in decreasing order [11]. Contusions are most common traumatic intracranial lesions and are always caused by trauma. Laceration either develops due to open skull fractures or bone fragments in closed skull fractures.

Severity of injury and transportation mechanism to health facility is important for the patient management and survival. As maximum number of cases of head injury is due to vehicular accidents proved to be fatal for life.

Summary and Conclusion

The present study of skull fracture and it associated features are maximum number of casesare due to vehicular accidents and proved to be fatal for life, the safety measures for both the drivers and the passengers of the respective vehicles should be addressed. Awareness of safety rules, speed limit for different type of vehicles should be implemented. Moreover, speaking on mobile, during driving, well-planned, high-tech roads, surveillance of traffic police can minimize the road accidents and avoid skull fractures.

Limitation of study – Due to less number of cases we have limited findings and results

- This research paper was approved by institutional ethics.
- No conflict of Interest
- No Funding

References

1. Biswas G, Verma SK, Sharma J – Pattern of road traffic accidents in North east Delhi J. Forens. Med. and toxicology 2003, 20 (1); 27-32.
2. Jacab R, Prabhakaran K – Victims of road traffic accidents assessments and management at field J. Ind. Med. Assoc. 1999, 97 (5); 171-175.
3. Dhillon S, Kapilla P, Sekhan HS – Pattern of injuries present in road traffic accidents in simla hills J. of Punjab academy of forensic medicine and toxicology 2007, 7 (2); 7-10.
4. Yavuz MS, Asirdiazer M, Cetin G – The correlation between skull fractures and intracranial lesions due to traffic accidents Am. J. Forensic. Med. pathol. 2003, 24 (4); 339-45.
5. Stablis G, Quigly G – Compound fractures occurs commonly from the assaults with various sharp / blunt weapons. Emerg. Med. J. 2005, 22; 303-304.
6. DEvdiga KV, Jain SP – An analytical study of acute head injury Ind. J. Surg. 1969, 31; 197-99.
7. Lambert DA – Death from falls MMWR 1988, 37; 21-24.
8. Pande CD – Incidence of accidental crania – cerebral trauma Ind. J. of Forense Med. 1979, 1; 21-24.
9. Lahaye PA, Gade GF – Injury to cranium In Moore EE Mattox KL Feliciano DV 2nd edition Trauma Norwalk Appleton Lange 1996, 247-8.
10. Di Maio DJ, Maio VJM – Head injuries, forensic pathology New York Elsevier 1993, 139-69.
11. Tedeschi CG – The wound Assessment by organ systems Head and Spine Forensic Medicine Philadelphia WB Saunders company 1977, 29-35.