

Proportion and Determinants of Traumatic Head Injury in Maxillofacial Trauma Patients Reporting At MCH Kottayam

¹Dr Shiney Dominic, Associate Professor, Department of Oral and Maxillofacial Surgery, Govt. Dental College, Kottayam, Kerala, India

²Dr George Philip, Assistant Professor, Department of Oral and Maxillofacial Surgery, Govt. Dental College, Kottayam, Kerala, India

³Dr Naveen Nandagopal, JR III, Department of Oral and Maxillofacial Surgery, Govt. Dental College, Kottayam, Kerala, India

⁴Dr Vipin E, JR I, Department of Oral and Maxillofacial Surgery, Govt. Dental College, Kottayam, Kerala, India

Corresponding Author: Dr Shiney Dominic, Associate Professor, Department of Oral and Maxillofacial Surgery, Govt. Dental College, Kottayam, Kerala, India

Citation of this Article: Dr Shiney Dominic, Dr George Philip, Dr Naveen Nandagopal, Dr Vipin E, “Proportion and Determinants of Traumatic Head Injury in Maxillofacial Trauma Patients Reporting At MCH Kottayam”, IJDSIR- January - 2021, Vol. – 4, Issue - 1, P. No. 493 – 498.

Copyright: © 2021, Dr Shiney Dominic, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. Which allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

The prevalence of traumatic head injury and the accompanying disability, morbidity and mortality is increasing day by day with a significant impact on economical, psychological and social life. The close anatomic proximity of the facial skeleton with cranium poses increased risk for head injuries in maxillofacial trauma patients, thereby the maxillofacial injuries can be considered as significant indicators for traumatic head injuries. The present study aims to assess the incidence and pattern of head injuries in patients with maxillofacial trauma. As per this study, RTA and assaults remains the main etiological determinant of traumatic head injury related maxillofacial fractures. Even though as per this

study, zygomaticomaxillary complex fractures have the higher prevalence with higher male have higher predominance of traumatic head injury and facial bone fractures, nasal bone remains the more commonest isolated facial bone fracture with 6.59%. This study necessitates the importance of prevention of road traffic accidents as well as assaults by installing strict traffic rules and regulations like seatbelts, helmets and banning the alcoholic drives and improving the quality of roads.

Keywords: Facial Skeleton, RTA, Trauma

Introduction

The prevalence of traumatic head injury and the accompanying disability, morbidity and mortality is increasing day by day with a significant impact on

economical, psychological and social life. As the vital structures in the head and neck region, sensory systems in the face, airway and circulatory systems are intimately associated, trauma patients requires special attention for maxillofacial region. According to World Health Organization (WHO), traumatic head injury will exceed other diseases as the main cause of disability and death by the year of 2020.

The close anatomic proximity of the facial skeleton with cranium poses increased risk for head injuries in maxillofacial trauma patients, thereby the maxillofacial injuries can be considered as significant indicators for traumatic head injuries.^{1,2} THI is defined as nondegenerative, noncongenital insult to the brain from an external mechanical forces, such as rapid acceleration and deceleration impact or blast waves, in which the brain function is temporarily or permanently impaired, possibly leading to permanent or temporary impairment of cognitive, physical, and psychosocial functions, with an associated diminished or altered state of consciousness^{3,4,5}. It involves diffuse axonal injury, cerebral contusions, epidural hematoma (EDH), subdural hematoma, and subarachnoid hemorrhage (SAH). The risk effect of maxillofacial trauma on the brain has not been properly documented till date. But some authors suggest that the facial skeleton has a protective function on the brain by absorbing the energy of trauma while others opposing this idea.

Even though head injury may occur in the early hours of trauma without having any clinical findings, the presence of vomiting, seizure, headache, loss of consciousness, and reduced Glasgow Coma Scale (GCS) score are considered to be the reliable indicators of head injury. The Glasgow Coma Scale score(GCS) is a widely accepted and standardized method to evaluate the level of consciousness and thereby the neurological status of the

patients.^{6,7} Early recognition of traumatic head injuries in maxillofacial trauma patients have a paramount importance for the initial assessment, stabilization and treatment planning in such patients by reducing the morbidity and mortality and thereby enhancing the treatment outcome as well as quality of life.

The aim of this study was to assess the incidence and pattern of head injuries in patients with maxillofacial trauma. Thus we can recommend to enhance the public awareness by encouraging the rules regarding the use of seatbelts and helmets, avoiding alcohol usage and risky driving, applying strict traffic rules and regulations and improving the road quality.

Materials And Methods

The patients with concomitant maxillofacial and head injuries reported at the department of oral and maxillofacial surgery of government medical college and dental college Kottayam were included in this study. Patients with history of previous head injury, stroke or cerebrovascular accidents were excluded from this study.

The patients were stabilized after providing life saving procedures according to ATLS protocol. Informations regarding age, sex, alcoholic consumption, etiology of injury and its details, use of helmet/seat belt at the time of accident, loss of consciousness, seizures, vomiting, ENT bleeding, GCS(Glasgow coma scale) score and medical history were recorded. Thorough clinical and physical examination was done to rule out any chest, abdominal, spinal or orthopedic injuries. CT head and facial bone and required radiographs were taken to assess details of maxillofacial and cranial trauma. Based on the relevant clinical findings, further radiographic evaluation and required consultations were done. Head injury was managed by neurosurgery department and maxillofacial fractures were treated by the oral and maxillofacial surgery department.

Maxillofacial injuries that were taken into consideration in this study includes soft tissue injuries of face, frontal bone fractures, naso orbito ethmoidal fractures, zygomatic complex fractures, isolated zygomatic arch fractures, orbital floor fractures, Lefort I, II, III fractures of maxilla, nasal bone fractures, dentoalveolar fractures and mandibular fractures. Skull fractures, cerebral contusions, epidural haemorrhage, subdural haemorrhage, subarachnoid haemorrhage and pneumocephalus are the head injuries taken into consideration in this study.

Results

There were total 167 patients of which 92 patients (55.09%) had head injury and 75(44.91%) patients were reported without head injury. Out of 92 patients 76 (64.96%) were males and 16 (32%) were females (Table 1 and Graph 1). Etiologically road traffic accidents have a predominance with 61.11% followed by assault (48.15%), self fall (12.5%) and sports injury (16.67%) among the patients with head injury (Table 2 and Graph 2). Zygomaticomaxillary complex fractures showed a higher prevalence of 27.54% among the facial bone fractures followed by panfacial fractures, lefort I and II fractures with 11.38%, 7.78% and 7.19% respectively (Table 3 and Graph 3). Among the intracranial injuries, 29.34% of maxillofacial trauma patients those affected with head injury were suffered from cerebral contusion followed by SDH, EDH, SAH, pneumocephalus and diffuse atonal injuries like lesions with 19.16%, 13.77%, 11.38%, 8.38% and 2.40% respectively (Table 4 and Graph 4).

Sex Distribution

	With head injury	Without head injury
Male	76 (64.96%)	41 (35.04%)
Female	16 (32%)	34 (68%)
Total	92 (55.09%)	75 (44.91%)

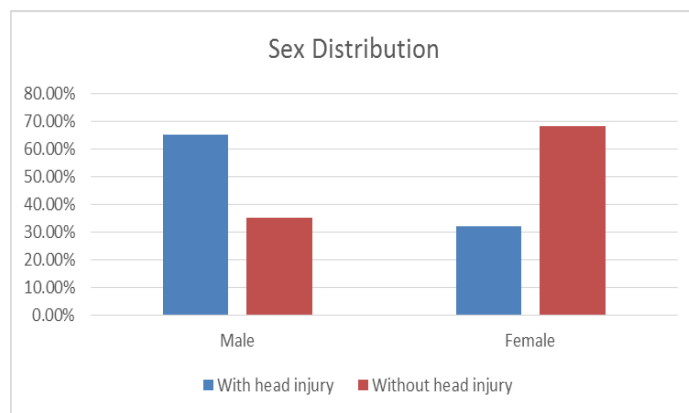


Table 1: shows that males are more commonly affected with maxillofacial trauma, of which 64.96% have head injury.

Etiological Distribution

	With head injury	Without head injury	Total
Rta	77 (61.11%)	49 (38.89%)	126 (75.44%)
Assault	13 (48.15%)	14 (51.85%)	27 (16.67%)
Self fall	1 (12.5%)	7 (87.5%)	8 (4.79%)
Sports	1 (16.67%)	5 (83.33%)	6 (3.59%)
Total	92 (55.09%)	75 (44.91%)	167

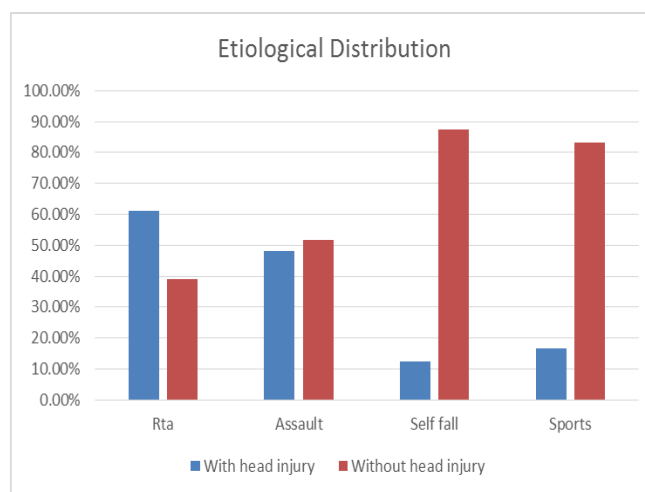


Table 2: shows that the most commonest etiological factor is road traffic accidents with 75.44% of which 61.11%

reported with head injury, followed by assault, self fall and sports injury respectively.

Facial Bone Fractures Distribution

	Frequency	Percent
Isolated Frontal bone #	9	5.39%
NOE #	7	4.19%
Isolated Nasal bone #	11	6.59%
Isolated Orbital bone #	9	5.39%
ZMC	46	27.54%
Isolated Maxillary sinus #	6	3.59%
Isolated Palate #	2	1.20%
Lefort I	7	4.19%
Lefort II	13	7.78%
Lefort III	12	7.19%
Isolated Mandibular condyle #	9	5.39%
Isolated Mandibular angle #	5	2.99%
Isolated Mandibular body #	6	3.59%
Isolated Mandibular parasymphysis #	4	2.40%
Isolated Mandibular symphysis #	2	1.19%
Panfacial #	19	11.38%

Table 3 indicates that zygomaticomaxillary complex fracture have higher prevalence among the facial bone fractures followed by panfacial fractures, Lefort II and Lefort III fractures.

Head Injury Distribution

	Frequency	Percent
Contusions	49	29.34%
Pneumocephalus	14	8.38%
EDH	23	13.77%
SDH	32	19.16%
SAH	19	11.38%
Others(eg.Diffuse axonal injuries)	4	2.40%

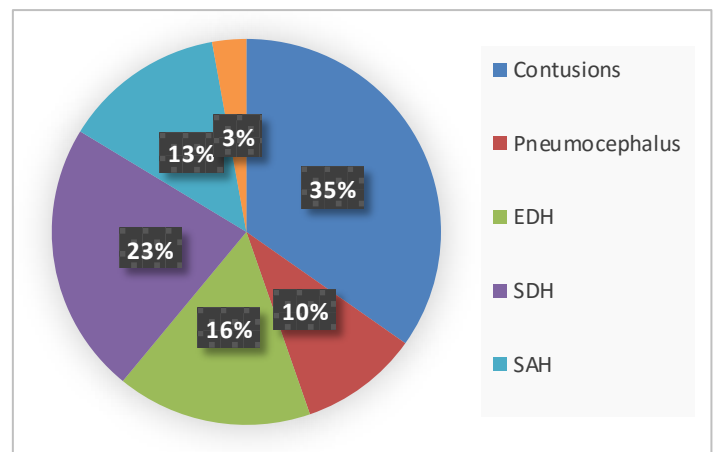


Table 4 indicates that 29.34% of maxillofacial trauma patients those affected with head injury were suffered from cerebral contusion followed by SDH, EDH, SAH, pneumocephalus and diffuse atonal injuries like lesions with 19.16%, 13.77%, 11.38%, 8.38% and 2.40% respectively.

Discussion

The prevalence and occurrence of traumatic head injury associated with maxillofacial trauma varies worldwide due to difference in the demographics and geography of the areas. Of the total 167 patients included in this study, 92 patients have head injury along with maxillofacial trauma

which accounts 55.09%. The above data was found to be more compared to previous studies which may be due to the severity and mode of impact. Among 92 patients, 64.96% male patients and 32% female patients were reported with head injury. The previous literature also reported the male predominance.^{8,9}

Even though the incidence of craniofacial trauma depends on the geographical variation, the road traffic accidents still remains the most commonest etiology of craniofacial injuries. Disobedience of traffic rules, alcohol usage and poorly maintained vehicle conditions supplements the above statement. In our study 75.44% of patients were reported with history of road traffic accidents. Out of 126 patients with road traffic accidents, 61.11% have head injury and 38.89% have maxillofacial injuries without any head injuries.

Assault accounting 16.67% holds the second most common etiological factor of craniofacial trauma. Of the 27 assault cases 48.15% have maxillofacial trauma with head injury and remaining 51.85% were reported with maxillofacial trauma without any head injury. Among the remaining patients, 4.79% and 3.59% have the history of self fall and sports injury respectively.

As per our study zygomaticomaxillary complex fractures showed a higher prevalence of 27.54% among the facial bone fractures followed by panfacial fractures, lefort I and II fractures with 11.38%, 7.78% and 7.19% respectively. Even though literatures reported the higher incidence of zygomaticomaxillary complex fractures, the anatomic position and increased prominence of nasal bone makes the nasal bone more common among the isolated facial bone fracture.^{10,11} In our study also nasal bone remains the more commonest isolated facial bone fracture with 6.59%. As per our study 29.34% patients were reported with cerebral contusions which accounts the commonly occurred intracranial lesion in maxillofacial trauma cases.

Hasnat et al and Gwynn et al reported that cerebral concussions and contusions were frequently seen in maxillofacial trauma cases.^{6,12} Hasnat et al found that 35% cases were reported with cerebral contusions.⁶ Subdural hemorrhage with 19.16% was the second most commonly occurred intracranial lesion in maxillofacial trauma cases. 13.77% have extradural hemorrhage which was followed by subarachnoid hemorrhage and pneumocephalus with 11.38% and 8.38% respectively. Remaining 2.40% cases were reported with diffuse axonal injuries like lesion. In contrast, Ashok et al reported an incidence of 5% subdural haemorrhage, 14% subarachnoid haemorrhage and 13% extradural haemorrhage.¹³

Conclusion

This prospective study showed an updated prevalence of traumatic head injury and facial bone fractures based on its main determinants like sex and etiology. As per our study, RTA and assaults remains the main etiological determinant of traumatic head injury related maxillofacial fractures. Males have higher predominance of traumatic head injury and facial bone fractures which was same as per previous literature reviews. This study necessitates the importance of prevention of road traffic accidents as well as assaults by installing strict traffic rules and regulations like seatbelts, helmets and banning the alcoholic drives and improving the quality of roads.

References

1. Salentijn EG, Peerdeman SM, Boffano P, van den Bergh B, Forouzanfar T. A ten-year analysis of the traumatic maxillofacial and brain injury patient in Amsterdam: Incidence and aetiology. *J Craniomaxillofac Surg* 2014;42:705-10.
2. Rajendra PB, Mathew TP, Agrawal A, Sabharawal G. Characteristics of associated craniofacial trauma in

- patients with head injuries: An experience with 100 cases. *J Emerg Trauma Shock* 2009;2:89-94.
3. Dawodu ST. Traumatic Brain Injury (TBI)-Denition, Epidemiology, Pathophysiology. Medscape Reference: Drugs, Diseases & Procedures; 10 November, 2011. LLC. Available from: <http://www.emedicine.medscape.com/article/326510-overviewshowall>. 2014.
 4. Elbaih AH, et al., Patterns of brain injuries associated with maxillofacial fractures and its fate in emergency Egyptian polytrauma patients, *Chinese Journal of Traumatology* (2018), <https://doi.org/10.1016/j.cjtee.2017.12.005>.
 5. Abosadegh MM, Rahman SA. Epidemiology and incidence of traumatic head injury associated with maxillofacial fractures: A global perspective. *J Int Oral Health* 2018;10:63-70.
 6. Hasnat A, Hoque E, Selim-Ul-Azam³, Kamrujjaman M, Akhtar M. Pattern of Maxillofacial Trauma among Patients with Head Injuries. *Update Dental College Journal* 2017;7(1)
 7. Agbara R, Obiechina A E, Ajike S O, Adeola D S. Pattern of maxillofacial injuries in patients with craniocerebral injuries: A prospective study. *J Oral Med Oral Surg* 2018;24:112-118
 8. Bataineh AB. Etiology and incidence of maxillofacial fractures in the north of Jordan. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1998; 86:31-5.
 9. Hohlrieder M, Hinterhoelzl J, Ulmer H, Lang C, Hackl W, Kampfl A, et al. Traumatic intracranial hemorrhages in facial fracture patients: review of 2,195 patients. *Intensive Care Med.* 2003; 29:1095-100.
 10. Lim LH, Lam LK, Moore MH, Trott JA, David DJ. Associated injuries in facial fractures: review of 839 patients. *Br J Plast Surg.* 1993; 46:635-8.
 11. Sandhya K, Bobby J and Vincia P. Interrelation of maxillofacial fractures and cranial injury – A prospective study. *International Journal of Applied Dental Sciences* 2017; 3(2): 162-164.
 12. Gwynn P, Carraway JH, Horton CE, et al: Facial fractures-associated injuries and complications. *Plast and Reconstr Surg.* 1971; 47: 225-230.
 13. Ashok KG, Ran'ineesh G, Asish C. A retrospective analysis of 189 patients of maxillofacial injuries presenting to a tertiary care hospital in Punjab, India. *J Maxillofac Oral Surg.* 2009; Sep;8(3):241-5.