Original Article

UPDCJ OPEN ACCESS

Pattern and Management of Maxillofacial Injuries in Polytrauma Patients Attending a Tertiary Care Hospital of Bangladesh

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ARTICLE INFO.

Received: 27 November, 2024
Accepted: 10 January, 2025

Volume: Vol-15, Issue-1, April 2025
DOI: https://doi.org/10.3329/updcj.v15i1.77957

Publisher: Update Dental College, Dhaka, Bangladesh
Web: www.updatedentalcollege.edu.bd
E-mail: updcj@hotmail.com

Scan to access article citation and full online link

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ABSTRACT

Introduction: Treating maxillofacial injury, either minor or severe, in polytrauma patients, relies on initial resuscitation of the patient. Managing such cases requires prior knowledge of the pattern and severity of traumas. As there is inadequate baseline data for Bangladeshi population, the present study aimed to analyze the pattern and management of maxillofacial injuries in polytrauma patients attending a tertiary healthcare center in Bangladesh. **Materials and methods**: This was a cross-sectional observational study, conducted for six-month period from May 2021, in Chittagong Medical College Hospital, Chattogram. For this study 102 patients were selected purposively. Data were collected using a structured case record form. **Results**: Participants' ages ranged from 4 to 68 years. Among the patients, 47.06% had concomitant injuries in the upper and lower extremities, followed by 'head and extremity injury' (25.49%). Mandible was the most common site for maxillofacial injuries. Mandibular fractures were the most common type of fractures (84.31% of multiple response cases). Among all facial fractures, single maxillofacial-region-fracture (62.75%) was more common than multiple such fractures (37.25%) in the polytrauma cases. Majority of maxillofacial-region-fractures (66.67%) were treated with closed reduction.
Conclusion: Considering the site and pattern of maxillofacial injuries are needed for effective management to restore function and to minimize complications. For better patient support, emphasize should be given for multidisciplinary approach for development and allocation at tertiary care setting.

KEY WORDS: Maxillofacial Injuries, Polytrauma Patients, Tertiary Care Hospital, Mandibular Fracture Management.

INTRODUCTION

Polytrauma has been defined in several ways. According to some studies, a patient is identified as having polytrauma if at least two anatomical regions are injured simultaneously[1–3], while some others refer it as multiple injuries that affect several systems or organs[4–6]. It is among the leading causes of young adults' mortality and carries noteworthy public health concerns owing accompanying morbidity, disability and socioeconomic burdens[6]. Polytrauma has also been defined as "two or more injuries, one of which may be life threatening, sustained in the same incident that affect multiple body parts or organ systems and result in physical, cognitive, psychological, or psychosocial impairments and functional disability"[7]. It is evident from the definitions that a multidisciplinary approach is required for its effective management to resolve the resulted diverse complications[5,8,9]. Polytrauma can result from road traffic accidents, falls from heights, violent crimes such as firearms and weapons[10,11], occupational hazards, natural disasters and wars[12] etc. These high-energy impacts also contribute for maxillofacial injuries.

Maxillofacial injuries in polytrauma patients frequently include the mandible, zygomatic complex, and nasal bones, with a prevalence of 44.2%, 32.5% and 16.2% respectively[13]. Due to concomitant injuries, management of maxillofacial injuries includes control of airway & bleeding, maintenance of circulation, and complex surgical intervention, all being backed by systemic antibiotic prophylaxis[13–15]. These actions stabilize the patient's overall condition. When the patient's condition allows, to stabilize maxillofacial injuries open reduction and internal fixation (ORIF) or closed reduction is used to restore the function and prevent malocclusion[16,17]. Maxillofacial trauma can initiate substantial functional and aesthetic problems, which in turn result in psychosocial distress. Impairment of imperative functions such as vision, speech, mastication, respiration have profound impact on quality of life[13,18,19].

A review of 52 articles revealed that approximately 7.4 to 8.7% of medical emergencies were oral & maxillofacial trauma with males outnumbering the females by a ratio of 4:1[13]. In Qatar the overall prevalence of maxillofacial injuries was 18.5% of all trauma admissions[20]. This prevalence might increase to 25%[21]. A five-year evaluation from Telangana, India revealed that prevalence of facial fracture was 28% and prevalence of facial injury with concomitant other injuries was 24.20%[22].

The epidemiology of oral and maxillofacial injuries is diverse in relation to geographical area, demographic characteristics, sociocultural and economic factors, individual behavior, psychological status etc[23].

Understanding the epidemiology, major risk factors and patterns of maxillofacial injuries is decisive for developing tailored health services, customizing clinical protocols, and improving outcomes.

Insufficient data are available on the pattern and management of maxillofacial injuries in polytrauma patients in Bangladesh[24]. So, this study was performed to assess the pattern and management of maxillofacial injuries in polytrauma patients attending a tertiary level hospital in Chattogram, Bangladesh.

MATERIALS AND METHODS

This was a cross-sectional observational study was run over a period of six months, from May 2021 to October 2021 at Chittagong Medical College Hospital (CMCH), Chattogram, Bangladesh. The study included patients, attended or were admitted in CMCH, who had multiple traumas along with sustained maxillofacial injuries (during the same event). Patients excluded from the study had maxillofacial injuries only or with other concomitant injuries but during separate events.

Data were collected from purposively selected samples. After admission the patients were stabilized. A pre-tested structured case record form was used to record the following data:

- Demographic information
- Detailed examination (number, type and site of injuries)
- Diagnostic imaging i.e. x-rays and computed tomography (CT) scans of face
- Other investigation (for the management of associated injuries)

Ethical Review Committee of Chittagong Medical College issued ethical clearance for the study, before collecting data from the Departments of Oral & maxillofacial surgery, Orthopedics, Casualty, ENT, and Neurosurgery of Chittagong Medical College Hospital (CMCH), Chattogram. Written informed consent was attained from each participant or his/her legal guardians and full anonymity was maintained.

Descriptive statistical analyses were performed using SPSS (version-23). Categorical variables were presented as frequencies and percentages.

RESULT

Among the 102 participants, 80.4% were male. Age of the participants ranged from 4 to 68 years. More than half of the maxillofacial trauma patients (55.9%) belonged to 10-29 years age group.

Among the patients, 47.06% had concomitant injuries to the upper and lower extremities. 'Head and extremities injury' was also common as associated injury among 25.49% respondents. Regarding site of maxillofacial fractures, it was allowed to select multiple responses. A total of 140 responses were recorded from 102 participants. Mandible was the most common site of maxillofacial injuries and occurred in 84.31% of the cases (Table I).

Table I: Distribution of the respondents according to their site of injury [n=102]

Characteristics	Categories	Number	Percentage
Site of concomitant injury			
	Extremities	48	47.06
	Head and extremities	26	25.49
	Head	16	15.69
	Head and chest	4	3.92
	Chest and extremities	4	3.92
	Chest	2	1.96
	Head and eye	2	1.96
Total		102	100.0
Site of Maxillofacial injuries			
	Mandibular	86	84.31
	Dento-alveolar	18	17.65
	Mid facial	30	29.41
	Panfacial	4	3.92
Total		140*	137.25*

*Multiple response

Regarding types of maxillofacial fractures, it was allowed to select multiple responses. A total of 142 responses were recorded from 102 participants. Mandibular fracture was the most common fracture (84.31%) among the study participants. Other fractures included maxillary fracture (27.45%), dento-alveolar fracture (17.65%), and zygomatic fracture (9.80%). Percentages do not sum to 100% because more than one type of maxillofacial fracture could be selected. Among these fractures, single maxillofacial region fracture was observed in 62.75% of polytrauma cases. Majority of the maxillofacial region fracture (66.67%) were treated with closed reduction (Table II).

Table II: Distribution of the respondents according to their pattern and management of maxillofacial injuries [n=102]

Characteristics	Categories	Number	Percentage
Types of Maxillofacial fractures			
	Mandibular	86	84.31
	Maxillary	28	27.45
	Dento-alveolar	18	17.65
	Zygomatic	10	9.80
Total		142*	139.22*
Number of fractures on maxillofacial region			
	Single	64	62.75
	Multiple	38	37.25
Types of management strategies for maxillofacial trauma			
	Open reduction and internal fixation	34	33.33
	Closed reduction	68	66.67
Total		102	100.0

***Multiple response**

DISCUSSION

This study was carried out to determine the pattern of maxillofacial injuries among polytrauma patients i.e. site and types of maxillofacial

injuries, site and type of associated injuries, and management of maxillofacial injuries in such patients admitted and managed in CMCH. CMCH is the only tertiary care center in the Chattogram division, the southeastern part of Bangladesh, with the Department of Oral & Maxillofacial Surgery. The government allotted 20 beds and local authority organized 10 beds in this department. On average, daily 10-12 patients visit here for management of maxillofacial fracture. Patients with maxillofacial injuries along with polytrauma from this portion of the country are referred to this institute for necessary management. CMCH covers a catchment area of 33444.03 sq km., from the Saint Martin Islands to Cumilla[25]. There are 11 districts in Chattogram division, including urban and non-urban areas, upland or hilly areas and coastal areas. These areas differ in access to healthcare facilities.

Maxillofacial injuries have multifactorial etiology and may befall at any age[26]. Causes are different in different age groups[24]. The most common concomitant injuries in this study were injuries to the upper and lower extremities. This was in line with the findings of Zhou et al. (2015), which showed that the most prevalent injury was injury to the extremities (51.3%), after that skull injury (27.6%)[27]. A study in Nigeria revealed that the upper limbs were the most frequently injured areas, followed by the lower limbs[28]. In another study, most of the victims (37.30%) experienced isolated maxillofacial injury followed by injuries to neurological components, particularly head injury, were the most common accompanying injury followed by orthopedic injuries and ophthalmic injuries[29]. Associated maxillofacial injuries were found in 28.9% of patients including head injury (58%), thoracic injury (24%) along with some abdominal injury, pelvic injury and cervical spine injury[30].

The most common maxillofacial fracture site or type following trauma varies between studies. In the present study, the most commonly involved bone was the (84.31% of multiple response cases). The mandible is more prone to injury than the zygomatic complex because of its motion and lesser bony support compared with the maxilla[31]. Regarding maxillofacial fracture sites, most studies have shown that mandible was most commonly affected[23,32]. Few studies reported the orbital wall was found to be the most common injury site[33,34].

Maxillofacial fractures can be dealt with either closed reduction, or open reduction and internal fixation (ORIF) method, or a combination of approaches. The choice of treatment depends upon several factors such as nature of the injury, the presence of comorbidities and/or associated injuries, availability of facilities, skills of the surgeon, whether favorable or unfavorable, and patient's financial ability[35]. In this study, 66.67% of the patients were managed with closed reduction procedures. The remaining patients underwent open reduction and internal fixation. In contrast, Abhinav et al. (2019) found that open reduction internal fixation was the treatment performed in 89.1% of the patients[36].

This study marks the importance of collaboration and harmonization among multiple disciplines, so that maxillo-facial injuries can be answered promptly, and this might reduce aesthetic and functional morbidities.

With the aim of providing speedy treatment to RTA victims to save lives, across the country a total of 21 trauma centers were constructed under the authorization of the Directorate General of Health Services (DGHS) of Bangladesh. Currently, most of these are nonoperational due to lack of manpower, necessary medical equipment and negligence in proper monitoring. Therefore, the centers could not serve the purposes though financial investment on the facilities was huge. Five trauma centers are situated within Chattogram division: at Lohagara, Hathajari, and Raujan in Chattogram, Daudkandi in Comilla (near Dhaka-Chattogram highway) and Mohipal of Feni[37,38]. But it is an issue of surprise that there is no post for any oral and maxxilofacial surgeon[39]. To ensure trauma patients' arrival within 'golden hour', the first 60 minutes following a traumatic injury, the trauma centers can be made completely functional[40].

LIMITATIONS

Mono center study, moderately small sample size as well as purposive sampling technique might question the generalizability of the results. As it was carried out at tertiary level referral hospital, referral bias might be introduced which could influence the prevalence of types of injury observed.

CONCLUSION

Mandibular fractures were the most prevalent type of fractures. Mandible was the most common site of maxillofacial injuries. This study shows an alarming rate of concomitant injuries in extremities with maxillofacial injury. Head injury was also present in one-third patients. Hence, it is recommended to perform a head along with whole-body CT scan for each grievously injured patients routinely so that no concomitant injury remains unnoticed. Among all facial fractures, single maxillofacial-region-fracture was more common than multiple fractures. Two-third of the maxillofacial-region-fractures were preferred to be treated with closed reduction. These findings highlight the crucial duty of maxillofacial surgeons in management of polytrauma. To avert facial deformities and accompanying functional problems a collaborative tactic is emphasized in trauma care groups. To implement targeted preventive policies focused should be put on the causal factors. In-depth knowledge of injury pattern helps clinicians in timely delivery of appropriate care, thereby reduce morbidity and mortality.

RECOMMENDATIONS

Prospective follow up study could evaluate the long-term outcomes, efficacy of specific treatment measures and potential complications of treatment provided. Multicenter study with consecutive sampling could offer complete picture and limit probable biases.

ACKNOWLEDGEMENT

My heartfelt gratitude to all doctors and other staff of the Departments of Oral & Maxillofacial Surgery, ENT, Casualty, Neurosurgery, and Orthopedics of Chittagong Medical College Hospital (CMCH), Chattogram for the help and co-operation they showed to me.

CONFLICT OF INTEREST: The authors declare no conflict of interest.

FUNDING: This research received no external funding.

DATA AVAILABILITY STATEMENT: The data presented in this study are available on reasonable request from the corresponding author

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How to Cite

Dey A, Chowdhury AP, Zahur T, Mahmud ME, Alam MM. Pattern and Management of Maxillofacial Injuries in Polytrauma Patients attending a Tertiary Care Hospital of Bangladesh. Update Dent. Coll. j [Internet]. [cited 2025 Apr. 27];15(1):15-9. Available from: https://www.banglajol.info/index.php/UpDCJ/article/view/77957