A retrospective analysis of 189 patients of maxillofacial injuries presenting to a tertiary care hospital in Punjab, India

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Abstract

Introduction Maxillofacial injuries form a major aspect of trauma management in trauma centers. Prompt diagnosis and management is needed to provide better quality of life and cosmetic results as compared to delayed interventions.

Material and methods We present a retrospective study of 189 patients of complex, operable maxillofacial injury with an analysis of patients' age and gender, mode of injury, vehicle details and associated injuries along with the maxillofacial injuries admitted in a tertiary care hospital in Northern India over one year.

Results Maximum patients were in the age group of 21–30, a decade early as compared to other figures, with fractures of zygoma being predominant associated with head injury as the commonest comorbid condition. Motorized two wheelers were the leading cause with more than 75% patients driving at the time of injury. Majority of the injuries were not singular and in concordance with the literature men were the most affected.

Discussion Motor vehicle accident is the most common cause for maxillofacial injury worldwide. Being a referral hospital the number of patients were low but the complexity was high with a reverse trend towards the type of injuries seen and the ones found in community hospitals. The stand alone factor of this study with respect to the other publications is the presentation of the associated symptom complex with the specified fracture and the type, number and rotation of fracture segments with each facial bone fracture; the location of the patient at the time of impact in the vehicle, type of vehicle and the associated injuries.

Keywords Maxillofacial injury · Trauma · Fractures

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Introduction

The state of Punjab is considered the Grain House of India with the majority of population employed in the Agricultural sector and ambulant on two wheelers. Non enforcement of traffic rules, ignorance on the part of the drivers and non asphalt roads result in more accidents, which form a major chunk of the maxillofacial injuries presenting to the health care personnel. The injuries sustained are composed of a vast

spectrum of soft tissue injuries with concomitant complex pan facial fractures.

The availability of conclusive data in the over burdened health care system is difficult to procure. It was our endeavor to present the trauma profile with the type and extent of faciomaxillary injury along with the accident site analysis, of the patients presenting to our Institute which is a tertiary care hospital catering to an average population of 2.5 crore. This is a retrospective study of 189 patients of

operable maxillofacial injury with an in-depth analysis of patients' age and gender, mode of injury, vehicle details and associated injuries along with the maxillofacial injuries.

Material and methods

We present a descriptive analysis of 189 patients who presented with maxillofacial trauma over a period of one year from

February 2007 to January 2008 to a tertiary care hospital in Ludhiana, Punjab. The variables noted were: age of the patient; gender; mode of injury; vehicle details in which the patient was travelling including the location of the patient within the vehicle before the impact; type of associated head injury, chest and/or abdominal trauma or any associated orthopedic injury; categorization of type of maxillofacial injuries sustained; nature of fracture segments, displaced or un-displaced; and any specific symptoms and or symptom complex with which the patient presented to the trauma centre.

The aim of the study was to highlight the at risk population, the high risk behavior of the trauma victim depicted by not wearing safety helmets, seat belt; alertness as compared to the driver or front passenger than the one's sitting behind.

Results

The study brought forth many startling facts that were not in concordance with that of the standard teachings in facial trauma, as being a tertiary care center the triage receives specific filtered cases; the incidence does not truly represent the numbers in the community.

Maximum incidence of maxillofacial trauma occurred in age group, 21–30 years, which had 66(34.9%) patients followed by 45(23.8%) patients in 31–40 years age group, least incidence was in patients who were less than 10 years, which had 3(1.6%) patients. There were 38(20.1%) patients in 11–20 year age group, 16(8.5%) patients in 41–50 years age group and 21(11.1%) patients in > 51 year age group. The least incidence was found in the extremes of age groups (Fig. 1).

It was seen that the majority of the patients of the 189 patients studied, 137(72.5%) were males and 52(27.5%) were females. The male to female ratio was 2.64:1. The current trend worldwide of majority of maxillofacial injuries attributed to road traffic accidents was seen in our study with 151(79.9%) patients sustaining maxillofacial injury (Table 1). Out of 151 patients 47(31.1%) patients had accident in car. Of these 24 were driving car of the remaining 23, 21 patients were sitting on front seat while 2 were sitting back seat. The detailed breakup of the accident group is as follows:

a) 63(41.7%) patients were on a motor cycle when they met with an accident. Of these 63, 59 were driving while 4 were pillion riders.

Fig. 1 Number of patients presenting with faciomaxillary trauma

Fig. 2 Bar diagram showing the number of patients according to the mode of injury

Fig. 3 The type of head injury associated with the faciomaxillary patients with their incidence

b) 42(27.8%) patients were on a scooter when they met with accident. Of these 42, 26 were driving while 16 were pillion riders.

c) 4(2.1%) patients were traveling on cycle who met with an accident. 7(4.6%) patients were going by the side of road when they were hit by some vehicle resulting in maxillofacial injuries.

d) 3(2%) patients were driving tractor when they met with an accident. 18(9.5%) patients sustained injuries following altercation and 9(4.8%) patients, following accidental fall from height. Indoor accidents claimed 7(3.7%) patients, while 2(1.1%) patients sustained injury while playing. Only in 2(1.1%) patients the exact cause of injury could not be attained (Fig. 2). It was also evident that these patients had concomitant injuries with head injuries forming the major share followed by orthopedic injury [44(23.2%) patients] and chest and abdominal trauma [3(1.6%) patients]. The details of the associated head injury are given in Fig. 3 (Pie Diagram). The incidence of various maxillofacial fractures seen in the study group are depicted in the Table 2, with zygoma fractures taking the precedence as opposed to fracture mandible, fracture maxilla and fracture nasal bone.

Discussion

The etiology of maxillofacial injuries varies from one country to another and even within the same country depending on the prevailing socioeconomic, cultural and environmental factors. Skeletal and soft tissue injuries of face constitute a significant portion of the workload of the plastic surgeons in our institute. Only a few injuries are as challenging as those of the face. Surgeons who undertake treatment of facial injuries have a dual responsibility: repair of the aesthetic defect (restoration of the pre-injury appearance) and restoration of function. A third goal is to minimize the period of disability. Thereby, making the complete assessment and diagnosis, during the primary survey, of these injuries mandatory.

Earlier studies from Europe and America revealed that Road Traffic Crashes (RTC) were the most frequent cause of facial injuries [1,2]. However, more recent studies have shown that assault is now the most common cause of maxillofacial injuries in developed countries [3,4,5], whereas traffic accidents remain the most frequent cause in many developing countries [6–13].

While RTC have been steadily falling in the developed countries, they continue

to rise with horrifying speed in the low and middle-income countries of Africa and Asia [14]. The World Health Organisation has estimated that nearly 25% of all injury fatalities worldwide are a result of road traffic crashes, with 90% of the fatalities occurring in the developing world.

The reductions in RTC in developed countries are largely attributed to a wide range of road safety measures such as seat belt use, traffic calming measures and traffic law enforcement.

The roads are badly maintained, and there is general lack of enforcement of traffic rules and regulations, especially the use of seat belts and helmets. Non-usage of protective elements was also thought to be responsible for extensive soft tissue injuries seen in maxillofacial injured patients [15–17].

Motorcycles have become a prominent mode of transportation in both urban and suburban cities in Punjab. Frequent traffic jams as a result of mixed traffic and population explosion have made motorcycles attractive to commuters because motorcycles can pass through narrow ways [12]. However, most of the motorcyclists are unlicensed and often do not follow traffic rules and regulation.

The causes of facial injuries in the United States included motor vehicle accidents, assaults, altercations, bicycle and motorcycle accidents, home and industrial accidents, and athletic injuries, in descending order of frequency. A discordant finding was evident with motorized two wheeler accidents taking precedence with 105 patients, followed by car accidents a distant second (50 patients) and altercations, home and industrial accidents forming the minority group.

The peak age of incidence of maxillofacial injuries of 21–30 years among Punjabis is not different from reports from other parts of the world [1–4,18]. The possible explanation for this is that people in this age group take part in dangerous exercises and sports, drive motor vehicles carelessly, and are most likely to be involved in violence.

More males (72.5%) were involved in maxillofacial injuries than females in agreement with previous reports [7,8].

Lim et al, in 1993, studied the incidence of concomitant injuries in a population of 839 facial trauma patients. Approximately 11% sustained injuries outside the facial skeleton, 8% had injuries of the extremities, 5% had associated neurosurgical injuries, 4% had ocular injuries, and 1% had a spinal injury [19]. The east west divide clearly

Table 1 Mode of injury along with activity of the patient and location within the vehicle at the time of impact and the other causes of faciomaxillary injury

Road traffic accident 151(79.9%)	Car 47(31.1%)	Driving (24)	
		Passenger (23)	Front seat (21) Rear seat (2)
	Motor cycle 63(41.7%)	Driving (59)	
		Pillion rider (4)	
	Scooter 42(27.8%)	Driving (26)	
		Pillion rider (16)	
	Tractor 3(2%)		
	Bicycle 4(2.1%)		
	Walking 7(4.6%)		
Altercation	18(9.5%)		
Fall from height	9(4.8%)		
Indoor activity	7(3.7%)		
Sport injury	2(1.1%)		
Unknown	2(1.1%)		

evident in the study depicting 46% association with head injury, 23% with orthopedic trauma and 1.3% of chest wall and abdominal trauma.

The causal relationship for these finding lies in the fact that more than 80% of the mechanically ambulant population of India relies on two wheelers as the favored mode of transportation as opposed to four wheelers in the Western countries and the refusal to follow traffic laws; wearing helmets, driving within speed limit. Alcohol, drug abuse, and emotional problems are common contributing factors, though they were not studied as separate variables.

As opposed to the common concept of fracture nasal bone being the most common facial bone to be fractured, we found fracture zygoma to be the commonest, closely followed with fracture mandible and fracture maxilla and nasal bone a distant third and fourth respectively. It was also evident that the facial bone fractures were uncommonly singular with compound and comminuted nature adding on to the complexity of facial fractures.

Severe blows, such as from a fall or a fist, may cause separation of the zygoma at its articulating surfaces, and high-energy injuries may cause shattering of the body of the zygoma, often through weak areas such as the zygomaticofacial foramen [20]. As the zygoma is disrupted, it is usually displaced in a downward, medial, and posterior direction [21,22].

Fractures of the mandible were most complex with the bone fractured at more than one place. More mandibular fractures are bilateral than unilateral, especially after the forces experienced in automobile accidents. There is a saying that ‘like a Life Saver,’ the mandible cannot be broken in only one spot [23].

The prominence, position, and anatomic configuration of the mandible are such that it is one of the most frequently injured facial bones [10]. After automobile accidents, the mandible is the most commonly encountered fracture at many major trauma centers. The mandible is a strong bone but has several areas of weakness that are prone to fracture [24,25]. Fracture of the body and parasymphiseal were the two most common sites of fractures encountered in our study.

Clinical examination is the cornerstone in the diagnosis of fractures of the mandible [26,27]. Fischer et al. [28] looked at mandible fractures that were caused by motor vehicle collisions and found associated injuries in 99%. Facial and head lacerations and facial fractures were the leading associated injuries, occurring in more than half of the patients who had a mandible fracture. Closed head injury is the major life-threatening associated injury and cause of mortality [29,30].

The ratio of mandible fractures to maxillary fractures is 4:1 [31]. In centralized trauma units, there is a higher incidence of maxillary fractures in relation

to mandibular fractures [32]. Kazanjian and Converse [33] and Murray et al. [34] confirmed that most nasal fractures occur in thin portions of the nasal bone. In the Kazanjian and Converse series, 80% of a series of 190 nasal fractures occurred at the junction of the thick and thin portions of the nasal bones.

The stand alone factor of this study with respect to the other publications is the presentation of the associated symptom complex with the specified fracture and the type, number and rotation of fracture segments with each facial bone fracture. Open reduction and internal fixation remained the Gold Standard for the treatment of majority of the complex injuries, but it increased the cost of treatment exponentially.

The limitation of the study lies in the small cohort, but it overcomes the hurdle as the institute serves as a referral centre to almost the entire plains of Punjab and adjoining

Haryana and the Hilly terrain of Himachal Pradesh; serving a population of 2.5 crore. We do not consider this an epidemiological study for the same reasons and the fact that being a tertiary care center the complex trauma only are referred. Being a retrospective study details of the other substantial variables like influence of alcohol, fatigue on the part of the driver could not be elicited. Even with these limitations, the study is representative of the extent and grim scenario of faciomaxillary trauma in Northern India.

Table 2 The detailed assessment of various maxillofacial fractures is depicted

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