



Epidemiological analysis of maxillofacial fractures treated at a university hospital, Xinjiang, China: A 5-year retrospective study



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ABSTRACT

Purpose: To investigate the epidemiological characteristics of maxillofacial fractures treated at a university hospital, Xinjiang, China over a 5-year period.

Patients and methods: Between 2006 and 2010, a total of 1350 patients with maxillofacial fractures were reviewed retrospectively. The data collected included demographics, aetiology, site of fracture, time regarding injuries, presence of associated injuries, treatment modalities, and complications.

Results: A total of 1860 maxillofacial fractures were seen in 1350 patients with a male to female ratio of 4.9:1. The most common aetiology of the fractures was motor vehicle accident, followed by interpersonal violence. The age group 21–30 years accounted for the largest subgroup in both sexes. The mandible was the most common site of fracture followed by the zygoma. Associated injuries were found in 48.3% of patients, with a prevalence of intracranial injuries (37.0%). Majority of fractures were treated with open reduction (62.4%), and 7.2% of patients presented post-operative complications.

Conclusion: Road traffic accident is the most common cause of maxillofacial fractures in China, which is characterized by an increasing prevalence and resulting in more associated injuries. Thus, more attention should be paid on the prevention and treatment of these injuries caused by road traffic accidents in our country.

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1. Introduction

Maxillofacial fractures are a large public health problem with significant negative impact on an individual's overall health and even survival. These fractures are relatively common in automobile collisions, with prevalence of 20–60% of all patients involved in road traffic accidents (Ugboko et al., 1998). Despite the legislative changes and preventative measures involving seatbelt and airbag use, as well as the reduction of drinking and driving, road traffic accidents are still the major cause of facial fractures in many developing countries.

A great number of authors in various regions have reported the aetiology, fracture characteristics, and treatment pattern of maxillofacial injuries of their patients. Most of the authors described traffic accidents as the primary cause of facial fractures (Li et al., 2006; Al-Khateeb and Abdullah, 2007; Chrcanovic et al., 2012; Naveen Shankar et al., 2012), while some reported violence as the primary cause (Bakardjiev and Pechalova, 2007; Lee et al., 2010).

The presentation, severity, and pattern of the maxillofacial fracture will depend on the aetiology, magnitude of the causative force, impact duration, the acceleration imparted by it to the part of the body struck, and the rate of acceleration change (Naveen Shankar et al., 2012).

The management of complicated facial fractures is challenging even to the most experienced maxillofacial surgeons, while the presence of coexistent injuries and the complexity of these injuries make it more difficult to consolidate experience and develop realistic treatment protocols. Furthermore, the lack of sufficient specialist facial trauma units results in unacceptable delays from referral to operation, complicating the management and compromising the outcome.

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In China, the world's most populous country, more than 100,000 people die and millions are injured in road traffic accidents or other traumatic mishaps each year, and trauma has become the key aetiological factor of traumatic injuries and deaths in individuals under 35 years old (Song et al., 2006).

Xinjiang, the largest autonomous region in China, located in the northwest of the country spans over 1.6 million km², with a population of 21,813,334 (according to the 2010 year census). It borders with Russia, Mongolia, Kazakhstan, Kyrgyzstan, Tajikistan, Afghanistan, Pakistan, and India. The road, a major means of transportation in Xinjiang, is a key factor in Xinjiang's economic development. It connects this region with China's east coast, central and western Asia, plus some parts of Europe.

A clearer understanding of the demographic patterns of maxillofacial injuries will assist health care providers as they plan and manage the treatment of traumatic maxillofacial injuries (Al Ahmed et al., 2004). Such epidemiological information can also be used to guide the future funding of public health programs geared towards prevention. To this end, numerous studies have been carried out to explore the epidemiological features of maxillofacial fractures in different population groups. However, to our knowledge there is a lack of reports detailing the causes, incidence, and treatment pattern of maxillofacial injuries in China, and no study has been published about maxillofacial fracture analysis for this region. The main purpose of this study was to investigate the epidemiological characteristics of prevalence, aetiology, sex and age distributions, fracture site, treatment pattern, associated injuries, and complications of maxillofacial fractures treated at the Department of Oral and Maxillofacial Surgery, the First Affiliated Hospital of Xinjiang Medical University, Xinjiang, China, over a 5-year period from January 2006 to December 2010.

2. Material and methods

The medical records of 1350 patients who had sustained maxillofacial fractures and admitted to our hospital from January 2006 to December 2010 were retrospectively reviewed and analyzed. Standardized data was gathered from patients' medical records included demographics (e.g. age, sex), aetiology of injury, anatomic site of fracture, time of hospital admission and operation, presence and location of associated injuries, treatment pattern, length of in-hospital stay, and complications. Patients with isolated skull fractures were excluded from our study. We also excluded patients who had only minor superficial soft tissue injuries. The patients' age ranged from 0 to 91 years old, and was divided into 8 age groups: 0–10, 11–20, 21–30, 31–40, 41–50, 51–60, 61–70, and over 70 years old. Cause of injury was divided into following ten categories: (1) motor vehicle accident (MVA); (2) interpersonal violence (IPV); (3) fall on the ground; (4) fall from height; (5) motorcycle accident; (6) hit by object; (7) sports accident; (8) bicycle accident; (9) work-related accident; and (10) miscellaneous, which included pathological fractures, coal mine blast injuries, animal attack accident, tooth extraction, and unknown aetiology.

Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 19 (IBM, Chicago, IL). The statistical analysis mainly involved descriptive statistics and the Pearson's Chi-square, a *P* value less than 0.05 was considered statistically significant. The study was approved by the institutional review board of the Division of Medical Ethics, the First Affiliated Hospital of Xinjiang Medical University.

3. Results

3.1. Age and sex distribution

During the study period 1350 patients presented maxillofacial fractures. The age of patients at the time of injury ranged from 0 to

91 years old, with a mean age of 31.90 (SD ± 13.96). No statistically significant difference was observed between male and female mean ages (male 32.05 years; female 31.13 years; *P* > 0.05). Most of the fractures occurred under 40 years of age, and which accounted for 76.4% of the entire samples. After the third decade of life, the age-specific distribution in patients shows a decreasing incidence with each new decade: 82 injuries (6.1%) occurred in the first decade, 165 (12.2%) in the second, 441 (32.7%) in the third, 344 (25.5%) in the fourth, 191 (14.1%) in the fifth, 89 (6.6%) in the sixth, 29 (2.1%) in the seventh, 9 (0.7%) in the eighth and ninth. The significant majority of (*n* = 1122, 83.1%) patients are males, and females accounted for 16.9% (*n* = 228) (M:F = 4.9:1 *P* < 0.001). The male to female ratio showed significantly higher differences in sports accident and interpersonal violence groups, reaching 12.4:1 for motorcycle accidents.

3.2. Yearly and monthly distribution

The yearly distribution of the maxillofacial fractures showed that the incidence tended to be increasing year by year with the highest number of 405 (30.0%) cases in 2010, followed by 2009 with 335 (24.8%) cases; 2008, with 270 (20.0%) cases; 2007, with 211 (15.6%) cases; and 2006, with 129 (9.6%) cases. The monthly distribution showed summer and autumn were the seasons with greatest percentage of maxillofacial fractures with its peak in October. In 2010, most of the 297 (73.3%) fractures occurred during these two seasons, while it was spring and winter for 2009 with 236 (70.4%) cases (Fig. 1).

3.3. Aetiology of maxillofacial fractures

The major aetiology of maxillofacial fractures in this study was MVA, which consisting of 42.2% of the total. The second leading cause was IPV with 237 (17.6%) cases, followed by falls on the ground (*n* = 203, 15.0%). Fig. 2 shows the remaining causes of injury in detail. Both in males and female patients, MVAs were the predominant cause of injury while IPV was mainly for male cases. When the cause of "falls" is considered, the proportion of females who had fracture from falls (31.6%, 72/228) was higher than the proportion of male (19.8%, 222/1122). Pearson Chi-square demonstrated significant statistical association (*P* < 0.05) between male and female in IV, sports and falls.

Regarding the age and aetiology, MVA was the main aetiological factor for all age groups. Aside from MVA, falls were the most

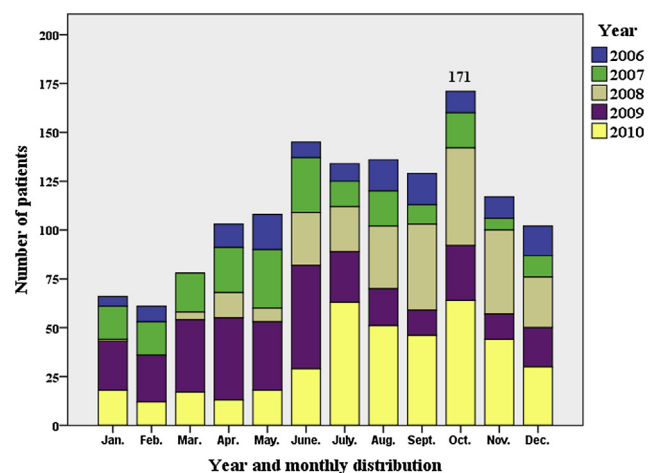


Fig. 1. Year and monthly distribution of maxillofacial fractures.

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