ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 5, Issue – 4, August - 2022, Page No. : 01 - 08

Assessment of prevalence, pattern, etiology and management of maxillofacial trauma in Sivagangai – A five years retrospective study

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Citation of this Article: Dr Ajit Kumar Pillai.S, Dr T. Maria Singam, Dr Saravana Priya. M, Dr R. Rameswari, "Assessment of prevalence, pattern, etiology and management of maxillofacial trauma in Sivagangai – A five years retrospective study", IJDSIR- August - 2022, Vol. – 5, Issue - 4, P. No. 01 – 08.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Maxillofacial injury is the most commonly affected component following trauma. They can affect both skeletal and soft tissue of the facial region, which negatively influences on both psychosocial and functional activities of the patients. In developing countries with lesser than ideal, doctor patient ratio, it is essential to categorize and disseminate the data regarding the prevalence and patterns of these injuries to better organize and manage the available man power

Aim: To assess the prevalence, etiology, pattern and types in management of maxillofacial trauma treated in government Sivagangai medical college and hospital, Tamil nadu.

Materials and Methods: This retrospective study included case records of patients admitted in Sivagangai medical college and hospital for trauma management during the period July 2017 to June 2020 (5 years) . Data regarding patient's age, gender, etiology of trauma, anatomical area of injury, pattern of fracture and treatment provided were recorded. The etiology of trauma were categorized into Road traffic accidents(RTA), accidental fall, assault, industrial injury, bull gore injury and others.

Results: Among the total 780 trauma patients 334 had maxillofacial injuries suggesting a prevalence of 45% with the mean age 24 years. The most common etiology for maxillofacial injury was RTA, accounting for 73.5% of injuries (244/334), followed by assault 12.7% (42/334), Accidental fall 11.1%, 1.8% of bull gore injuries, 2 industrial injury (0.6 %) and 1 case of sports injury. The most affected part of the maxillofacial region were mandibular bone 47.3% and Malar and maxillary fractures constituted 38.8%. Open reduction with internal fixation (60.5%) under general anesthesia is the commonly used treatment modality.

Conclusion Young male population are at high risk of RTA, resulting in maxillofacial injuries. The maxillofacial bones are almost similar in their vulnerability to trauma sustaining severe fractures that necessitates major surgical procedures.

Keywords: Maxillofacial, Trauma, RTA Open reduction of mandible.

Introduction

Trauma is the major cause of mortality and morbidity in this era of globalization where rapid transportation becomes unavoidable. Road traffic accidents forms the major cause for these trauma, in which, maxillofacial trauma constitutes significant portion[1]. In developing countries with lesser than ideal, doctor patient ratio, it is essential to categorize and disseminate the data regarding the prevalence and patterns of these injuries to better organize and manage the available man power.[2,3] Our institution is a government tertiary care centre receiving referrals from several primary and secondary care centres in our district, and we dental and maxillofacial surgeons treat the maxillofacial trauma patients. The present study was conducted aiming to assess the prevalence, etiology, pattern and types in management of maxillofacial trauma treated in government Sivagangai medical college and hospital, Tamil nadu.

Materials and Methods

The case records of patients admitted in Sivagangai medical college and hospital for trauma management during the period July 2017 to June 2020 (5 years) were retrieved. Patients whose complete case records containing clinical notes, surgical notes and CT facial bone report were included in the study. Patients with incomplete records, head injury patients referred for neurosugical managements were excluded. Among the total records of 1142 trauma patients, 780 were selected for the study, among them 334 had maxillofacial injuries.

Data regarding patient's age, gender, etiology of trauma, anatomical area of injury, pattern of fracture and treatment provided were recorded. The etiology of trauma were categorized into Road traffic accidents(RTA), accidental fall, assault, industrial injury, bull gore injury and others. Fractures were classified according to International Classification of Diseases (ICD)-10[3]: S02.2- Fracture of nasal bones, S02.3- Fracture of orbital floor, S02.4- Fracture of malar, maxillary and zygoma bones, S02.5- Fracture of tooth (traumatic), S02.6- Fracture of mandible, S02.8- Fractures of other specified skull and facial bones. The management were broadly divided into Open reduction with internal fixation requiring general anesthesia (ORIF), Closed reduction with arch bar and inter-maxillary fixation (IMF), conservative management and wound debridement for soft tissue injuries. Data were collected tabulated and subjected to statistical analysis using SPSS software (SPSS for Windows, ver. 24.0; SPSS Science, Chicago, IL, USA).

Results

Prevalence: Among the total 780 trauma patients 334 had maxillofacial injuries suggesting a prevalence of 45%. The mean age and standard deviation of the patients was 24 years, with a minimum age of 7 years and a maximum age of 80 years (Fig 1). Young adults in their twenties(35.4%) were highest affected followed by thirties age group(22.6%). Gender distribution shows that 90.5% (302/334) of subjects were male and 9.5% (32/334) were female (Fig. 2), the prevalence of trauma was significantly higher (P<0.001) higher among males than females. 98% of the RTA patients were not wearing helmet at the time of the accident.

Etiology

The most common etiology for maxillofacial injury was RTA, accounting for 73.5% of injuries (244/334), followed by assault 12.7% (42/334), Accidental fall 11.1%, 1.8% of bull gore injuries, 2 industrial injury (0.6 %) and 1 case of sports injury. (Fig. 3) Statistical analysis revealed RTA as the Statistically significant (P<0.001) cause for trauma.

Pattern of fracture

Considering zygomatico maxillary complex as a single unit, 43 patients had fracture in more than one facial bone. The most affected part of the maxillofacial region was mandibular bone 47.3% (182/377) whereas Malar and maxillary fractures constituted 38.8% (149/377). 6.5% (25/377) had orbital fractures, 2.6% had isolated dentoalveolar fractures, and 2.8% had nasal bone fractures. 17 cases had only soft tissue injuries. (Fig. 4) Within the mandibular injuries, the split-up was condyle 33%, body 26.1%, parasymphysis 23.4% , angle 8.3%, Symphysis 5% coronoid 4.1%. (Fig. 5).

Data analysis also showed that 42.3% injuries involved left side, 32.1% on right side and 25.6% had both sides injured. (Fig. 6)

Management

Overall 60.5% of patients were treated by open reduction and internal fixation. 12.9% by closed reduction with archbar and IMF, 21.6% by conservative method and all isolated soft injuries were treated with wound debridement. (Fig. 7) However, as Nasal bone fractures were handled by ENT surgeons, its management data is not included in the present study.

Discussion

Maxillofacial trauma can be a major health care problem as it can be life threatening in the immediate period due to its proximity to vital structures like airway, major vessels and brain. During hospitalization it requires multi speciality management involving major surgeries under general anaesthesia and post surgical care[3]. During rehabilitation, changes in occlusion and/or parasthesia due to nerve injury can affect speech, esthetics and mastication affecting overall nutrition and lifestyle[4,5]. Thus, proper understandings of these injuries are essential in healthcare administration of any country, especially in developing country like India.

Maxillofacial injuries constitute 45% of all injuries reported. This can be attributed to the fact that almost 98% of the patients did not wear helmet at the time of accident, which would have otherwise protected their face and head. This further consolidates the need to educate and enforce helmet wearing, especially in highways, semi urban and rural areas[6].

Males are the most affected gender and RTA is the most common cause of trauma, this is one of the constant finding in all the studies concerning trauma thus far. The same scenario is reflected throughout the world regardless the country's socioeconomic or lifestyle status[1,5,8]

In the present study, RTA constituted three fourth of the trauma cases, it increases to almost 80% (205/268) when

we consider the working age group of 20-60 years(Table 2). These findings are of great importance from administration and personal point of view, as trauma can lead to long period of absence, medical expenses and even after recovery temporary or permanent loss of work efficiency is expected[4,5,14]. These data can be used in counselling and other social activities to create awareness and attitude change towards the road safety in the high risk young male population[6,14].

Assault or interpersonal violence is second most common reason for maxillofacial injury. Most of these assault cases involved usage of hard objects like wood, bottles. The law enforcement personnel should educate the persons involved, that maxillofacial bone fracture are grievous in nature and carry punishment of upto 7 years imprisonment and fines[15]. Accidental fall caused trauma in 7 out of 18 elderly patients, it was also one of the major etiology in the children below 15 years of age. 6 cases of bull gore injury had reported during this five year period. Bull-related injuries are relatively common in rural Tamil Nadu[16], as bulls are used in daily agricultural activities also in sporting events like Jallikattu, where bull-tamers play in close proximity to bulls, they try taming, in controlled events.

Mandibular fracture was the highest occurring fractures in this study accounting for 47% of the total fractures. This is in agreement with other reports from across india[7-11], but some studies also suggest zygomatico maxillary complex fracture as the most involved.[12,13]. In this study also Malar, zygomatico maxillary bones were involved in 38.8%, difference with mandible of less than 10 %. 43 patients had pan-facial injury involving both these bones, suggesting that the entire maxillofacial skeleton is very vulnerable in trauma especially RTA. In Mandible, condyle, body and parasymphysis constitutes more than 80% of all fractures which is in line with the findings of other studies.[7-10]

Open reduction with internal fixation under general anesthesia is the commonly used treatment modality in this study, which suggest the severity of the trauma and damage the bones sustained during the trauma. As the maxillofacial bone performs variety of functions from breathing, mastication to speech and esthetics, it is of paramount importance to establish anatomical continuity and rigid fixation which is possible only with open reduction with internal fixation[17]. Archbar and intermaxillary fixation is used mostly in cases of condylar or coronoid fracture especially in children to avoid complications of surgical procedures during growth. Archbars are also used in dentoalveolar fracture cases. Conservative line of management is used in cases of undisplaced fractures where esthetics and function are not affected.

Scope of future study

Further analysis into the various aspects of reasons for RTA such as drunken driving, over speeding, types of vehicle and safety measures used is required to better understand the incidence and distribution of maxillofacial trauma.

Conclusion

Young male population are at high risk of RTA, resulting in maxillofacial injuries. The maxillofacial bones are almost similar in their vulnerability to trauma sustaining severe fractures that necessitates major surgical procedures. Tertiary care centres has to be adequately equipped and managed to provide better trauma care. Proper awareness and social activities focusing on target groups and cost effective preventive measures should be implemented.

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Legend Figures and Tables

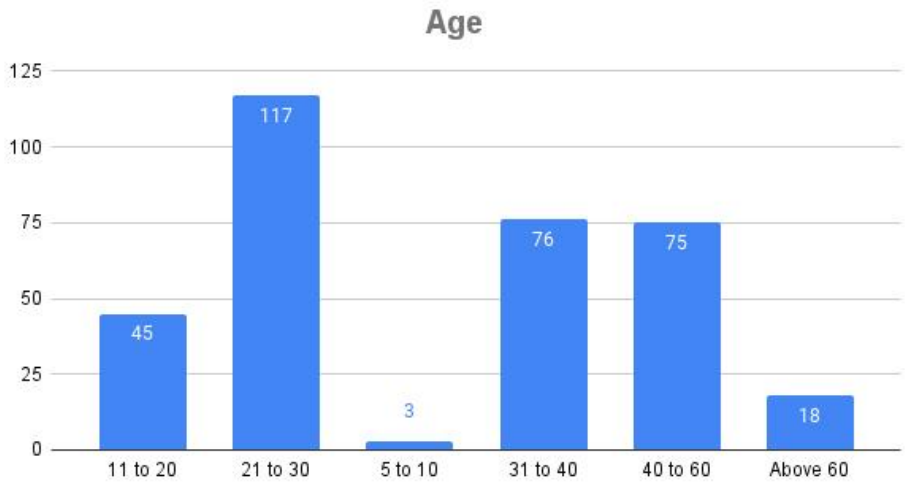
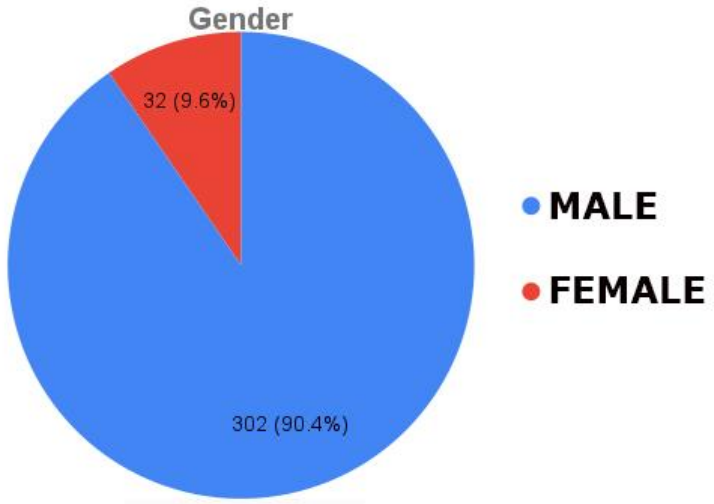


Fig .1



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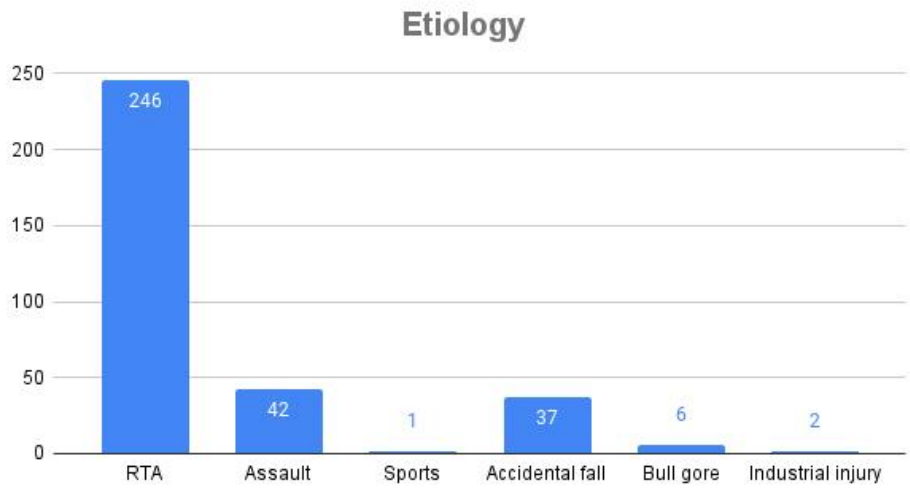

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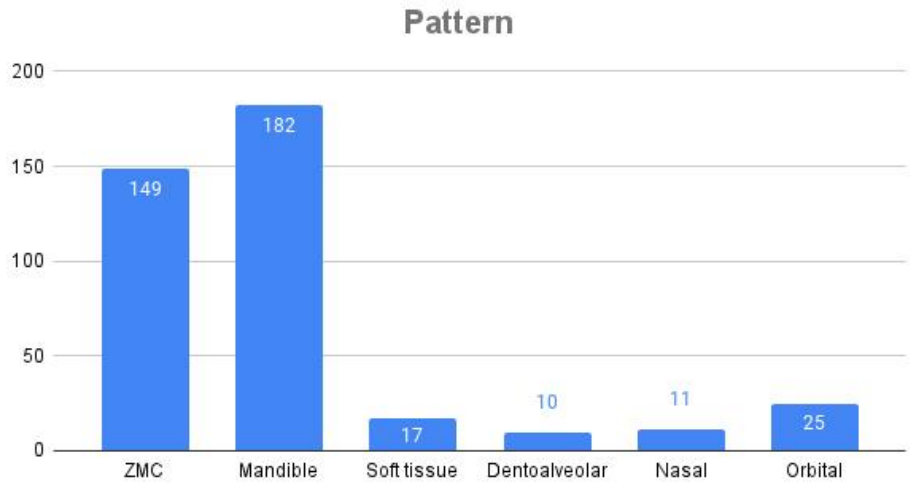

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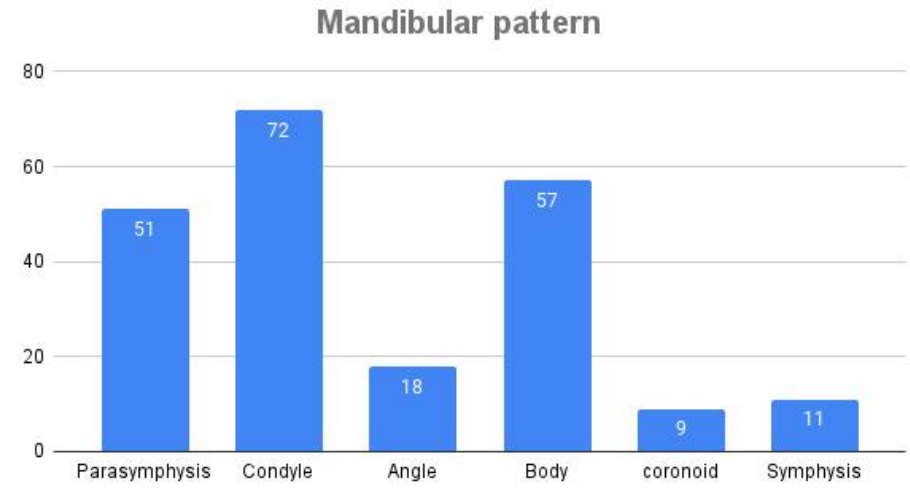
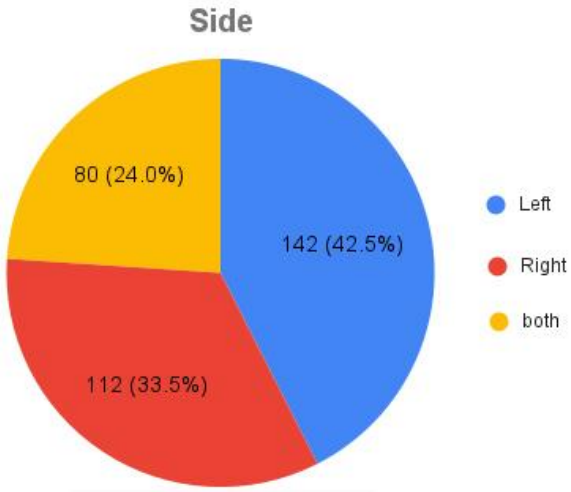


Fig 5



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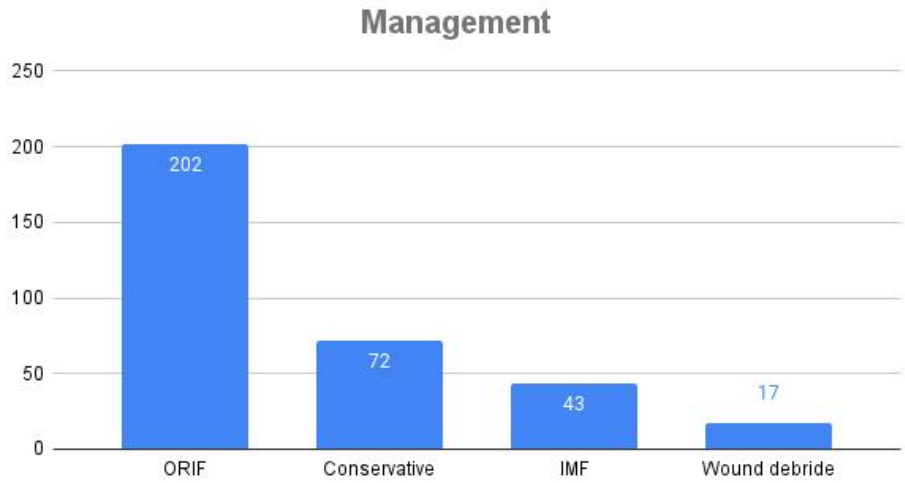

Fig 7

Table 1: Age and etiology comparison

Age and Etiology	RTA	Assault	Accidental fall	Bull gore	Industrial injury	Others
5-10	2	-	1	-	-	-
11-20	31	3	10	-	-	-
21-30	97	13	4	3	-	-
31-40	58	11	6	1	-	
41-60	50	13	9	1	2	
Above 60	8	2	7	1	-	