

Evaluation of distribution, pattern, etiology and treatment of maxillofacial injuries in a rural tertiary care centre

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Abstract

Context: Maxillofacial injuries can cause long-term functional, esthetic, and psychological complication. Road traffic accidents (RTA) are the major cause in the developing countries like India. **Aim:** This retrospective study was done to evaluate the prevalence, pattern, etiology and management of maxillofacial injuries in a rural tertiary care centre. Settings and Design: A two year retrospective study was done between January 2014 to December 2015 on patients with maxillofacial injuries attending dental OPD and emergency department at a rural tertiary care centre. **Methods and Material:** Patients between 5-75 years were included. Unconscious patient with head injury, polytrauma and pregnant females were excluded. Patients were evaluated by age, gender, mode of injury, etiology, maxillofacial injury sites and treatment rendered. Statistical analysis used: Data was expressed as percentages. **Results:** 150 patients accounting for 192 maxillofacial fractures were included and analysed. The male:female ratio was 3:1. Commonly affected age group was 21-30 year (49.3%). Road traffic accidents accounted for 49.01 %. Two wheelers were the most commonly involved vehicle. Mandible was most commonly fractured site. **Conclusion:** The RTA with two wheelers was the most common etiology of maxillofacial injuries, involving young adult (21-40 years) male patients. Mandible was most commonly fractured.

Key Word: maxillofacial injury, Road Traffic Accidents, closed reduction, open reduction and internal fixation

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INTRODUCTION

Maxillofacial injuries range from isolated injuries involving only one or two components of the facial skeleton to complex facial injuries involving the entire facial skeleton¹. Maxillofacial injuries can cause long-term functional, esthetic, and psychological complication². Also these injuries may lead to substantial economic

consequence on the patients. The main causes of maxillofacial injuries are road traffic accidents (RTAs), assaults, falls, sports-related injuries and wars. Road traffic accidents (RTA) are the major cause of maxillofacial injuries in the developing countries like India³. However usage of restraint devices significantly reduces the risk and severity of injury, and also reduces the number of deaths resulting from crashes⁴. The present study was conducted in our centre which is closely located near national highway road where many number of RTA cases are treated. This study evaluated the distribution, pattern, etiology, management of maxillofacial injuries. Such epidemiological data helps in planning of the future public health programs directed at prevention of accidents.

SUBJECTS AND METHODS

We analysed 150 fractures in 192 patients who were diagnosed with facial bone fracture and received closed reduction or open reduction and internal fixation at Akash

hospital, devanahalli, a tertiary care centre in Bengaluru rural over two years from January 2014 to December 2015.

Inclusion criteria: The patients of either gender aged between 5-75 years, with isolated maxillo facial injuries were included in the study.

Exclusion criteria: Unconscious patients, baseline head injury patients, poly trauma patients and pregnant females were excluded from the study.

Study design: Prior to this research, protocol of the study was approved by the ethical committee. A proforma was prepared for the collection of data. The parameters assessed included age, sex, etiology, type of injury which included soft tissue injury and fracture and treatment rendered. The treatment modalities were close reduction, open reduction and internal fixation for maxillofacial fractures, soft tissue repair for lacerations, contusions and abrasions. The type of anaesthesia (general anaesthesia/local anaesthesia) was decided based on

severity of the injury, treatment rendered. [A]The etiology of injury was categorized into five main categories: ¹Road traffic accident (RTA) involving automobiles, motorcycle which included drivers, pillion riders, passengers, and pedestrians 2 Self fall 3 Assaults or interpersonal violence 4 Work related injury 5 Sports injuries [B] Fractures were assessed according to location that is exclusively lower third, middle third and combination of both middle third and lower third of the face. Sites of mandibular fractures were classified as symphysis, parasymphysis, body, angle, ramus, condyle, coronoid and dentoalveolar. Sites of mid-facial fractures were classified as maxilla, zygoma, naso-orbito-ethmoid, isolated zygomatic arch, orbital floor, nasal. The maxillary fractures were classified according to Lefort classification. [C] Vehicles were divided into two categories, category A: two wheel vehicle (eg. motor cycle) and category B: four wheel vehicle (light motor vehicle and heavy motor vehicle).

RESULTS

Table 1: Gender wise Distribution of the maxillofacial injuries

Sl.No	Gender	Number of patients	Percentage
1.	Male	108	72%
2.	Female	42	28%
Total		N=150	100%

Table 2: Age wise distribution of the maxillofacial injuries

Sl.no.	Age(years)	Number of patients	Percentage
1.	5-10	2	1.33
2.	11-20	12	8
3.	21-30	74	49.3
4.	31-40	36	24
5.	41-50	16	10.6
6.	51-60	6	4
7.	61-70	4	2.66
Total		N=150	100%

Table 3: Categorization of the etiology of maxillofacial injuries

S.No.	Etiology	Number of patients	Male	Female	Percentage
1.	RTA	98	80	18	65.3%
2.	Self fall	24	14	10	16%
3.	Assault	14	8	6	9.33%
4.	Work related injuries	14	6	8	9.33%
5.	Sports injury	0	0	0	0%
Total		N=150			100%

Table 4: Type of vehicle used

Sl.No	Type of vehicle	Number of patients
1.	Patients on two wheeler (motor cycle, automobiles, bicycle)	86 (87.7%)
2.	Patients on four wheeler	12 (12.3%)
Total		98

Table 5: The anatomical site of maxillofacial fractures

Sl.no	Site of injury	No. of fractures	Percentage
1.	Mandible		
	(A) Condyle	10	5.2
	(B) Coronoid	2	1.04
	(C) Angle	10	5.2
	(D) Ramus	2	1.04
	(E) Body	4	2.08
	(F) symphysis+parasymphysis	34	17.7
2.	Maxilla		
	(a) le fort I	4	2.08
	(b) le fort II	4	2.08
	(c) le fort III	2	1.04
3.	Nasal bone	8	4.16
4.	Zygomaticomaxillary Complex (includes isolated zygoma fracture and orbital floor fracture))	50	26.04
5.	Dentoalveolar fracture	22	11.4
6.	Isolated soft tissue injury	40	20.8
	Total	192	100%

Table 6: Treatment of maxillofacial fractures

Sino.	Treatment/management	Number of patients	Percentage	Antimicrobial agents
1.	Arch bar fixation /closed reduction for dentoalveolar fracture and condylar fracture under Local Anaesthesia	58	38.6%	Inj cefuroxime 1 gm + Metronidazole 500 mg IV Infusion
2.	Open reduction and internal fixation under General Anaesthesia	52	34.7%	Inj Cefotaxime 1 gram + Metronidazole 500 mg IV Infusion
3.	Soft tissue repair/ dressing	40	26.7%	Cap Amoxyclav 625mg+ Tab Metronidazole 400 mg
	Total	150	100%	

During the study period a total of 150 patients were included and a total of 192 maxillo-facial fractures were analysed. Gender wise Distribution of the Maxillofacial injuries is shown in Table 1. The male: female ratio was 3:1. Age wise distribution of the injury is shown in Table 2. The patient age ranged from 5 to 75 years, most affected age group was from 21-30 year (49.3%) followed by patients in the age group between 31-40 year (24%). The categorization of the etiology of maxillofacial injury is shown in Table 3. The most frequent etiology of maxillofacial injury was road traffic accident [RTA] accounting for 65.3% of patients. The type of vehicle is shown in Table 4. Among the RTA motorized two wheeler accidents accounted in 86 patients (87.7%). The accidents included skids and falls, collision with other vehicles and pedestrians. The anatomical site of maxillofacial fracture/injury is shown in Table 5. Analysis shows that mandibular fractures were common and accounted for 32.26% of fractures (62/192). Among the mandibular fractures symphysis and parasymphysis fracture were the most common fracture sites 17.7% (34/192). Maxillary fracture were 5.2% (10/192), and nasal bone fractures were 4.16% (8/192), zygomatico

maxillary complex fractures accounted for 26.04% (50/192), 20.8% (40/192) caused isolated soft tissue injury of the face, 11.4% were dento-alveolar fractures (22/192). Treatment done for maxillofacial injury is shown in Table 6. 38.6% of patients (58/150) were treated by closed reduction and arch bar fixation under local anaesthesia, 34.7% of patients (52/150) were treated with open reduction and internal fixation (ORIF) under general anaesthesia, Isolated Soft tissue injuries requiring tissue repair and dressing under local anaesthesia were performed in 26.7% (40/150) patients which were mostly located extraorally and included contusion, lacerations and abrasions.

DISCUSSION

Trauma is one of the major causes of death among people under 40 years of age⁵. The cost of injury is higher than those of any other health problems and roughly equals to the costs associated with heart diseases and cancers⁶. The number of maxillofacial injury is continuously associated with the use of alcohol and illicit drugs during driving leads to RTA. This account for 90% of the fatalities due to RTA occurs in developing countries⁷. The average ratio

of male to female was 3:1, this can be explained by the fact that in developing countries men are active member of the family and do remain outdoor for a larger period of time and are more vulnerable to accidents, assaults, violation of traffic than women. This finding is in accordance with findings reported by Shankar *et al*⁸ and Gupta R *et al*⁹. In the current study the common age group affected was 21-30 years (49.3%) followed by 31-40 years (24%). This may be due to the fact that this age group is more active, suffer more traumas due to more outdoor activities, indulge in high speed and careless rash driving tendencies. This finding is consistent with study by Kapoor *et al* and Chandrashekhar *et al*.^{10,11} In our study the RTA was the most common cause of maxillofacial trauma (65.3%). And is consistent with Gandhi *et al*¹² and Subhashraj *et al*¹³. In rural India motorized two wheeler vehicles are registered in more number (70%) compared to light/heavy motor vehicles. Since our institution is a referral center located in rural area with close proximity to National highway aid in predominantly treating low income group and their main mode of transportation are motorized two wheelers (bike, scooter) and bicycle. Among the patients with maxillofacial injuries, 86 patients used motorized two wheeler (category A) and 12 patients were on four wheeler (category B); among them 53.3% (80 patients) were male and 12% (18 patients) were female. In our study the commonest bone fractured was mandible 62 patients (32.26%), followed by zygomatico-maxillary fracture 50 patients (26.04%), dento alveolar fracture 22 patients (11.4%), maxillary fracture 10 patients (8.32%) and nasal bone fracture 8 patients (4.16%). The isolated soft tissue injury was seen in 40 patients (20.8%). This findings are similar to previous studies reported in the literatures Shankar *et al* and Kapoor *et al*.^{8,10} Mandible is most vulnerable because of its position and predominance on face, osteology of mandible, the influence on the presence of developing or completed dentition all play a role in weakness of the lower jaw¹⁴. There are many treatment regimens in maxillofacial fracture, but the treatments chosen may differ depending on cost of treatment, affordability, feasibility, patient's willingness to avail the treatments and skill and experience and expertise of operating surgeons. Even though open reduction and internal fixation is gold standard treatment, most of the patients (38.6%) were treated in our institution with closed reduction with arch bar fixation, despite many challenges like malocclusion, asymmetry, nutrition, oral hygiene and pain, our study results are consistent with Marker *et al*, Worsae *et al* and Pandey S *et al*.^{15,16,17} and (34.7%) with open reduction and internal fixation (ORIF) with antimicrobial agents. Soft tissue repair/dressing was done in (26.7%) patients. Post

operatively the malocclusion and infection were the most common complications in mandible fracture. The incidences of post operative complications vary from 8-11%. Complication includes infection, malocclusion, mal-union, scar formation and ophthalmic complication. In our study, the complication i.e. post operative infection was seen only in 6 patients (0.6%), this may be because of aseptic and infection control measures, pre-operative prophylaxis and skills of the surgeons.

CONCLUSION

The RTA with two wheelers is the most common etiology of maxillofacial injuries, involving young adult (21-40 years) male patients. Mandible is most commonly fractured. Majority of the injuries are treated with closed reduction under local anesthesia and ORIF were performed in indicated fracture patients. Preventive measures such as adherence to the traffic rules and regulations, denying insurance coverage, timely maintenance of faulty roads will reduce the morbidity and mortality.

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