

Analysis of Prevalence and Pattern of Zygomatic Complex Fractures in North-Eastern Part of Madhya Pradesh, India

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ABSTRACT

Introduction: Maxillofacial fractures are frequently encountered in patients sustaining traumatic injury. Fractures of the zygomatic complex are common facial fractures as the zygoma forms greatest prominence of the cheek. The aim of the study was to evaluate the prevalence and pattern of zygomatic complex fracture in population of north-eastern part of Madhya Pradesh.

Material and methods: A prospective study was done on patients reporting with maxillofacial trauma in Department of dentistry, Shyam Shah Medical College Rewa, (M.P) for a period of 2 years from January 2014 to December 2015.

Results: Facio- maxillary injury was seen in 532 patients. The etiology of maxillofacial trauma was road traffic accident in 396 (74.43%) patients. 117 (41.48%) patients were diagnosed with zygomatic complex fracture. The peak incidence of mid-face fracture was in the age range of 21–30 years. The most common clinical characteristics in patients presenting with zygomaticomaxillary complex fractures were subconjunctival ecchymosis (88.03%), step deformity (84.61%), buccal sulcus ecchymosis (83.76%), periorbital ecchymosis (82.91%), and flattening of cheek (78.63%).

Conclusion: The study discusses the etiology and incidence of maxillofacial injuries with a particular emphasis on the pattern and treatment protocol for zygomatic complex fractures followed in our institute.

Keywords: Maxillofacial trauma, zygomatic complex fracture, surgical approaches.

complex fractures from January 2014 to December 2015 in Shyam Shah Medical College Rewa (M.P.), the tertiary care centre of North-eastern Madhya Pradesh.

The aim of study was to investigate epidemiological data (age, gender), fracture sites (malar bone, zygomatic arch), fracture etiology, characteristics and surgical approaches.

MATERIAL AND METHODS

A prospective study was conducted in patients reporting to the casualty and departments of Surgery and Dentistry, Shyam Shah Medical College and associated Sanjay Gandhi Memorial Hospital Rewa (M.P) between January 2014 to December 2015. Patients reporting to the emergency room or the outpatient department with midface fractures were included in the study. The study was approved by the ethical board of the institute and informed consent was taken from the patients regarding the participation in the study. The data was analyzed for age, gender, etiology, fracture sites, characteristics of fractures, and treatments provided.

Most of the cases presented with flattening of malar eminence, circumorbital ecchymosis, subconjunctival haemorrhage, partial trismus and paraesthesia of infraorbital nerve. Diagnosis were confirmed by taking routine radiographs (Paranasal sinuses view, Submentovertex view), oral pantomogram (OPG) and computed tomography (CT) scans. Most of the patients were treated by open reduction and rigid internal fixation (ORIF) as shown in Figures-1,2. All patients were reviewed from one month to one year with an average of six months.

STATISTICAL ANALYSIS

SPSS version 21 was used to make graphs and tables. Descriptive statistics like mean and percentages were used to interpret results.

RESULTS

A prospective study on patients reporting with zygomatic complex fractures was done between January 2014 to December 2015 in dental department of S.S. Medical College Rewa (M.P). A total of 2437 patients reported with traumatic injury in Sanjay Gandhi memorial hospital associated with S.S. Medical College

INTRODUCTION

Facial trauma is the most common trauma all over the world and more than 30% of the trauma cases suffer from fractured maxillofacial (MF) skeleton.¹ Moreover the neurological component associated with it makes it even more complex to manage.² Maxillofacial fractures are often associated with severe morbidity, functional deficit, disfigurement, and significant financial cost.^{3,4}

Zygoma occupies a prominent position on the face and so the zygomatic complex fractures are second most common fractures of the facial skeleton after nasal bone fractures.⁵⁻⁷ Fracture and dislocation of this bone causes cosmetic defects and disrupts other ocular and mandibular functions. Fractures of zygomatic complex causes disruption in articulation of zygomatico-maxillary complex, zygomatic complex proper and orbitozygomatic complex.

It is very important to reduce and fix these fractures accurately. After skeletal healing inadequate reduction can cause reduced projection of malar region of the face leading to cosmetic deformities. Accurate assessment should be done in relation to skull base posteriorly and midface anteriorly.

We prospectively studied prevalence and pattern of zygomatic

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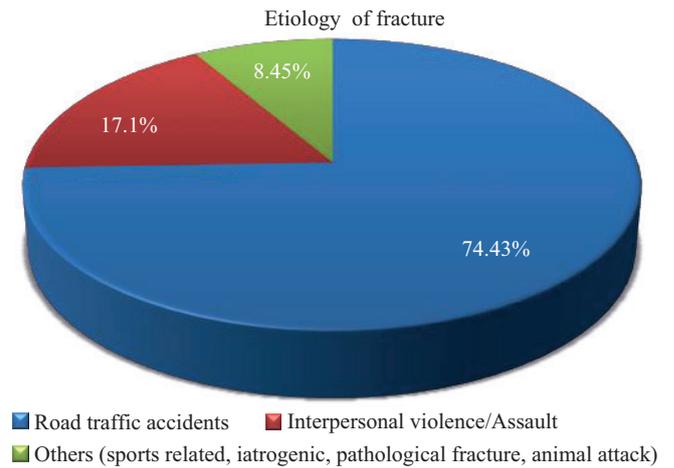
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Rewa during this time interval. Facio- maxillary injury in form of bone fractures and/or soft tissue injury, was diagnosed in 532 (21.8 %) patients. In patients sustaining facio-maxillary injury, the etiology was road traffic accident (RTA) in 396 (74.43%), assault in 91 (17.1%), and miscellaneous causes (Sports related, Iatrogenic, Pathological fracture, Animal attack) in 45 (8.45%) patients (Graph-1). Out of a total of 532 patients, 100 (18.80 %) were found to be suffering from soft tissue injuries only and 432 patients (81.20%) were found with facial bone fractures. Midface fractures were confirmed in 282 patients. Of a total of 282 patients with midface fractures included in this study, 192 (68.09%) were males and 90 (31.91%) were females. The peak incidence of mid-face fracture was in the age range of 21–30 years. Out of 282 patients sustaining midface fractures, 117 (41.48%) patients were diagnosed as zygomatic complex fracture (Table-1).

In the characteristics of zygomatic complex fracture, most common symptoms were subconjunctival ecchymosis (88.034%), step deformity (84.61%), buccal sulcus ecchymosis (83. 76%), periorbital ecchymosis (82.905%), flattening of cheek (78.63%), parasthesia (64.102%), pain (57.26%), epitaxis (35. 89%), trismus (26. 49%), and diplopia (5. 98%) (Graph-2).

Majority of cases in this study required an open reduction with or without internal fixation for restoration of function and esthetics. Conservative management was opted for treatment of

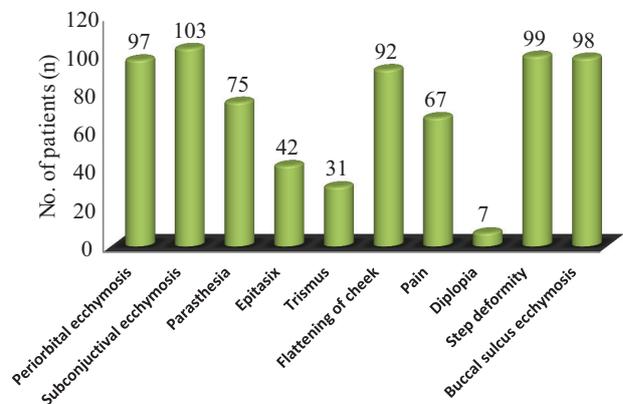
only 10 patients. According to surgical approaches, the zygoma fractures were treated by exposing the frontozygomatic suture through lateral eyebrow incision in 107 cases (91.45%). The approach to the inferior orbital rim was performed through a infraorbital incision in 99 (84.61%), sub tarsal approach in 7 (5.98%) and subciliary in 5 cases (4.27%). Intraoral approach through vestibular incision was utilized for fixation of zygomatic buttress in 78 cases (66.66%). As for the zygomatic arch, Gillies temporal approach was the first choice and was performed in 43 cases (36.75%). Lower eyelid incision with lateral extension were made in 23 cases (19.65%) (Table-2, Graph-3).



Graph-1: Distribution of patients with facio- maxillary injury according to etiology of injury. (N=532)



Figure-1: 3D CT Scan showing fractured left zygomatic complex



Graph-2: Distribution of patients according to clinical characteristics of ZMC fractures. (N=117)

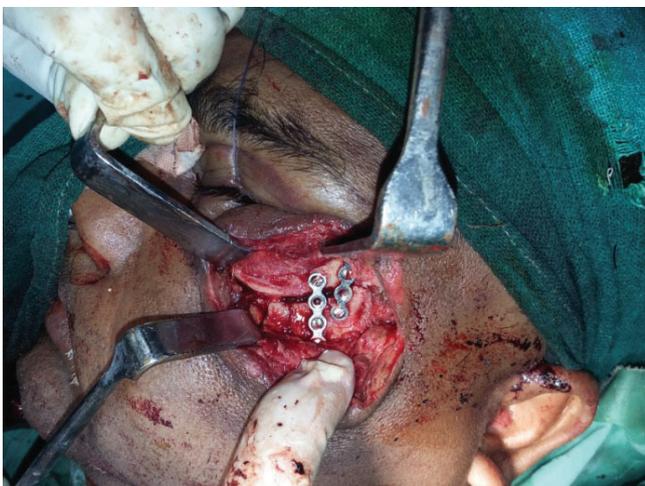
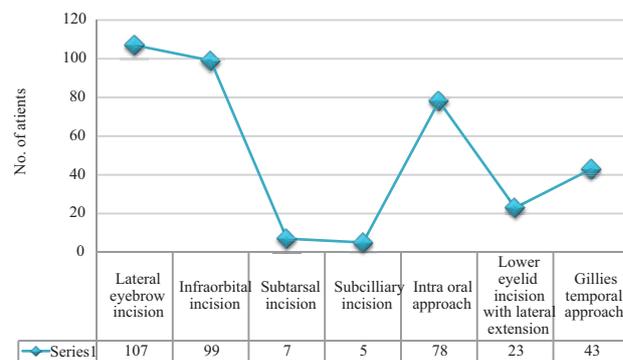


Figure-2: Open reduction and internal fixation done by stainless steel miniplates and screws



Graph-3: Distribution of patients with zygomatic complex fracture according to the incision made for surgical exposure

Age Group	ZMC		Lefort I		Lefort II		Lefort III		NOE Fracture		Multiple	
	M	F	M	F	M	F	M	F	M	F	M	F
0-10	2	2	3	1	4	1	3	2	2	1	0	0
11-20	18	9	4	3	9	5	12	5	3	1	2	1
21-30	25	11	5	2	5	3	15	7	1	2	3	0
31-40	12	4	3	1	7	2	6	3	0	1	1	2
41-50	10	7	1	1	3	1	4	0	1	0	1	0
51-60	9	2	1	0	5	2	3	2	2	0	0	1
61-70	3	3	0	0	1	0	2	1	1	1	0	0

Table-1: Distribution of patients with midface fractures according to the sites involved. (N=282; Males= 192, Females= 90)

Incision	No. of pts.	Percentage
Lateral eyebrow incision	107	91.45%
Infraorbital incision	99	84.61%
Subtarsal incision	7	5.98%
Subciliary incision	5	4.27%
Intra oral approach	78	66.66%
Lower eyelid incision with lateral extension	23	19.65%
Gillies temporal approach	43	36.75%

Table-2: Distribution of patients with zygomatic complex fracture according to the incision made for surgical exposure

DISCUSSION

Zygomatic bone is a quadrangular bone situated at the lateral midface. Fracture of zygomatic complex is the second most common fracture after nasal bone due to its prominence in lateral midface.⁸⁻¹⁰ The epidemiological survey on the causes and incidence of maxillofacial injuries vary with geographic region, socioeconomic status, culture, region and era.¹¹ Zygomatic complex fracture accounts for 45% of all midface fractures as documented by Kovacs et al.¹² This is consistent with 41.48% in our study also.

The most common causes of maxillofacial injuries is road traffic accidents, assaults, sports, occupational related injuries, and falls. In our study we found the etiology was RTA (74.43%), assaults (17.1%), and others causes (8.45%). This is well matched with other studies.^{13,14}

In our study, males (68.08%), were more effected as compare to females (31.91%). This may be due to higher frequency of consumption of alcohol in males. Alcohol impairs judgment, brings out aggression, often leads to inter-personal violence and road traffic accidents.^{15,16} The peak incidence of mid-face fracture was found in the age range of 21–30 years, which is in accordance with other studies.^{17,18} The most common symptom was subconjunctival ecchymosis (88.03%). This may be due to tear of periosteum of orbital rim. Buccal sulcus ecchymosis (83. 76%) was the 2nd most common presenting symptom. We found Step deformity in 84.61%, flattening of cheek in 78.63% periorbital ecchymosis in 82.91%, parasthesia in 64.10%, pain in 57.26%, epistaxis in 35. 89%, trismus in 26.49%, and diplopia in 5.98% cases. This results is in accordance with other studies.^{19,20}

The main aim of reducing zygomatic fractures is aesthetic and functional restoration of both face and orbit. The criteria of approach were based on the location and type of fractures. Lateral eyebrow incision, infraorbital incision and intraoral vestibular incision were most commonly utilized for surgical

exposure. As for the zygomatic arch, Gillies temporal approach was preferred. In some cases, lower eyelid incision with lateral extension were taken in 23 cases (19.65%). These approaches provided best result with minimal complications such as pain, palpability of implants.

CONCLUSION

The study is an overview of 117 patients reporting with zygomatic complex fracture over a period of 2 years. Road traffic accidents were the main cause of the injury, followed by assault. The male to female ratio was 2.13:1. The findings of this study favorably correlate with other similar studies. The study was conducted at the tertiary care centre catering to the entire population of Vindhya region (north-eastern) of Madhya Pradesh, India with an aim to collect epidemiologic data pertaining to individuals sustaining maxillofacial trauma with special reference to zygomatic complex fractures. The information may assist healthcare providers in evaluating and designing a framework for reducing the incidence of facial injuries. Strict legislative measures must be enforced regarding use of the seat belt, wearing of helmet, restricted speed limits and unwavering adherence to traffic rules.

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