

Management of Zygomatico-Maxillary Complex Fracture in Military Dental Centre, Dhaka: A Study of 40 Cases

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Abstract

Introduction: Zygomatic bone is closely associated with the maxilla, frontal, temporal bones which are usually involved when a zygomatic bone fracture occurs. The most common causes of these fractures are from the assaults, road traffic accidents and falls. Aesthetic beauties and functions are greatly hampered with the displacement of the fractured fragments.

Objective: To analyze the aetiology, clinical presentations, surgical intervention and complications associated with zygomatic complex (ZC) fractures in a tertiary level healthcare facility.

Materials and Methods: This descriptive observational study was carried out in the Oral and Maxillofacial Department, Military Dental Centre, Dhaka during the period of January 2016 to December 2016. Data were obtained from clinical notes and surgical records of the patients using standardized data collection form specifically designed to examine the variables and features of zygomatic complex fractures.

Results: Road traffic accidents were the leading cause (75%) of zygomatic fractures. The mean operation time was found 99.5±31.2 minutes with a range from 60 to 125 minutes. Open reduction and two-point internal fixation were employed in more than two-third (67.5%) of the cases. Four (10.0%) patients developed postoperative complications; among them 2(5.0%) cases suffered paresis of temporal branch of facial nerve and trismus. Other complications included paraesthesia, ectropion, scar and palpability of plate. Twenty-five (62.5%) patients were found having limited mouth opening preoperatively and postoperative improvement occurred in 21(52.5%). Thirty three (82.5%) patients had facial asymmetry preoperatively and postoperative improvement occurred in 29(72.5%).

Conclusion: More than two-third of the patients received two point fixations. Only four patients out of forty in this study were found having post operative complications. The functional and Aesthetic outcome was found to be fair in terms of improvement in limitation of mouth opening and correction of facial asymmetry.

Key-words: Zygomatic Complex (ZC), Zygomatic Arch(ZA), Military Dental Center (MDC), Zygomatico-Maxillary fracture.

Introduction

The zygomatico-maxillary complex plays a key role in the structure, function and aesthetics of the facial region. The zygoma articulates with four bones: the frontal, sphenoid, maxillary and temporal and they are usually involved when a zygomatic bone fracture occurs; therefore these type of fractures are referred to as zygomatico-maxillary complex or the tetrapod fracture¹. To give the best results with the least morbidity is the aim of any treatment². The most common cause of maxillofacial injuries is road traffic accident (RTA). Zygomatic complex fractures are second most common facial fractures after nasal bone as it is the most prominent portion of face after nasal bone and mandible³. Their prevalence is related to different conditions and the surgical treatment with adequate reduction is a challenge for the surgeons⁴. The objective of this study was to analyze the aetiology, clinical presentations, surgical interventions and complications associated with zygomatic complex fractures in a tertiary level healthcare facility.

Materials and Methods

This descriptive observational study was carried out on 40 patients of zygomatico-maxillary complex fracture in the Oral and Maxillofacial Department, Military Dental Centre, Dhaka during the period of January 2016 to December 2016.

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Patients with only zygomatico-maxillary complex fracture not associated with other fracture were included in this study. Patients with head injury, massive soft tissue injury and unwilling patients were excluded from the study. Data were obtained from the clinical examination and surgical records of the patients using standardized data collection form specifically designed to examine the variables and features of zygomatic complex fractures. The questionnaire was compiled and analyzed and presented in tabulated form. Diagnosis and classifications of fractures were based on the history, clinical examinations and investigations. Diagnosis of fractures and indications for open reduction and osteosynthesis were done as per standard procedure. Informed written consent was taken from all the patients. For the surgical treatment of zygomatic complex fractures, the type of the surgical approach and operative time were noted. To assess fracture stabilization, approximation, patients were reviewed with radiograph. By using SPSS (Statistical Package for Social Sciences) software version 20, data were processed and analyzed. Continuous scale data were presented as mean, standard deviation and categorical data were presented as number percentage. Summarized data were presented in tables.

Results

It was observed that maximum patients (40.0%) belonged to the age group 31-40 years. The mean age was found to be 35.3 ± 9.5 years with a range from 18 to 58 years (Table-I). The majority (95.0%) of the patients were male and the ratio was 19:1 (Table-II). Almost two third (62.5%) of the patients had right sided and 15(37.5%) had left sided fracture (Table-III). Three fourth (75.0%) of the patients had road traffic accidents as the major etiologic factor of zygomatic fractures (Table-IV). The mean operation time was found 99.5 ± 31.2 minutes with a range from 60 to 125 minutes (Table-V). More than two third (67.5%) of the cases underwent two-point of fixation (Table-VI). Four (10.0%) patients had postoperative complications among them 2(5.0%) cases had paresis of temporal branch of facial nerve and trismus, 1(2.5%) case had paraesthesia, ectropion and scar and 1(2.5%) case had pain, palpability of plate and facial asymmetry (Table-VII). Improvement in limitation of mouth opening and facial asymmetry was observed in the postoperative period than the preoperative period (Table-VIII).

Table-I: Distribution of the patients by age (n=40)

Age (in year)	Patients (n)	%	Mean \pm SD	Range (min-max)
≤ 20	01	2.5	35.3(\pm 9.5)	18-58
21-30	13	32.5		
31-40	16	40.0		
41-50	07	17.5		
>50	03	7.5		

Table-II: Distribution of the patients according to sex (n=40)

Sex	Number of patients	Percentage
Male	38	95.0
Female	02	05.0

Table-III: Distribution of the patients according to the side of fracture (n=40)

Side of fracture	Number of patients	Percentage
Right side	25	62.5
Left side	15	37.5

Table-IV: Distribution of the patients according to aetiology (n=40)

Aetiology of zygomatic fractures	Patients (n)	%
Road traffic accidents	30	75.0
Sports	05	12.5
Occupational hazard	03	7.5
Assault	01	2.5
Fall	01	2.5

Table-V: Distribution of the patients according to duration of operation (n=40)

Duration of operation	Patients (n)	Mean	\pm SD	Range
60-80 minutes	2	99.5 minutes	\pm 31.2 minutes	Min 60 to Max 125
81-100 minutes	27			
101-120 minutes	10			
121-140 minutes	1			

Table-VI: Distribution of the patients according to fixation and reduction (n=40)

Point of fixation	Patients (n)	%
Open reduction with two point fixation	27	67.5
Open reduction with three point fixation	12	30.0
Close reduction of isolated arch fracture	01	2.5

Table-VII: Distribution of the patients according to postoperative complications (n=40)

Patients (n)	%	Postoperative Complications
36	90.0	No
01	2.5	Paraesthesia, ectropion and scar
01	2.5	Pain, palpability of plate and facial asymmetry
02	5.0	Paresis of temporal branch of facial nerve and trismus

Table-VIII: Improvement of presenting symptoms after operation (n=40)

Symptoms	Preoperative	Postoperative	Level of improvement
Limitation of mouth opening	25 (62.5%)	4 (10%)	21 (52.5%)
Facial asymmetry	33 (82.5%)	4 (10%)	29 ((72.5%)

Discussion

It was observed that the majority (40.0%) of patients belonged to the age of 31-40 years. The mean age was found 35.3 ± 9.5 years that range from 18 to 58 years. In Balakrishnan et al⁵ the age group of the patients varied from

18 to 60 years. The highest incidence of fracture was seen between the age group of 20 and 40 years. Chattopadhyay and Chander⁶ study showed the age group of the patients varied from 16 to 80 years with the mean of 32 years. The highest incidence of fracture was seen in the age group of 20 to 30 years. In Chang et al⁷ the patients mostly belonged to the age of 20-29-years group; their mean age standard deviation was 32.36(± 14.69) years (range 17-58 years).

In this study majority (95.0%) of the patients were male and 2(5.0%) patients were female. The male female ratio was 19:1. Balakrishnan et al⁵ study recorded that there were more males than females (ratio 6.7:1) sustained zygomatic complex fractures. This showed 213 (86.9%) patients were male and 32 (13.1%) patients were female. Many studies have shown that young adult males were commonly affected^{8,9}. In Olate et al¹⁰ among 153 patients, 126 were men (82.4%) and 27(17.6%) were women. In Chattopadhyay and Chander⁶ thirty six (90%) patients were male and four (10%) patients were female.

The present study showed that almost two-third (62.5%) patients had right side and 15(37.5%) had left sided fracture. In Balakrishnan et al⁵ 98(40%) patients had left sided and 147 (60%) had right sided fractures. In Roy Chowdhury and Suresh Menon¹¹ the right side of the face was involved in 59.77% of cases whereas left side of the face involved in 37.93% cases. In Chattopadhyay and Chander⁶ sixteen (40%) patients had left sided and 24(60%) had right sided fractures.

In this series, it was observed that 30(75.0%) road traffic accidents were the major etiologic factor of zygomatic fractures. Accidental falls and domestic violence formed 8.04% (7) and 2.29% (2) cases respectively.

In this present study, it was observed that mean operation time was 99.5(±31.2) minutes with a range from 60 to 125 minutes. In Rana et al¹² mean operation time was found 97.8(±52.7) minutes in 2 point fixation and 99.5(±31.2) minutes in 3 point fixation. In Chang et al⁷ protocol of forced mouth opening physiotherapy starts from the second week after the operation with mouth gag six times per day at home; they are followed-up every week for 2 months.

In this current study, it was observed that 27(67.5%) cases were treated surgically by two-point of fixation. In Balakrishnan et al⁵ 28(70%) cases were managed by two-point fixation and 8(20%) by three-point fixation¹³. In Tadj and Kimble¹⁴ study of 263 cases of fractured zygomatic complex, it was found that bone plating was the most frequently employed fixation.

Two-point fixation methods were preferred to achieve stability against rotation with the best aesthetic outcome as the scars were well hidden intraorally and in the eyebrows¹⁵. Chattopadhyay and Chander⁶ showed two point fixation methods to achieve stability against rotation with the best aesthetic outcome as the scars were well hidden intraorally and in the eyebrows¹⁴.

It was also observed that 4(10%) patients had postoperative complications and among them, 2 cases had paresis of temporal of facial nerve and trismus, 1 case had paraesthesia, ectropion and scar and 1 case has pain, palpability of plate and facial asymmetry. In Balakrishnan et al⁵ postoperative complications were found among 6.7% of the patients. Covington et al¹⁶ reported a complication rate of 1.5% while Tadj and Kimble¹⁶ reported a rate of 20.7%. In Zachariades et al¹⁷ an analysis of 5,936 patients with facial trauma, loss of vision developed in 18 patients. Zygomatic complex fractures were accounted for 0.45% cases. Osteotomies and bone grafting may be required in case of major asymmetry (3-4% of patients)¹⁸. In this series, it was observed that 25 (62.5%) patients had limited mouth opening in preoperative and 4(10%) had limited mouth opening in postoperative period with 21(52.5%) improvement and facial asymmetry was found in 4(10%) cases postoperatively with 29(72.5%) improvement. In Chang et al⁷ the experimental oral and maxillofacial surgery group, comprised of 18 patients (64.29%); 17(94.40%) had limited mouth opening preoperatively.

Conclusion

Zygomatic maxillary complex fracture management is one of the important subjects in the oral and maxillofacial surgery trauma department. Many surgeons have been working in this field to identify the definitive surgical procedure. In this study, more than two-third of the patients received two-point fixation. Only four patients out of forty in this study were found having postoperative complications. The functional and aesthetic outcome was found to be fair in terms of improvement in limitation of mouth opening and correction of facial asymmetry. Bioresorbable system and Titanium system are out of the scope of this work. If Bioresorbable system could be used, then it would not cause any interference with growth and postoperative radiotherapy.

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