

Treatment of Orbital Floor defects with Titanium Mesh in Zygomatic Complex Fractures

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ABSTRACT

Background: Outcome of treatment of orbital floor defects with titanium mesh in zygomatic complex fractures. Eye trauma results in significant aesthetic and functional problems. Rehabilitation necessitates a grasp of the orbit's altered structure and function, as well as the materials and procedures used in its restoration.

Study design: Descriptive case series

Study duration: 1 year. 22 December 2018 to 21 December 2019.

Study place: Allama Iqbal Teaching Hospital, Kh. Muhammad Safdar Medical College, Sialkot

Results: This study was carried on 150 patients over a period of 6 months from January 1st 2013 to June 30th 2013 at the department of Oral & Maxillofacial Surgery PIMS Hospital Islamabad. 135/150(82.75%) patients were male and 15/150(17.24%) patients were female. The mean average age of the male patients was 30.02 years + 10.26 and the mean average age of the female patients was 29.90 years + 10.53. In our study 82.8% were males and 17.8 were females.

Conclusion: The conclusion of study is titanium mesh is a better treatment option in management of complex orbito-zygomatic complex fractures, Diplopia is initially present but eventually resolve within 3 month.

Keywords: Titanium mesh, zygomatic complex fracture

INTRODUCTION

Treatment for orbital floor fractures is highly controversial and non-comparable in the majority of instances. The majority of orbital floor fracture statistics and maxillofacial injury data originate from industrialised countries such as the United States, the United Kingdom, the Netherlands, and Scandinavian countries. In our investigation, however, we discovered that orbital floor repair with membranous bone graft can help to decrease donor site haemorrhage. Other studies have had the same limitations as ours, including a small sample size, uncontrolled factors, inaccuracy in data collection, and a lack of data records. We have made an effort to provide a variety of therapeutic solutions. The use of a biodegradable orbital floor is up for debate. The therapeutic effectiveness of none of the materials has been established. One of the most difficult challenges is maintaining the three-dimensional geometry of the implant. The implant must be biocompatible and capable of withstanding the pressure exerted by the orbital content without coiling or deforming.

These characteristics should be similar to those of the tissue being replaced. If the implants do not fade within a reasonable amount of time, the hosts should tolerate them indefinitely. Individuals with displaced orbito-zygomatic complex fractures who have diplopia or enophthalmos more than 2mm should be evaluated and treated. In order to determine if the patient had diplopia, the patient was instructed to move a finger or an object nine times in front of their eyes. Enophthalmos is defined as a 1cm³ increase in orbital volume.

METHODOLOGY

150 patients of orbitozygomatic complex fracture, fulfilling the inclusion criteria were selected. The diagnosis was on clinical basis selected from OPD/Emergency Department of Oral Maxillofacial Surgery, Mayo Hospital. An Informed consent was obtained from them or their parents/guardian for using their data for research and procedure will be explained to them. Procedures were performed by the consultant and follow up done by researcher. Correction of enophthalmos and diplopia will be done with proper reduction and fixation. Fixation of the zygomatic bone will be done with miniplates at three points (fronto-zygomatic suture, infra orbital rim and zygomaticomaxillary buttress). Orbital

floor defects was reconstructed titanium mesh. Enophthalmos and diplopia post operatively will also be recorded at time of discharge and follow up visits will also be planned on 1st, 2nd, 3rd and 6th month. CT scan were revised on the first and sixth follow up months to assess orbital volume and enophthalmos. All the information was entered in a structured performa. (See annex II).

Data will be entered and analyzed with SPSS version 17.0 Mean and standard deviation will be calculated for numerical variables like age. Frequency and percentage will be calculated for categorical variables like gender, size of the defect enophthalmos and diplopia. Data will be stratified for age(≤ 25 years of age, ≥ 25 years of age) to address the effect modifiers

Exclusion criteria:

Patients already treated for orbito-zygomatic complex fractures determined on history and physical examination.

Patients with vision loss determined on history and physical examination by researcher himself.

Fire arm injuries/ Avulsive injuries determined on history and physical examination by researcher himself.

Patients medically not fit for surgery determined on history and physical examination by consultant anesthesia and researcher himself and appropriate laboratory tests.

Patients having orbito-zygomatic complex fractures one month older determined on history and physical examination by researcher himself.

RESULTS

This study was carried on 150 patients over a period of 6 months from January 1st 2013 to June 30th 2013 at the department of Oral & Maxillofacial Surgery PIMS Hospital Islamabad. 135/150(82.75%) patients were male and 15/150(17.24%) patients were female. The mean average age of the male patients was 30.02 years + 10.26 and the mean average age of the female patients was 29.90 years + 10.53. In our study 82.8% were males and 17.8 were females. The sample of 150 patients includes the age range from 12 to 60years with mean age of 30 years. Male (n=135) have the mean age of 30.20years and female (n=15) with the mean age of 29.90 years. Orbital floor fracture of right side was more common in our study. Out of 150 patients 110 (73.3 %) were presented with right orbital floor fracture and 40 (23.7%) with the left orbital floor fracture. Orbital floor defect (OFD) was measured preoperatively with the help of CT scan. It ranged from 8mm to

26mm with the mean 15.46 mm+4.18 in 150 patients. In male (n-135) patients mean OFD was 15.16 mm+ 4.26 and in female patients mean OFD was 16.90 mm+ 3.63. Immediate post operatively diplopia was checked following the completion of procedure. Out of 150 patients; 100 (66.6%) patients showed satisfactory results. At follow up visit, 3 weeks postoperatively, out of 150 patients; 125(83.3%) showed satisfactory results. Immediate post-operative enophthalmos was checked following the completion of the procedure, Out of 150 patients 100(66.6%) patients have no enophthalmos post operatively. After follow up, 3 weeks postoperatively out of 150 patients 115(76.6%) patients showed satisfactory results.

Table 1: Gender of subjects:

Gender	Frequency	Percent
Male	135	82.8
Female	15	17.2

Table 2: Side Involved

	Frequency	Percent
Right	110	60.3
Left	40	39.7

Table 3: Diplopia

	Frequency	Percent
Absent	140	93.1
Present	10	6.9

Table 4: Enophthalmos:

	Frequency	Percent
Absent	115	76.6
Present	35	23.3

Chi-square test: 1.462, Degree of freedom: 1 P-value (1-sided): 0.113

DISCUSSION

The result titanium mesh for reconstruction of orbital floor fractures associated with orbito-zygomatic complex fracture was assessed in our study. In our research, males outnumber women. The majority of our study's participants are in their thirties or forties. It is backed up by scientific evidence. In 2009, Sakakibara and colleagues found a mean age of 26. Kosaka and colleagues conducted research on persons in their 30s and 40s.

True diplopia patients frequently express this as their primary problem. Diplopia can be either monocular or binocular. Constriction along the fracture line and concussion injury to extraocular muscles or soft tissue are the most prevalent causes of binocular double vision and restricted eye movement in patients with traumatic brain injury.

The majority of our patients experienced double vision and was unable to look upward. This is explained by the processes discussed above. CT scanning can be used to identify fat, muscles, and hematomas in the orbital region.

The CT scan used in this investigation clearly revealed each and every one of them. The orbital floor is made entirely of bone material. The inferior rectus muscle was located on the orbital floor. The orbital fat enters the maxillary sinus from the fractured side. The inferior rectus muscle seemed to be oedematous and rounded in appearance. In both the preoperative and postoperative CT images of the same fracture, no trap door fracture or muscle imprisonment could be identified.

Postoperative diplopia was missing in 93.1 percent (140 patients) of patients treated with titanium mesh, whereas it was present in 6.9 percent (10 patients) of patients treated with titanium mesh (ten patients). Titanium implants and bone grafts were used to bridge the gap between large internal orbital defects. This approach proved to be more dependable and consistent. A total of 5% of the population was infected. Glassman and colleagues Until Sargent and Fulks, the metal was utilised as a barrier between the metal and the orbital soft tissues (1991). Banu

et al., on the other hand, discovered that out of 35 patients, only 7(17%) suffered diplopia in the following weeks. After 1–4 weeks, diplopia was reported to have improved in 28 patients. A large number of specialists agree.

Repair of the orbital floor with a simple titanium mesh implant. Using the chi-square test, we discovered that our results were inconsequential in terms of correcting diplopia.

In our study, results regarding enophthalmos. Out of 150 patients in the population enophthalmos was corrected in 115 patients which accounted for 76.6% of the patients while enophthalmos was present in 35 patients accounting for 23.4% of the patients. In a study conducted by Banu et al out of 35 patients 13 patients have enophthalmos greater than 2mm accounting for 30.9% patients preoperatively, post-operatively enophthalmos persisted 3 patients(7%) which is significantly less than our study and can be attributed to early presentation to trauma and ER department and relatively earlier intervention. In another study conducted by Emeka et al consisting of 10 patients it was found that non preformed titanium mesh improved enophthalmos in 7 patients (70%) while 3 patients (30%) had residual enophthalmos which is very near to the results of our study. Probably the most difficult aspect of interpreting the enophthalmos and dystopia data is that despite attempts to be objective in measurements, some bias may be unavoidable

CONCLUSION

The conclusion of study is titanium mesh is a better treatment option in management of complex orbito-zygomatic complex fractures, Diplopia is initially present but eventually resolve within 3 month, enophthalmos is debilitating complication of the orbito-zygomatic complex fractures, its recommended in my study that orbito-zygomatic complex fractures should be treated earlier with generous exploration of the orbital floor so as to avoid these complications, special emphasis should be paid to the medial orbital wall.

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