



GILLES ELEVATION AND SINGLE POINT FIXATION IN THE TREATMENT OF SIMPLE ZYGOMATICOMAXILLARY COMPLEX FRACTURES- LONG TERM FOLLOW UP CLINICAL STUDY

Plastic Surgery

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ABSTRACT

Fractures involving the zygoma are among the most common facial fractures. The objective of zygoma fracture repair is to restore preinjury function and appearance. The debate continues as to which of these common fractures can be treated with less invasive methods and which one needs more extensive open reduction and internal fixation to accomplish the desired repair.

This study presents follow up results of 40 patients with fracture zygoma of whom 29 patients were treated with single point fixation at zygomaticomaxillary buttress level. The results show that Gilles elevation and single point fixation gives comparable results to two point fixation in view of aesthetic appearance and functional outcome.

Conclusion: Gillies method of fracture elevation and single point fixation has improved the functional and cosmetic outcome of the patient. Single point fixation shortens the operative time, reduces the cost, reduces the postoperative morbidity and speeds recovery, minimizes the complications and allows early return to normal function.

KEYWORDS

Zygomaticomaxillary complex, Single point Fixation.

Introduction

The zygomatic bone is a major buttress of the midfacial skeleton and contributes significantly to the strength and stability of midface. The zygoma articulates with four other facial bones namely maxilla, temporal bone, frontal bone and sphenoid. The zygoma may be separated from its four articulations. This is called a zygomatic complex fracture.

Etiology: The cause of zygomatic injuries varies with patient demographics and the location of reporting institution. Common modes of injuries causing zygoma are RTA, Assaults and fall from height.

Clinical features: The nature, force and direction of injuring blow should be determined. A direct lateral blow as in an assault often results in an isolated zygomatic arch or an inferomedial displacement of zygomatic complex fractures. A frontal blow usually produces a posteriorly and inferiorly displaced fracture.

The patient with a zygomatic complex fracture complains of Pain, Periorbital edema, Ecchymosis, Parasthesia or anaesthesia over the cheek, lateral nose, upper lip and maxillary anterior teeth, Trismus due to medial displacement of arch, Epistaxis, Diplopia, Depression of malar eminence and Infraorbital rim produces flattening of the cheek, Subconjunctival hemorrhage, Antimongoloid slant to the lateral canthus due to downward displacement of the zygoma, Enophthalmos, and Step offs.

In isolated zygomatic arch fractures a depression is observed and palpated anterior to the tragus. Pain and decreased mandibular motion are commonly present with these injuries, whereas orbital signs are usually absent.

Radiographic evaluation:

.Plain radiographs;

Occipitomental view (Waters view): It is a posteroanterior projection with head positioned at a 30° angle to the vertical and the chin resting on the cassette. This projects the petrous pyramids off the maxillary sinuses permitting visualization of the sinuses, lateral orbits and infraorbital rims.

Reverse waters view position: In patients who are unable to assume a face down position a reverse waters view can be taken.

Caldwell's view: It is a posteroanterior projection with the face at 15° angle to the cassette. This view is helpful in the evaluation of rotation around a horizontal axis.

Submentovertex view: (jug handle view) This view is helpful in the evaluation of the zygomatic arch and malar projection.

CT scan: CT scan of facial bones in axial and coronal planes is the gold standard for all patients with suspected zygomatic fractures. CT scan defines fracture patterns, degree of displacement, comminution and evaluation of orbital soft tissues. CT scan allow for visualization of buttresses of mid facial skeleton.. Coronal views are helpful in the evaluation of orbital floor fractures. Soft tissue windows in the coronal plane are useful to evaluate the extraocular muscles and to evaluate herniation of orbital tissues into the maxillary sinus.

Most zygoma fractures are displaced medially and posteriorly. Frequently displacement is minimal and requires no treatment. In 50 – 70% of cases only anterior or gingival sulcus alone approach is used.

For low and middle energy fractures stable fixation can be achieved at one or more of anterior buttresses. The location of fixation and number of sites of fixation depends on the fracture pattern, location, vector of displacement and degree of instability. Single plate fixation and single lag screw fixation has also been recommended.

Gillies elevation and single point fixation of fracture zygoma:

Elevation of fracture zygoma by Gillies approach followed by single point fixation by miniplates at zygomaticomaxillary buttress through upper buccal sulcus incision avoids soft tissue morbidity and gives a stable fixation and counteracts the pull of gravity and the action of masseter muscle. Single point fixation shortens the operative time, improves the patient's compliance, minimizes scars, reduces the cost and improves functional outcome.

Aim of the study

1. To obtain pre injury function and appearance to the maximum possible extent with lesser amount of soft tissue morbidity by using single point fixation
2. To compare the single point fixation of fracture zygoma with other methods in terms of functional and cosmetic outcome.

MATERIALS AND METHODS

All patients who reported to the Plastic Surgery Department, presenting with fracture of zygoma were included in the study. The study period is from October 2008 to March 2010. The methodology adopted consists of recording Cause of injury, Age and Sex groups involved, Assessment of clinical features, Investigations, Treatment given / surgery performed, Post operative assessment and Complications if any.

40 patients of fracture zygoma were registered with the plastic surgery department during the study period.

1. Detailed history regarding nature of injury and symptoms were obtained. A thorough physical examination was done to assess the general status of the patient, other associated injuries, clinical features of fracture zygoma, ocular examination and its complications.
2. Investigations were done which included X-Ray skull PNS view without cone, Submento vertex view, CT-Scan skull and facial bones with 3-D reconstruction as required.
3. Where indicated and once the patient is fit for surgery, under GA Reduction of fracture zygoma achieved through Gillies approach by using Rowe's elevator. Fracture reduction confirmed by bird's eye view examination for malar prominence and symmetry, infraorbital rim and frontozygomatic suture palpation and visualization of zygomaticomaxillary buttress through upper buccal sulcus incision. Zygomatico maxillary buttress is rigidly fixed by using 4 hole miniplate or L plate with 2x8mm screws with Rowe's elevator in situ. If there is a comminuted fracture at the zygomaticomaxillary buttress two plates are used in the single axis to provide better stability. If the infraorbital rim also shows extensive comminution then two point fixation at zygomaticomaxillary buttress and infraorbital rim is needed. Zygomaticofrontal suture and zygomatic arch are not fixed with plate and screws. Then wounds sutured and patient monitored in the hospital for 5 days.

Patients without displacement of fracture zygoma were treated conservatively.

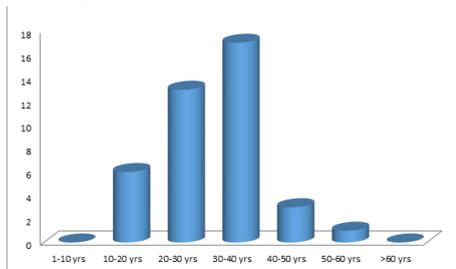
4. In the post operative period complaints of the patients if present were recorded and followed up.
5. Preoperative and post operative appearance was assessed by comparing the digital photographs in the frontal, lateral, bird's eye view and worm's eye view with reference to malar projection, facial symmetry and mouth opening.
6. All patients were enquired whether they have noticed any difference in the face in relation to the pre injury state and whether any of their family members or friends noticed any difference in the face with regard to the symmetry of face, any scars and malar projection.
7. Functional assessment was done by analyzing the mouth opening pre operatively and post operatively. Radiological comparison was done by taking the X-ray Skull sinus view without cone in the post operative period.

DISCUSSION

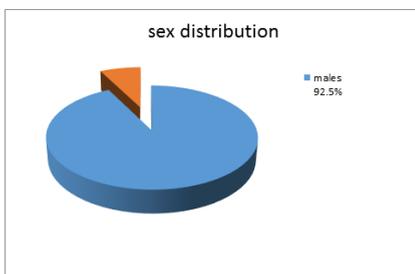
The total number of patients treated during the study period at the plastic surgery department was forty.

Age wise distribution of zygomatic fractures is shown in the chart.

Majority of patients fall in the 20 to 40 year age group forming 75 % of the total incidence. The age group 30 to 40 has the highest incidence 42.5% in this study.

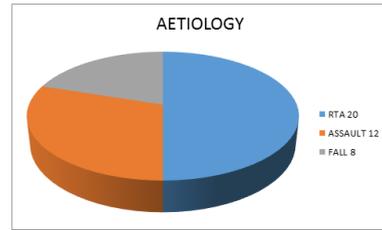


Sex wise distribution of zygomatic fractures is shown in the following chart



Males have the highest incidence of 92.5% whereas females have 7.5% incidence. Majority of zygomatic fractures occurring in young male patients

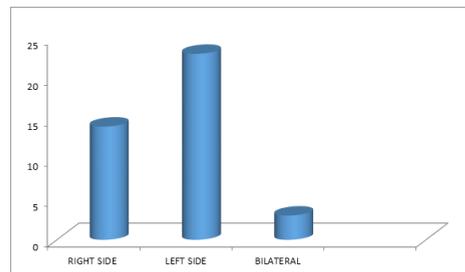
The following diagram shows the aetiology of zygomatic fractures.



Road traffic accidents constitute the majority of cause of zygomatic fractures. With increasing urban violence the incidence of assaults are also on the rise.

Side wise distribution of zygomatic fractures are shown in the following table Left sided zygomatic fractures are more common than right sided fractures. Bilateral zygoma fractures occur in a small percentage of patients.

SIDE DISTRIBUTION



Zygoma fractures associated with other injures in 6 cases.

Table V

Associated fractures	No. of patients
Mandible	3
Maxilla	2
Nasal bones	1

Ocular symptoms present in 17 patients. One patient had associated bilateral ptosis.

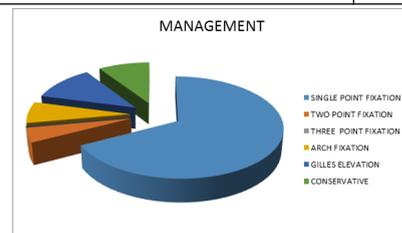
Pre operative infraorbital nerve anaesthesia present in 5 patients which was improved immediately after surgery.

Post operatively 3 patients had infra orbital nerve anaesthesia but was improved over a period of 3 to 6 months. One patient had anaesthesia in the temporal region, recovered in 2 months time.

Management of zygomatic fractures

Table VI

Management option adapted	No. of patients
Single point fixation at zygomatico maxillary buttress	29
Two point fixation	2
Three point fixation	0
Zygomatic arch fixation	3
Gillies elevation alone	5
conservative	4
Total	43



43 zygoma fractures in 40 patients were treated in our department. 29 of the 40 patients were treated with single point fixation at the zygomaticomaxillary buttress. 3 patients with comminuted fracture in the zygomatic arch were treated with plate and screw fixation at the zygomatic arch. Two patients with comminuted fracture in the infraorbital rim were treated with two point fixation (zygomaticomaxillary buttress and infraorbital rim). 4 patients without or minimal displacement were treated conservatively and followed up for a period of 3 months and was found to show satisfactory results. 3 patients with bilateral injuries were treated with single point fixation on the more displaced side and treated conservatively on the minimally or undisplaced side.

All 29 patients treated with single point fixation were followed up for a minimum period of 3 months. The longest follow up period was one and half years.

Results were analyzed in terms of symmetry of face, malar projection on both sides, ability to open the mouth, occlusion of teeth. All patients were asked whether they noticed any difference in the face or any of their friends or relatives noticed any difference in the face with respect to the symmetry and scars.

7 patients complained of edema in the initial period. The edema settled down over a period of one month in all the patients. All the patients were satisfied with the results and none of the relatives or friends has correctly identified the injured side. All patients were satisfied with their functional and cosmetic results.

Patients treated with single point fixation had similar functional and cosmetic results compared with the patients treated with two point fixation.

CONCLUSION

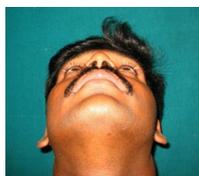
Majority of zygoma fractures can be treated with single point fixation alone at the zygomaticomaxillary buttress level. Comminuted fractures need two or three point fixation. Fracture zygoma without significant functional or cosmetic impairment can be treated conservatively. Gillies method of fracture elevation and single point fixation using intraoral approach has improved the functional and cosmetic outcome of the patient. Single point fixation shortens the operative time, reduces the cost, reduces the post operative morbidity and speeds recovery, minimizes the complications and allows early return to normal function. Single point fixation gives equivalent results when compared to two point fixation.

CT scan with 3D reconstruction and digital X ray skull PNS view without cone has given us an accurate way of detecting even small fractures of zygoma and helped in the management. Use of miniplate and screws at the zygomaticomaxillary buttress alone minimizes plate related complications like plate exposure and avoidance of further injury to the infraorbital nerve.

Clinical examples:

Preoperative

postoperative



Patient no:2



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