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Incidence of Zygomatico Maxillary Fracture among the Skull Fracture & Possible Complications

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Abstract:
Introduction: *In the modern era Traumatic skull fracture is a common injury need evaluation to prevent possible complications. Different types of skull base fractures are encountered in the world. Most common facial trauma, simply ignored, may cause complication of intra orbital infection, intra cranial complications & facial deformity. Another most common injury is fracture temporal bone. Bilateral Zygomatico maxillary fracture may be turned in to Le-fort fracture. Facial deformities & diplopia are common complication as a consequence of neglected Zygomatico maxillary fracture.*
Materials and methods: *All together 500 cases of skull fracture cases are under studied by Surgeons, Unit-I & Radiologist of the Medical College together. CT Machine Allenger, 60 slices, Toshiba Company is used in the study. Age of the patients is 5 to 80 years. CT scan of all head injury patient are examined carefully & findings are recorded in the* ***Excel*** *table for analysis. Temporal bone fracture cases are further segregated for different types, structures (parts) involved in the fracture.*
Results: *Out of 500 cases of skull fracture 97 cases of Zygomatico maxillary fracture were observed. These fractures are either simple involving the maxillary sinuses, Greater wing of sphenoid &Zygomatico arch or complex Zygomatico maxillary fracture involving orbital cavity, lesser wing of sphenoid & temporal bone. Bilateral Zygomatico maxillary fracture turns in to Le-fort fracture. Injury to the lesser wing may cause compression of the optic canal & injuries associated with the structure passing through the superior, inferior orbital fissure.*
Conclusion: *In the study one clear idea is that most of the time, floor of the orbit is involved in the fracture in such a way that blow in occurs in the form of elevation of the floor of orbit, roof of the maxillary sinus. The elevated or intruded bone piece, either from the floor or the orbital wall, impinges the extra ocular muscles. Hematoma formation & rupture of the eye ball may occur.*
Keywords: *Traumatic skull fracture, Zygomatico maxillary fracture, complex Zygomatico maxillary fracture.*

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I. Introduction:

In the modern era Traumatic skull fracture is a common injury need evaluation to prevent possible complications. Different types of skull base fractures are encountered in the world. Most common facial trauma, simply ignored, may cause complication of intra orbital infection, intra cranial complications & facial deformity. Another most common injury is fracture temporal bone. Bilateral Zygomatico maxillary fracture may be turned in to Le-fort fracture. Facial deformities & diplopia are common complication as a consequence of neglected Zygomatico maxillary fracture.

Because of traffic congestion & fast life style in the modern world such type of study is required to evaluate the complication associated with any skull fracture.

The frequency of ZMC fractures is second only to nasal structure, function and fractures, which are the most common type of facial fractures. It has an important role in protecting the eye, and participates in the formation of orbital cavity, the maxillary sinus, the temporal fossa, and the zygomatic arch. The main causes of fractures are trauma due to RTAs, assaults, falls, sports related injuries, and the civilian warfares.

Aim and object:
Role of study Zygomatico maxillary fracture is to evaluate incidence, involvement of other surrounding structure & associated complications.

Study design:
Observational study
Setting: Jawaharlal Nehru Institute of Medical Sciences, Porompat, Imphal Manipur

II. Material & Method:

All together 500 cases of skull fracture cases are under studied by Surgeons, Unit-I & Radiologist of the Medical College together. CT Machine Allenger, 60 slices, Toshiba Company is used in the study. Age of the patients is 5 to 80 years. CT scan of all head injury patient are examined for the carefully & findings are recorded in the **Excel** table for analysis. Temporal bone fracture cases are further segregated for different types, structures (parts) involved in the fracture.

Duration:
Study is for a period of 2 years.

Inclusion criteria:
All head injury patients attended in the Accident and Trauma Centre (ATC), JNIMS.

Exclusion criteria:
1. Skull fracture involving only the small appendage like, nasal bone & mandible.
2. Previously skull operated for other disease process or injuries.
   Study in JNIMS is for 2 years from 1st May 2015 to 31st April 2017. Patients attended in the trauma centre as well as attended in the OPD, Surgery Unit-I were included in the study.

Ethical Approval:
Ethical approval was taken.
Procedure:

CT scan findings of all Head injury patients are precisely observed. Finding data are entered in the excel sheet. Total number Zygomatico maxillary fractures are segregated, scaled the type of fracture, frequency & associated injury of vital structures in the maxillary bone, orbit, Temporal & sphenoid bones. Out of 500 cases of skull fracture, 97 cases of Zygomatico maxillary fracture were detected. Complex Zygomatico maxillary fractures are most common.

III. Results:

Out of 500 cases of skull fracture 97 cases of Zygomatico maxillary fracture were observed. These fractures are either simple involving the maxillary sinuses, Greater wing of sphenoid &Zygomatico arch or complex Zygomatico maxillary fracture involving orbital cavity, lesser wing of sphenoid & temporal bone. Bilateral Zygomatico maxillary fracture turns in to Le-fort fracture. Injury to the lesser wing may cause compression of the optic canal & injuries associated with the structure passing through the superior, inferior orbital fissure.

Table 1: Segregation of different types of skull fracture out of 500 study cases

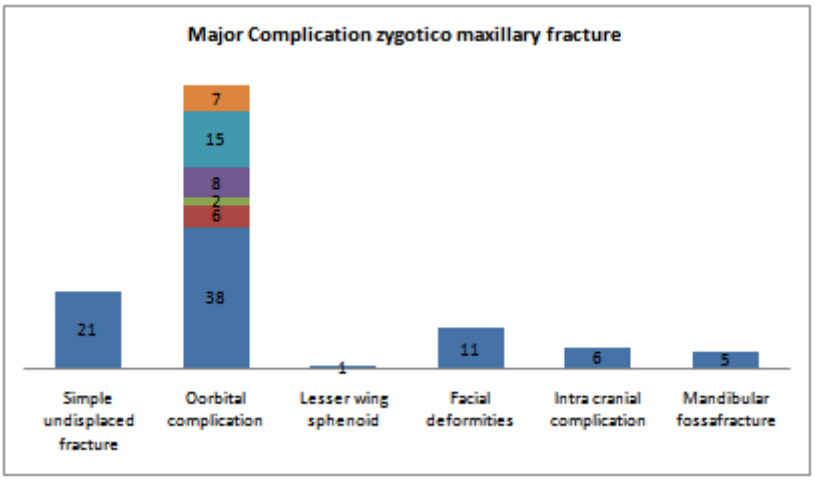
Type of skull fracture	Total no. of fracture	percentage	Associated complications
A. Individual bone skull bone fracture			
Parietal bone fracture	40	08	
Occipital bone fracture	49	10	
Frontal bone fracture	55	11	
Temporal bone fracture	119	23.6	
Combine skull vault fracture	20	4.0	
Combine skull base fracture	**36**	**7.2**	
B. Facial bone fracture-complex			
Zygomatico maxillary fracture	97	19.4	
Le-fort fracture	06 (type I, 4; Type –II, 2)	1.2	
Frontal sinus fracture	18 (Rt.05, Lt. 10, Bilateral 03)	3.6	
Nasal bone fracture	31	6.2	
Orbital fracture	19 (Rt. 07, Lt. 08, Bilateral 02 Eye ball rupture-01)	3.8	
C. Anterior cranial fossa only	**00**		
D. **Middle cranial fossa only**	05	1.0	
E. **Posterior cranial fossa only**	02	0.4	
F. **Complete skull fracture**	04 (complete coronal, 03; Complete sagital fracture 01)	0.8	

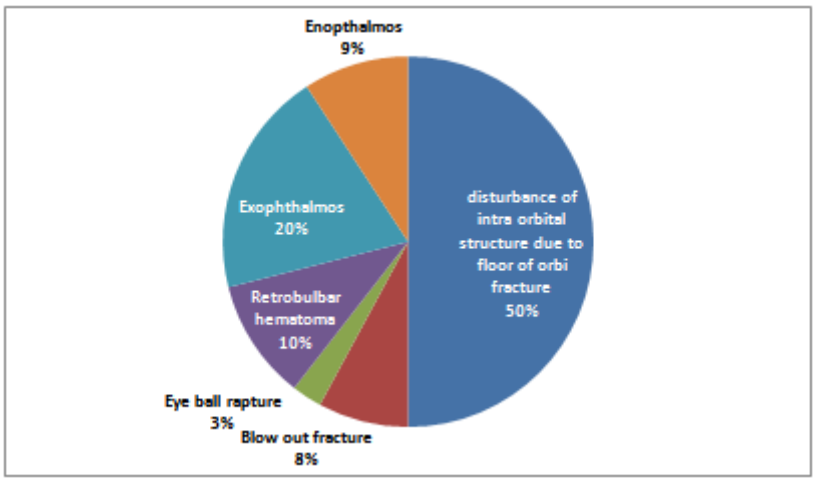
Table 2: Bones involved in the Zygomatico maxillary fracture & complications

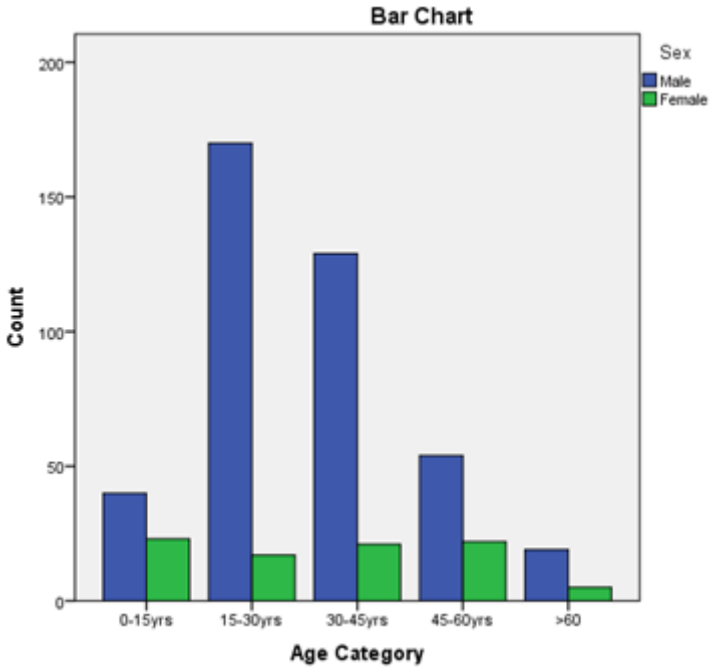
Total ZYM fracture	Simple undisplaced ZYM fracture	Complex Zygomatico maxillary fracture With Structures involved						Additional structure involved in the Zygomatico maxillary fracture	
97/ 500 cases ofdifferent skull fracture		Fracture Floor of epsilateral orbit	Medial wall fracture	Orbital margin fracture	Extraocular muscle impingement	Eye ball rupture	Lesser wing of spheno id fracture	Temporomandibular joint & squamous part of Temp.bone	Upper alveolus
	21	38	6	7	2	2	1	22	2

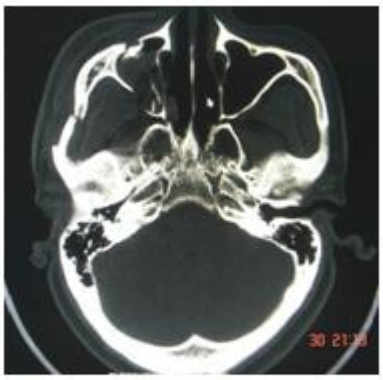
Table 3: Major Complication Zygomatico maxillary fracture

Simple undisplaced fracture	Orbital complication						Lesser wing sphenoid	Facial deformities	Intra cranial complication	Mandibular fossa fracture
	Disturbance of intra orbital structure due floor fracture	Blow out fracture	Eye ball rupture	Retro bulbar hematoma	Exophthalmos	Enopthalmos	Compression of optic nerve	Compression of malar eminence with diplopia	Extra dural, subdural & intra axial hematoma	Tinitus& compromised TM joint movement
21	38	6	2	8	15	7	1	11	6	5

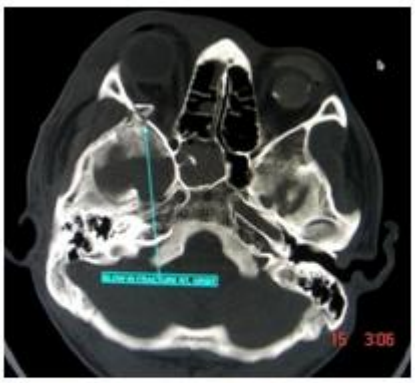




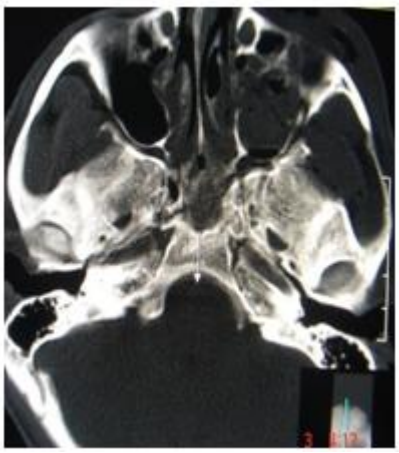




Right Zygomatico maxillary fracture



Blow in fracture bony piece involved in the right Zygomatico maxillary fracture



Left Zygomatico maxillary fracture

IV. Discussion:

The integrity of the zygoma is well established as critical in the maintenance of normal facial width and prominence of the cheek. Three principle buttresses need to be considered in midface fractures. The medial or nasomaxillary buttress reaches from the anterior maxillary alveolus to the frontal cranial attachment. The second is the pterygomaxillary, or posterior buttress, which connects the maxilla posteriorly to the sphenoid bone. The third is the lateral or zygomaticomaxillary buttress. This important buttress connects the lateral maxillary alveolus to the zygomatic process of the temporal bone. These buttresses help give the zygoma an intrinsic strength such that blows to the cheek usually result in fractures of the zygomatic complex at the suture lines, rarely of the zygomatic bone.

Fracture lines usually run through the infraorbital rim, involve the posterolateral orbit, and extend to the inferior orbital fissure. The fracture line then continues to the zygomatic sphenoid suture area and on to the frontozygomatic suture line.[2]

Lothrop was the first to describe an antrostomy approach in which he reached the fractured zygoma through the Highmore antrum below the inferior turbinate. He then was able to rotate the fractured zygoma upward and outward for a proper reduction. This transantral approach is known today as the Caldwell-Luc approach.

V. Conclusion:

In the study one clear idea is that **most of the time, floor of the orbit is involved in the fracture in such a way that blow in occurs in the form of elevation of the floor of orbit, roof of the maxillary sinus.** The elevated or intruded bone piece, either from the floor or the orbital wall, impinges the extra ocular muscles. Hematoma formation & rupture of the eye ball may occur.

Most unwanted fracture is fracture involving the depression of zygomatic bone leading to facial deformity. Post correcting operative results is satisfactory to achieve the original shape.

Exophthalmos is fairly common in these cases due to compression of the orbital cavity by the deformed surrounding bony structures, hematoma & blow in fracture of orbit.

Fracture lesser wing of sphenoid leads to compression of the optic canal & impingement of the optic nerve.

Fracture condylar fossa of the temporal bone leads to difficult chewing & tinitus. The intra cranial complications are rare, however hemorrhagic contusion are the common complication in the epsilateral basifrontal area.

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