COMPARISON BETWEEN SUBTARSAL AND SUBCILIARY INCISION IN MANAGEMENT OF ZYGOMATCO-ORBITAL FRACTURE.

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ABSTRACT

Objective: To compare outcome between the subtarsal and subciliary incision in management of zygomatic-orbital fracture in terms of postoperative ectropion. **Subject and Methods:** This prospective analytical cross-sectional study was performed at department of Oral & Maxillofacial Surgery, Liaquat University of Medical & Health Sciences, Jamshoro. Thirty-two patients of either gender, age 20 to 30 years having isolated zygomatic-orbital fracture were selected by consecutive sampling (16 patients in Subciliary and 16 in Sub-tarsal group), whereas patients with history of zygomatic-orbital fracture, neurological disorder, systemic diseases or immunocompromised patients were excluded. Zygomaticorbital fracture was confirmed by 3D CT scan and PA view of face. After surgery ectropion was monitored for three-weeks as outcome. **Results: -** Out of 32 zygomaticomaxillary complex fractured patients, male prevalence was high 27 (84.4%) then female patients 5 (15.6%). Most affected age group 21-25 years with 17 (53.1%) patients followed by 26-30 years with 15 (46.9%) patients with mean age of 25.59 ± 3.004 years. Postoperative ectropion was found significantly normal in subtarsal group as compared to subciliary group in all three postoperative weeks. **Conclusion**: It was concluded that rate of postoperative complications (ectropion) was high in subciliary incision group as compared to subtarsal incision group

Key Words: Subtarsal, Subciliary, Zygomatico-orbital, Fracture, Scar, Ectropion.

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INTRODUCTION

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

Orbital fractures represent one of the more common conditions encountered today in our modern mechanized life which produces multiple injuries that involve the maxillofacial region, be it the blowout variety or as a part of more complex zygomatic fractures[2].

The zygomaticomaxillary complex (ZMC) is a major buttress of the midfacial skeleton. It is important to structural, functional, and aesthetic appearances of the facial skeleton. A zygomaticomaxillary complex fracture is also known a tripod, tetrapod or quadripod fracture, trimalar fracture or malar fracture [3]. These anatomic regions are vulnerable to fracture due to prominence of the zygomaticomaxillary complex and delicacy of some orbital bones. Complications of these fractures include depression of the malar region, enophtalmos, injury to the globe and optic nerve and consequent blindness, sensory disturbance of the infraorbital nerve, trismus, injury to central nervous system, and even death. Therefore, management of these fractures is of considerable importance [4].

Management of zygomaticoorbital fractures is performed based on degree of involvement and includes closed and open reduction. However, closed reduction is less commonly used due to factors such as inability to judge the sufficiency of reduction. Several incisions can be used for providing access to the underlying bones in open reduction technique when repairing a zygomatic fracture [4].

The ideal surgical incision to treat fractures should provide maximum exposure of the fractured segments; ensure less potential of injury to facial structures, in order to improve cosmetic results. Many incisions that use for management of the zygomatic fracture i.e like subciliary incision, subtarsal incision and transconjuctival incision [4].

Subciliary incision was first utilized by Converse in 1944 to provide access to the orbital region. This incision is applied a few millimeters below the ciliary line and parallel to it and is performed from punctum in medial continuing to the lateral canthus[4].
Subtarsal incision was suggested by Converse in 1960. This incision is a modified version of skin-muscle subciliary incision, in which the incision is made along the inferior border of the tarsal plate in the natural subtarsal crease [4].
Facial fractures may lead to sequelae due to the trauma but also as a result of surgery. Complications to lower eyelid incisions are ectropion, scleral show, entropion, canthal malposition, and lid edema, all of which are aggravating since they are usually noticeable. Additionally, ectropion cause runny eyes, especially outdoors, and entropion often result in pain as the cilia contact and irritate the cornea. Moreover, lower lid and lacrimal lacerations can occur, although this is rare [5].
The subtarsal approach has a low risk of ectropion or scleral show but most often result in a visible and rarely hypertrophic scar. In comparison, the subciliary approach gives a less visible scar but comes with a risk of lid edema and a risk of ectropion and scleral show[5,6].

MATERIALS AND METHODS

This is a prospective analytical study with Non-probability consecutive sampling technique conducted at Oral and Maxillofacial Surgery Department of Liaquat University of Medical & Health Sciences, Jamshoro/Hyderabad, Pakistan from December 2018 to August 2019.
Sample Size: The sample size calculated was 32. which was divided in two groups i.e., Sub-ciliary=16 and Sub-tarsal= 16 surgical approach.

INCLUSION CRITERIA: Patient having isolated zygomatic-orbital fracture. Patient of either gender with age of 20 - 30 years. Patient signed the informed consent to take part in the study.

EXCLUSION CRITERIA: Patient having neurological disorders. Patient having any systemic diseases. Immunocompromised patients. Patient with past history of zygomatic fracture.

Data Collection Procedure:

Patients with zygomatic-orbital fracture fulfilling the inclusion criteria of study were selected. After consent form, standard photographs were taken from the patients with the midsagittal plane perpendicular to ground and patients looking straight to the lens. These photographs were used for further comparisons after surgery. The sample size was distributed in 2 groups (Group A: Subtarsal Incision, Group B: Subciliary Incision)

Group A: Subtarsal Incision

Operative Procedure:

All surgical procedures were performed by one surgeon under general anesthesia under aseptic technique. One cartridge contains 2.0% Lidocaine (1.8 mL) and epinephrine 1: 100,000 were injected through the incision line to control bleeding. The incision was made by surgeon from lower border of tarsal plate in subtarsal fold. The size of incision was 5 to 7mm, starting from lower eyelid margin and ends up to inferolateral. Scar inversion was prevented by encountering the orbicularis muscle and dividing it in fibers direction just few millimeters below from the incision skin. It also helps in preserving the all innervations to pretarsal and preseptal orbicularis. Direction of incision was down towards the infraorbital rim level in preseptal plane. Finally, periosteum was incised that exposed the fracture. For closure of the incision, periosteum was suture by using absorbable material and skin was sutured by single nylon 6-0 sutures.

Group B: Subciliary Incision

Operative Procedure:

All surgical procedures were performed by one surgeon under general anesthesia under aseptic technique. One cartridge contains 2.0% Lidocaine (1.8 mL), and epinephrine 1: 100,000 were injected through the incision line to control bleeding. Subciliary incision was performed by incising the skin about 2 mm below the ciliary line. Then, the skin covering the orbicularis oculi muscle was elevated for 4-6 mm. Dissection was performed by using orbital rim in the preseptal plane. Thereafter, the orbicularis oculi muscle was divided and the periosteum covering the orbital rim was exposed. The periosteum was then incised by scalpel and the underlying bone was exposed by using periosteal elevator. For closure of the incision, periosteum was suture by using absorbable material and skin was sutured by single nylon 6-0 sutures.

Assessment:

After 1 week, 2 weeks, and 3 weeks, the standard photographs were repeated, and presence or absence of ectropion was assessed by comparing the degree of palpebral fissure opening in pre-operative and 1 week, 2weeks, and 3-week postoperative photographs

RESULTS

Out of 32 zygomaticomaxillary complex fractured patients, male prevalence was high 27 (84.4%) then female patients 5 (15.6%) as shown in Table 1. Most affected age group was 21-25 years with 17 (53.1%) patients followed by 26-30 years (Table 2). with 15 (46.9%) patients with mean age of 25.59 ± 3.004 years (Table 3). Postoperative ectropion in 1st week was normal in 5 cases of subtarsal group (31.3%) and 0 cases in subciliary group (0.0%), in 2nd week it was found normal in 7 cases in subtarsal (43.8%) and 0 cases in subciliary group (0.0%) and in 3rd week it was found normal in 11 cases in subtarsal group (68.8%) and in 2 cases of subciliary group (12.5%) see Table 4 to 6.

TABLE: 1. Patients distribution according to gender (n=32)

Gender	Surgical groups		Total	P-value
	Subtarsal (n=16)	Subciliary (n=16)		
Male	14 (87.5%)	13 (81.2%)	27 (84.4%)	0.6
Female	2 (12.5%)	3 (18.8%)	5 (15.6%)	
Total	16 (100%)	16(100%)	32 (100%)	

TABLE: 2. Patients distribution according to age (n=32)

Age groups	Surgical groups		Total	P-value
	Subtarsal (n=16)	Subciliary (n=16)		
21-25	8 (50%)	9 (56.2%)	17 (53.1%)	0.7
26-30	8 (50%)	7 (43.8%)	15 (46.9%)	
Total	16 (100%)	16(100%)	32 (100%)	

TABLE: 3. Descriptive statistics of age (n=32)

Variables	Surgical groups		Total	P-value
	Subtarsal (n=16)	Subciliary (n=16)		
N	16	16	32	0.003
Minimum	21	21	21	
Maximum	30	30	30	
Mean	25.63	25.56	25.59	
SD	3.052	3.054	3.004	

TABLE: 4. Patients distribution according to Postoperative Ectropion (1st Week) (n=32)

Ectropion	Surgical groups		Total	P-value
	Subtarsal (n=16)	Subciliary (n=16)		
0	5 (31.3%)	0 (0.0%)	5 (15.6%)	0.001
I	2 (12.5%)	0 (0.0%)	2 (6.3%)	
II	5 (31.3%)	0 (0.0%)	5 (15.6%)	
III	4 (25.0%)	1 (6.3%)	5 (15.6%)	
IV	0 (0.0%)	3 (18.8%)	3 (9.4%)	
V	0 (0.0%)	4 (25.0%)	4 (12.5%)	
L	0 (0.0%)	3 (18.8%)	3 (9.4%)	
M	0 (0.0%)	2 (12.5%)	2 (6.3%)	
T	0 (0.0%)	3 (18.8%)	3 (9.4%)	
Total	16 (100%)	16(100%)	32 (100%)	

TABLE: 5. Patients distribution according to Postoperative Ectropion (2nd Week) (n=32)				
Ectropion	Surgical groups		Total	P-value
	Subtarsal (n=16)	Subciliary (n=16)		
0	7 (43.8%)	0 (0.0%)	7 (21.9%)	0.003
I	3 (18.8%)	0 (0.0%)	3 (9.4%)	
II	3 (18.8%)	3 (18.8%)	6 (18.8%)	
III	3 (18.8%)	3 (18.8%)	6 (18.8%)	
V	0 (0.0%)	5 (31.3%)	5 (15.6%)	
L	0 (0.0%)	4 (25.0%)	4 (12.5%)	
M	0 (0.0%)	1 (6.3%)	1 (3.1%)	
Total	16 (100%)	16(100%)	32 (100%)	

TABLE: 6. Patients distribution according to Postoperative Ectropion (3rd Week) (n=32)				
Ectropion	Surgical groups		Total	P-value
	Subtarsal (n=16)	Subciliary (n=16)		
0	11 (68.8%)	2 (12.5%)	13 (40.6%)	0.01
I	2 (12.5%)	4 (25.0%)	6 (18.8%)	
II	1 (6.3%)	3 (18.8%)	4 (12.5%)	
III	2 (12.5%)	1 (6.3%)	3 (9.4%)	
IV	0 (0.0%)	1 (6.3%)	1(3.1%)	
V	0 (0.0%)	5 (31.3%)	5 (15.6%)	
Total	16 (100%)	16(100%)	32 (100%)	

DISCUSSION:

Human face is most prominent part of human body, as well as most vulnerable part to injuries. Facial fractures are more common in trauma, making more than 30.0% of total trauma, increasing the morbidity, defacement, functional deficit, as well as high burden of expenditures[1,7]. Injuries or fracture of zygoma and its adjacent facial bones are known as zygomatic-orbital fracture. These are the most common fractures in maxillofacial trauma and misinterpreted by the Surgeons, leads to the diagnostic error.[8,9]

This prospective analytical cross-sectional study was performed at department of Oral & Maxillofacial Surgery department of Liaquat University of medical and health sciences. Most of the studies from literature reported that young male adults having age 15 to 30 years were at higher risk of suffering from zygomatic complex fractures due to road accidents. A study by Gomes PP et al [10] conducted the research on zygomatic complex fractures for five years on 371 patients reported that most of the injuries were in male and in age group of 21-40 years. Another study by Salentijn EG et al[11] on surgical and non-surgical management of zygomatic complex fractures reported t zygomatic complex fractures in 77.9% male patients and 22.1% female patients with mean age of 38.8 ± 15.7 years. Our research reported the similar results with higher overall male 27 (84.4%) prevalence in both subtarsal group 14 (87.5%), and subciliary group 13 (81.3%), whereas lower prevalence of overall female 5 (15.6%) in both subtarsal and subciliary group. Most affected age group 21-25 years with 17 (53.1%) patients followed by age group 26-30 years with 15 (46.9%) patients with mean age of 25.59 ± 3.004 years in both subtarsal group and subciliary group. In our study gender and age of patients either in subtarsal or subciliary group have similar results with other researches reporting high incidence of male patients with younger age of 21-30 years with no significant difference in age of male and female zygomatic complex fractured patients.[12,13]

In our study after surgery of zygomatic-orbital fracture postoperative complications ectropion were absent in subtarsal group and present in subciliary group. Postoperative complications were monitored for three consecutive weeks in both subtarsal and subciliary groups. Results of study shows that incidence of postoperative complication was low in subtarsal group as compared to subciliary group, whereas incidence of postoperative complication was continuously decreased from first week to third week in both groups.

Comparison of both groups shows that subtarsal group patients reported with lower rate of postoperative ectropion as compared to subciliary group. After third week postoperative ectropion was absent in 11 (68.8%) and 2 (12.5%) patients in subtarsal and subciliary group respectively. Remining five patients of subtarsal group were suffering from grade I to III whereas fourteen patients of subciliary group were suffering from grade I to V.

Similar lower prevalence of postoperative complications was reported by different researchers. A study by Subramanian B et al.[2] on zygomatic complex fractures reported no any complication in subciliary and subtarsal group. A study by Ashwin DP et al.[14] reported the postoperative ectropion in 4.3% patients, and wound dehiscence in 6.5% patients. Other studies by Eski M et al [15] and Yamsani B et al [16] also reported the lower prevalence of postoperative complications. Similar to other studies, incidence of postoperative complication in zygomatic complex fracture treated patients was very much low in our study either in subciliary or subtarsal group.

CONCLUSION:

Zygomatic-orbital fractures were surgically managed either by subtarsal or subciliary incision. It was concluded that such fractures reports more in males as compared to females in our part of world. Rate of postoperative complications (ectropion) was high in subciliary incision group as compared to subtarsal incision group.

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