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ORIGINAL ARTICLE

Subciliary and Subtarsal Incision in Management of Zygomatico-Orbital Fracture, A Study on Scar Assessment

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ABSTRACT

Objective: To evaluate outcome between the subciliary and subtarsal incision in management of zygomatico-orbital fracture in terms of postoperative scar assessment.

Subject and Methods: A total 36 patients of either gender, age 21 to 40 years having isolated zygomatico-orbital fracture were selected by consecutive sampling (16 patients in Subciliary and 16 in Sub-tarsal group). Zygomatico-orbital fracture was confirmed by 3D CT scan and Occipitomental view of face. After surgery postoperative scar assessment (Pigmentation, Pliability, Vascularity and height) was performed using Vancouver scar scale.

Results: Male participants accounted for 27 (84.4%) of the 32 zygomaticomaxillary complex fractured patients, followed by 5 female patients (15.6%). With 17 (53.1%) patients, the age group 21-25 years was the most afflicted, followed by 26-30 years with 15 (46.9%) patients and a mean age of 25.59 ± 3.004 years. In all three postoperative weeks, the subtarsal group performed considerably better than the subciliary group in terms of postoperative scar evaluation.

Conclusion: Scar formation was higher in subciliary group as compared to subtarsal group

Keywords: Subtarsal, Subciliary, Zygomatico-orbital, Fracture,Scar, Assessment

INTRODUCTION

Human face is most prominent part of human body, as well as most vulnerable part to injuries. Facial injuries are the most common type of injuries presented in emergency. Facial injuries are most commonly observed in young age especially age ranging from 15 years to 30 years. The most common causes of facial fracture in young age is either due to road accident or interpersonal violence, whereas facial injuries in elder age patients > 50 years are due to fall.[1]

Two key aesthetic and functioning face components are the zygomaticomaxillary complex and orbit. Because of the predominance of the zygomaticomaxillary complex and the fragility of certain orbital bones, such anatomic areas are prone to fracture.[2,3] Zygomatico-orbital fractures are amongst the more frequent midfacial fractures, as reported by various studies.[3]

Either the infraorbital rim and the orbital floor can be reached using transcutaneous and transconjunctival methods for the treatment of orbital and periorbital fractures . Subciliary (SCA), subtarsal (STA), and infraorbital (IOA) methods are among the transcutaneous options. Objectives such as excellent intraoperative vision, minimum postoperative scars, and satisfactory aesthetic results determine the choice of the most optimal surgical method.[4,5]

Subciliary incision was initially employed by Converse in 1944 to allow accessibility to the orbital area. This incision runs from the punctum in the medial canthus to the lateral canthus, a few millimetres beneath and parallel to the ciliary line.[6] Converse proposed subtarsal incision in the 1960s. The incision is created all across inferior border of the tarsal plate in the natural subtarsal wrinkle, which is a customized form of the skin-muscle subciliary incision. The orbicularis oculi muscle is separated several millimetres below the skin in the orientation of its fibres to avoid scar formation. The incision is then extended inferiorly on a preseptal plane at the level of the infraorbital rim.[7]

A cutaneous approach spares the conjunctiva, bypasses the tansconjunctival related complications. A thorough comprehension of each incisional approach necessitates an awareness of the pertinent anatomy as well as the potential for problems. Based on the patient's age and the extent of the fracture, each of these techniques has benefits and drawbacks which may render it more or less desirable to employ.[8]

SCA and STA both give adequate visibility and accessibility to the infraorbital rim and orbital floor fractures, but they contrast in respect of ease of use, time to acquire access, and aesthetic effects.[9] These methods create a scar, which can be unsightly at times.[10] Since the eyelids are so important to facial aesthetics, even slight modifications in their design can have a significant influence on the aesthetics and psychological results of sufferers.

Many individuals are concerned that an exterior incision would result in an unattractive outcome or a stigmatizing scar. In light of this, the researchers sought to investigate whether the subciliary or subtarsal technique is superior in this regard.

MATERIAL AND METHODS

This Comparative cross sectional study with Non-probability consecutive sampling technique was conducted at Oral and Maxillofacial Surgery department of Liaquat University of Medical & Health Sciences, Jamshoro/Hyderabad, Pakistan from December 2019 to November 2020. The sample size calculated was 32. This was divided in two groups, 16 each for subciliary and subtarsal group respectively. Patient having isolated zygomatic-orbital fracture with either gender having age range of 21 - 40 years were included in the study. Subjects with systemic illness, neurological disorders, immunity reasons and history of previous ZMC fracture were excluded from research.

Patients with zygomatic-orbital fracture fulfilling the inclusion criteria of study were selected. All patients gave a written informed consent and all outcomes/consequences were explained in detail. The sample size was distributed in 2 groups (Group A: Subciliary Incision, Group B: Subtarsal Incision). All surgical procedures were performed by same surgeon under general anesthesia under aseptic technique. T

The subciliary incision was placed about 2 mm caudal to the ciliary line. Dissection was done in a stepped skin-muscle flap fashion, keeping the pretarsal fibers of the orbicularis muscle attached to the tarsal plate. The subtarsal incision was placed about 5 to 7 mm below and parallel to the ciliary margin. In both the approaches after fixation of fracture with titanium miniplates, a 5-0 absorbable vicryl suture was used to re-approximate the orbicularis muscle. The skin was approximated by 5-0 prolene continuous suture. Scars were evaluated postoperatively at 1st, 2nd and 3rd week by Vancouver Scar scale (VSS).

Vancouver Scar Scale

Score	Pigmentation	Vascularity	Pliability	Height
0	Normal	Normal	Normal	Normal
1	Hypopigmentation	Pink	Supple	< 2 mm
2	Hyperpigmentation	Pink to red	Yielding	2-5 mm
3		Red	Firm	> 5 mm
4		Red to purple	Banding	
5		Purple	Contracture	

The categorical variables like gender, type of surgical approach and post-operative assessment of scar was calculated in frequency and percentage, while mean and SD was calculated for age. Chi-square was applied between type of surgical approach and outcome variables (Scar formation) to check the statistical difference. P-value <0.05 was used as significant.

RESULTS

In this study 27 (84.4%) were male among which 14 (87.5%) were in subtarsal group, and 13 (81.2%) in subciliary group, whereas 5 (15.6%) patients were female among which 2 (12.5%) were in subtarsal group, and 3 (18.8%) in subciliary group. Overall mean and standard deviation (SD) was 25.59 ± 3.004 years, whereas 25.63 ± 3.052 and 25.56 ± 3.054 years in subtarsal and subciliary surgical groups respectively as shown in table 1.

In terms of postoperative pigmentation, Vascularity, pliability and height; results were more acceptable in subtarsal group as compared to subciliary group. Detailed results of above variables have been mentioned in Table 2 and 3.

Table 1: Showing Gender Distribution and Age

Variables	Surgical groups		P-value
	Subciliary (n=16)	Subtarsal (n=16)	
Gender Male Female	13 (81.2%) 3 (18.8%)	14 (87.5%) 2 (12.5%)	0.6
Age Mean and SD	25.56±3.054	25.63±3.052	0.003

Table 2: Patients distribution according to postoperative scar

Scar assessment	Group A: Subciliary (n=16)			
	1st Week	2nd Week	3rd Week	P Value
Pigmentation Normal Hypopigmentation Hyperpigmentation	5 (31.3%) 5 (31.3%) 6 (37.5%)	6 (37.5%) 4 (25.0%) 6 (37.5%)	9 (56.3%) 2 (12.5%) 5 (31.3%)	0.1
Vascularity Normal Pink Pink to Red Red Red to Purple Purple	4 (25.0%). 0 (0.0%) 3 (18.8%) 2 (12.5%) 2 (12.5%) 5 (31.3%)	4 (25.0%) 3 (18.8%) 3 (18.8%) 2 (12.5%) 4 (25.0%) 0 (0.0%)	7 (43.8%) 2 (12.5%) 3 (18.8%) 4 (25.0%) 0 (0.0%) 0 (0.0%)	
Pliability Normal Supple Yielding Firm Banding Contracture	4 (25.0%) 0 (0.0%) 0 (0.0%) 4 (25.0%) 2 (12.5%) 6 (37.5%)	4 (25.0%) 2 (12.5%) 2 (12.5%) 2 (12.5%) 3 (18.8%) 3 (18.8%)	7 (43.8%) 2 (12.5%) 1 (6.3%) 2 (12.5%) 2 (12.5%) 2 (12.5%)	
Height Normal >2mm 2 to 5mm < 5mm	4 (25.0%) 1 (6.3%) 3 (18.8%) 8 (50.0%)	5 (31.3%) 4 (25.0%) 4 (25.0%) 3 (18.8%)	9 (56.3%) 1 (6.3%) 4 (25.0%) 2 (12.5%)	

Table: 3. Patients distribution according to postoperative scar

Scar Assessment	Group B: Subtarsal (n=16)			
	1st Week	2nd Week	3rd Week	P Value
Pigmentation Normal Hypopigmentation Hyperpigmentation	11 (68.8%) 2 (12.5%) 3 (18.8%)	12 (75.0%) 3 (18.8%) 1 (6.3%)	14 (87.5%) 1 (6.3%) 1 (6.3%)	0.1
Vascularity Normal Pink Pink to Red Red Red to Purple Purple	8 (50.0%) 4 (25.0%) 0 (0.0%) 4 (25.0%) 0 (0.0%) 0 (0.0%)	9 (56.3%) 3 (18.8%) 2 (12.5%) 2 (12.5%) 0 (0.0%) 0 (0.0%)	12 (75.0%) 0 (0.0%) 2 (12.5%) 2 (12.5%) 0 (0.0%) 0 (0.0%)	
Pliability Normal Supple Yielding Firm	8 (50.0%) 0 (0.0%) 4 (25.0%) 4 (25.0%)	8 (50.0%) 4 (25.0%) 1 (6.3%) 3 (18.8%)	13 (81.3%) 0 (0.0%) 1 (6.3%) 2 (12.5%)	
Height Normal >2mm 2 to 5mm	9 (56.3%) 3 (18.8%) 4 (25.0%)	11 (68.8%) 3 (18.8%) 2 (12.5%)	13 (81.3%) 2 (12.5%) 1 (6.3%)	

DISCUSSION

Subciliary, subtarsal, and infraorbital incisions are the most common cutaneous routes to the infraorbital rim. John Converse popularized the subtarsal incision.[11] 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 Haghighat[2] on management of zygomaticoorbital Fractures reported 7 (13.71%) females and 44 (86.29%) males aging from 17 to 44 years (mean±SD=26.70±6.52). Another study by Salentijn EG[12] et al conducted the research on surgical and non-surgical management of zygomatic complex fractures and reported the 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 and in both subtarsal group 14 (87.5%), and subciliary group 13 (81.3%), whereas lower prevalence of overall female 5 (15.6%) and in both subtarsal group 2 (12.5%), and subciliary group 3 (18.8%).

In this study postoperative pigmentation comparison of both groups shows that subtarsal group patients were reported with lower rate of postoperative pigmentation as compared to subciliary group. After third week postoperative pigmentation was absent in 14 (87.5%) and 9 (56.3%) patients in subtarsal and subciliary group respectively. Postoperative vascularity comparison of both groups shows that subtarsal group patients was reported with lower rate of postoperative vascularity as compared to subciliary group. After third week postoperative vascularity was absent in 12 (75.0%) and 7 (43.8%) patients in subtarsal and subciliary group respectively. After third week postoperative pliability was absent in 13 (81.3%) and 7 (43.8%) patients in subtarsal and subciliary group respectively. Postoperative height comparison of both groups shows that subtarsal group patients was reported with lower rate of postoperative height as compared to subciliary group. After third week postoperative height was absent in 13 (81.3%) and 9 (56.3%) patients in subtarsal and subciliary group respectively.

Findings of this study showed that subtarsal group sustained fewer complications in terms of scar as compared to subciliary group. The major benefits of the subtarsal approach are cosmetics, inconspicuous scarring, and the ability to execute a lateral extension, which allows accessibility to the whole lateral border of the orbit.[13] De Riu et al stated that apparent scar was more commonly detected in the subciliary group, which is comparable to our findings.[14] According to a study conducted by Mahajan R, scars were imperceptible in 25 individuals, light scars in four patients, and significant scars in one patient who had subtarsal incision.[13] In the research by Fleiner et al, none of the 52 patients treated with subciliary incision had an undesirable scar.[15] A retrospective study of 16 subciliary incisions, 91 subtarsal incisions and 23 infraorbital incisions4 also demonstrated that, considering the craniocaudal placement of the incisions, the esthetic

appearance of the scar deteriorates from the subciliary margin downwards.[16] Crosara JDM[17] in his study did not find any statistically significant difference was observed with respect to the scar appearance between the subciliary and the subtarsal incisions groups. However, Holtmann et al[18] did not find any statistically significant difference of imperceptible scars rate among the 45 subciliary incisions, 36 subtarsal incisions and 37 infraorbital incisions evaluated in their research. Appropriate soft tissue sealing may have an impact on the scar's cosmetic aspect. It's preferable to start with the periosteum and close in layers from there.

CONCLUSION

Based on the present study, we conclude that subtarsal incision is a good approach for fractures of zygomatico-orbital in terms of postoperative scar. The present study suggests the superiority of the subtarsal incisions, and advocates its use.

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