

Transconjunctival retroseptal vs. transcutaneous infraorbital approach out comes in the treatment of infraorbital rim and orbital floor fractures . Prospective study

نتائج عملية فتح خلال الجفن السفلي خلف الحاجز و عملية فتح تحت الجلد تحت الحافة السفلى للعين لمعالجة كسور محجر العين السفلية وعظم حافة المحجر

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Abstract:

We had many approach to access traumatic orbital fracture, the inferior orbital floor needs to be exposed either a transcutaneous or a Transconjunctiva approach can be taken. The aim of our research was to compare two approach out comes. Patients and Method thirty nine patients were included , twenty one (53.85 %) cases were treated by infraorbital and eighteen (46.15%) with retroseptal approach. Results, the average time exposure of fracture site was 5 minutes with retroseptal approach while from the infra orbital approach it was 11 minutes. Post operative complication was associated with retroseptal approach were 7 cases conjunctival chemosis, 2 cases scleral show and one case transient entropion. While post operative complication associated with infra orbital approach were 4 cases noticeable scar, 3 cases transient infraorbital nerve damages, 3 cases infection of surgical site, 3 cases presented post operatively transient ectropion and 2 cases chronic lid oedema and one case presented with scleral show. Discussion our results revealed that the mean average time need for exposure was 5 minutes with retroseptal approach while from the infra orbital approach it was 11 minutes.

Keywords: Transconjunctival retroseptal , infraorbital approach, Orbital floor, Infraorbital rim.

الخلاصة :

هناك طرق تقنية جراحية عديدة تم وصفها في علاج كسور الوجه والرأس ، محجر العين ، التي تحتاج الى فتح لإظهار الكسر اما بطريقة فتح الجلد (تحت محجر العين) او بطريقة فتح الجفن من داخل العين . الهدف من هذه الدراسة هو للمقارنة بين العلاج بين هاتين الطريقتين. المرضى وطريقة العمل تم علاج تسعة وثلاثون مريضا ، وواحد وعشرون (53.85%) تم علاجهم بطريقة فتح تحت محجر العين وثمانية عشرة (46.15%) مريضا تم معالجتهم بطريقة فتح الجفن من داخل العين. النتائج اظهرت ان زمن عملية الفتح فتح لإظهار الكسر خمسة دقائق للذين عولجوا بطريقة فتح الجفن من داخل العين و احدى عشرة دقيقة للمرضى الذين عولجوا بطريقة فتح الجلد تحت محجر العين. المضاعفات ما بعد اجراء العملية تبين وجود سبعة مرضى يعانون من احتقان الجفن، ومريضين يعانون من توسع الصلبة العينية ومريض واحد شكى من شتر العين . اما المضاعفات المصاحبة للطريقة الثانية فكانت اربعة مرضى يعانون من ندبة واضحة ، ثلاث مرضى يعانون من خلل مؤقت للعصب تحت محجر العين، وثلاث مرضى يعانون من تلوث في موضع العملية وثلاث مرضى يعانون من الشتر الخارجي المؤقت ما بعد العملية ومريضين من تورم مزمن للجفن ومرض واحد يعاني من توسع صلبة العين .

Introduction:

Infra orbital rim and orbital floor fracture can be part of pure orbital, zygomatic and or nasoethmoido orbital fractures. fracture of orbital cavity account for 40% of skull injuries, the floor is frequently fractures because thin which represent 67 to 84 % of orbital injuries [1]. fracture of floor classified as pure or impure blowout type ,pure fracture represent fracture of orbital floor only while impure fracture represent fracture floor and orbital rim [2]. C T- scan imaging very useful to detect orbital floor and walls fractures , coronal reconstruction and abscissa axis type can be determine the engorgement of the inferior oblique and the inferior rectus muscles , and identifying orbital volume herniation or entrapment of muscles into maxillary sinus. Several types of incisions have been used to approach the infraorbital rim and orbital floor, such as conjunctival, subciliary, subtarsal and infraorbital incisions, in addition to the endoscopically assisted intraoral approach [3]. Bourget 1924 first describe the removal of lower eyelid fat through The transconjunctival approach [4].The first reports in the literature of open reduction of infra orbital rim and floor fractures through use of subcilliary incision was first described by Converse in 1944 [5]. Tenzel, Tessier, and Converse [6] in 1973 access through the fornix for exploration and repair fracture of orbital floor to minimize visible scar.

There are two mechanisms that are accepted to be the cause of the orbital floor fractures: The buckling mechanism proposed by Fujino [7] suggests that when there is posterior displacement of the infraorbital rim, the force is transmitted to the orbital floor which buckles and fractures while the rim returns to its normal position without fracturing. The hydraulic theory given by Smith and Regan [8] , suggests that when an object larger than the entrance of the orbit impacts the upper eyelid and the globe, it transmits the kinetic energy to the periocular tissues [9]. This results in an increase in the intraorbital pressure. To relieve this, the floor blows out into the maxillary sinus.

The aim of this study was to compare transconjunctival retroseptal and infraorbital approach out comes in the treatment of infraorbital rim and / or floor fractures in terms of scar appearance ,chronic edema rates ,ectropion and scleral show.

Patients and Methods:

This study was conducted in the two centers, infraorbital approach was completed at Al Sadder Teaching Hospital in Najaf department of Oral and Maxillofacial Surgery and transconjunctival retroseptal approach was operated at Al Specialized surgeries hospital 10th floor in Baghdad from the year 2010 to 20166 after obtaining approval of the institutional ethics committee of university of Kufa and Baghdad and informed consent of the participants. The clinical examination was performed using standard protocols. Clinical features in a patient with an orbital floor fracture are intraocular pain, numbness in certain regions of the face, inability to move the eye, diplopia, blindness, enophthalmus, oedema, herniation , hematoma, infraorbital anesthesia, globe displacement, cranial nerve injuries and globe displacement can be in the form of proptosis, vertical displacement, horizontal displacement, traumatic herniation into maxillary sinus, enophthalmus is by far the most commonest type of globe displacements. All the patients were generally examined for associated injuries and were subjected to routine investigation, which includes routine blood investigation, radiographs (PNS and OPG), Advanced investigation like CT scan. Our study include total number of thirty nine patients which treated surgically. Twenty one (53.85 %) cases (16 males and 5 females) were treated by infraorbital approach and eighteen

(46.15%) patients (15 males and 3 females) were treated with transconjunctival retroseptal approach, average age (19- 47 years) mean age was 33 years. Postoperatively all the patients were followed for 3 months to evaluate ectropion, entropion, and infection of surgical site and other complication.

Methods:

Through the transconjunctival retroseptal approach, in order to perform a forced duction test vicryl 5/0 suture the tarsus of lower eyelid margin and in order to elevate eyeball upward and inward 4/0 silk suture was placed perconjunctivally to the inferior rectus muscle. Lignocaine 2% with 1:80000, adrenaline was injected to the incision site below conjunctival. An incision 5 mm made below the tarsus then cut the conjunctiva by fine scissor, incision was extent medially next to the lacrimal punctum and laterally to the lateral canthus. Blunt dissection used to separate the orbicularis oculi muscle to the orbital septum, therefore identify orbital margin with the finger, The orbital margin was found fragmented and displaced inferiorly then incision on periosteum to exposing the bone, mini plate bone osteosynthesis were plated ,5-0 vicryl used for reapproximated the periosteum. Suturing for closure of lateral canthus tendon and continued to the conjunctiva. There was no Intraoperative complications such as damage to the lacrimal system , corneal abrasion or tearing of eyelid .

infraorbital approach. The infraorbital incision is just above the infra-orbital margin, at the junction of the thicker cheek skin and the thin eyelid skin, the orbicularis muscle is divided overlying the inferior orbital rim^[10]. In order not to damage the lymphatic system of the lower eyelid , incision pass thin laterally ,after exposure the orbital rim the periosteum was incised 3 mm inferior to it to avoid postoperative tethering of the peri orbita and to facilitate good periorbital closure. periosteum are incised coincidentally with consequent prolonged eyelid edema and impaired scar^[11]. The displaced infraorbital rim fracture was reduced under direct vision. The reduced fragment was held in the anatomical position using four hole stainless steel plates (1.5 mm) and screws. The surgical area was debrided and cleaned with saline and antiseptic. The wound was closed in layers by using 3-0 Vicryl for the closure of the orbicularis oculi muscle and 5-0 silk or nylon was used for skin closure. Muscle and skin was closed from medial to lateral end without any tension. The patient advised to avoid blowing of nose to prevent orbital emphysema and visual compromise and instruct to use nasal decongestant sprays, Prophylactic antibiotics have also been prescribed to prevent potential orbital cellulites from bacterial spread if there is a communication between the orbit and the sinuses. Intraoperatively all the patients were evaluated for the operative time required.

Results:

The range of age of the patients was between (19-47) years and mean was 33 years . Twenty one (53.85 %) cases (16 males and 5 females) were treated by transcutaneous infraorbital approach and eighteen (46.15%) patients (15 males and 3 females) were treated with transconjunctival retseptal approach, There were 31 (79.5 %) men and 8 (20.5 %) women. All the patients after exploration through both approaches, reduction and fixation was done for orbital floor fracture with infraorbital bony miniplate osteosynthesis and screws except one case which presented with infra orbital bony excistosis. Intraoperatively all the patients were evaluated for the operative time required from incision to exposure of fracture site, the mean average exposure time required to expose fracture site with infra orbital approach was 11 minutes while with retroseptal approach was 5 minutes. Postoperatively all the patients were followed for 3 -6 months to evaluate infection of surgical site, laceration of tarsal plate, buttonhole laceration of lower eyelid , conjunctival chemosis, chronic oedema, transient entropion, transient ectropion. lower eyelid retraction. scleral show and Post operative scar. In our results no permanent postoperative complications were noted.

Table(1) type of approach associated with time of operation.

Type of approach	Time of operation
Transconjunctival retroseptal approach	Mean 5 min.
Transcutaneous infra orbital approach	Mean 11 min.

Table(2) Post operative complication associated with transconjunctival retroseptal and transcutaneous infra orbital approach

Type of complication Post operatively	Transconjunctival retroseptal approach	Transcutaneous infra orbital approach
Infection of surgical site	0	3
1. Chronic lid oedema.	0	2
2. Conjunctival chemosis	7	2
3. Transient entropion.	1	0
Transient ectropion.	0	3
4. Laceration of tarsal plate.	0	0
Lower eyelid retraction.	0	0
Lower eyelid laceration.	0	0
Scleral show.	2	1
Noticeable scar.	0	4
transient infraorbital nerve damages.	0	3
Total	10 (25.6%)	18 (46.15 %)

Post operative complication which was associated with transconjunctival retroseptal approach were 7 cases (17. 9%) conjunctival chemosis, 2 cases (5.2%) with scleral show and one case (2.56%) with transient entropion. While post operative complication associated with transcutaneous infra orbital approach were 4 cases (10.25%) with noticeable scar, 3 cases (7.69%) with transient infraorbital nerve damages, 3 cases (7.69%) with infection of surgical site, 3 cases (7.69%) presented post operatively with transient ectropion and 2 cases (5.12%) with chronic lid oedema, 2 cases (5.12%) presented post operatively with conjunctival chemosis and one case (2.56%) presented with Scleral show.



Trans conjunctival approach pre operatively.



**Trans conjunctival Coronal C T scan
Left floor blow out fracture.**



**Transconjunctival approach,showed thin and
floor fracture**



**Trans conjunctival approach, 2 months
post operatively.**



Infra orbital approach, patient pre fracture operatively.



Infra orbital approach, showed rim



Infra orbital approach ,reduction and plating of the fracture.



Infra orbital approach patient showed post operatively

Discussion:

Exposure of the orbital floor carried out by transcutaneous or transconjunctival approaches, The transcutaneous technique includes several incisions, as subciliary, subtarsal and infraorbital. All these approaches offer good access to the fracture , surgical time needed for exposure , aesthetic point of view and differing whether it is easy or difficult procedure Baqain et al 2008^[12] . As a treatment for surgery are if the patient complaint of double vision, enophthalmus , visual impairment , increased orbital pressure and hypo anesthesia of infraorbital nerve, treatment of orbital fracture is controversial due to amount of soft tissue herniation and difficulty in evaluating the defect area^[2]. Bourquet in 1924 who was first reported the removal of lower eyelid fat by the transconjunctival approach^[4]. Tessier^[13] did use the technique to approach the orbital floor and maxilla in the treatment of maxillofacial anomalies and traumas in 20 patients, he described in detail the methods for approaching the orbital floor, medial wall, lateral wall and documented the usefulness of the approach, through a transconjunctival incision we able to reach periosteum and allows access to great parts of orbit.

Converse et al ^[6] and David DJ ^[14] conducted follow-up studies and reported the advantages, disadvantages, and complications associated with the transconjunctival approach, transconjunctival approach was associated with a few contraindications such as acute or chronic conjunctival disease , monocular eye functioning patient and anophthalmic socket with ocular prosthesis and patient with a previous scleral buckle procedure for retinal detachment Appling W D 1993 ^[15].

Our results revealed that the mean average time required for exposure was 5 minutes with transconjunctival retroseptal approach while from the infra orbital approach it was 11 minutes , may be due to that we are more familiar with retroseptal approach , any operative surgery seems difficult to all surgeons at least initially.

Our results revealed that the outcomes of transconjunctival approach were 7 cases (17. 9%) conjunctival chemosis, 2 cases (5.2%) with scleral show and one case (2.56%) with transient entropion which was in agreement with conclusion of Westfall et al, 1991 ^[17] in the follow up of 1200 patients treated by retroseptal approach for eight years, they reported many post operative complications such as canthal dehiscence, conjunctiva chemosis , cicatricial entropion , lower eyelid avulsion and lower eyelid retraction.

Our results revealed that the outcomes of post operative complication associated with transcutaneous infra orbital approach were 4 cases (10.25%) with noticeable scar, 3 cases (7.69%) with transient infraorbital nerve damages, 3 cases (7.69%) with infection of surgical site, 3 cases (7.69%) presented post operatively with transient ectropion and 2 cases (5.12%) with chronic lid oedema and one case (2.56%) , our results was in agreement with Uemura, Tetsuji et al 2016 ^[18] reported that the lack of a visible scar represents the biggest advantage of the transconjunctival approach. To reduce the risk of complications, surgery needs to be completed without lateral canthotomy from an aesthetic perspective. Baumann and Ewers, 2001 ^[16], Appling WD et al 1993 ^[15], Holtmann B et al 1981 ^[10] believed that the transconjunctival technique if it is accompanied with lateral canthotomy is better than transcutaneous, specially sub ciliary technique because it exhibit good access and small incidence of ectropion and eyelid retraction. Shaifulizan Ab et al 2014 ^[19] concluded that transconjunctival technique provide a good surgical access for orbital rim and floor associated with lateral canthotomy for the orbital wall and lateral part of rim , while our study operated with transconjunctival approach with out required for lateral canthotomy. our results in agreement with Novelli,G. L^[20] et al 2008, Kushner, G.M 2006 ^[21], they concluded that the scar in the conjunctiva and is a low complication rate, with a low ectropion incidence.

Conclusion.

The transconjunctival retroseptal approach is simple, functionally acceptable and provide good surgical field to the orbital floor and rim, it was aesthetically superior to the transcutaneous infra orbital approach, has minimal time exposure and minimal complications except conjunctival chemosis.

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