‘Sutureless’ transconjunctival approach for infraorbital rim fractures

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Abstract

Aim: To analyze the ease and surgical outcome of using sutureless transconjunctival approach for repair of infra-orbital fractures. **Design:** Prospective clinical case series. **Materials and Methods:** Totally 5 patients with infra-orbital rim or orbital floor fractures were selected and the fractures were accessed through a pre-septal transconjunctival incision. After reduction and fixation, the conjunctiva was just re-approximated and re-draped into position. Incidence of post-operative complications such as diplopia, lid retraction, eyelid dystopia, foreign body granuloma and poor conjunctival healing was assessed at intervals of 1 week, 15 days and a month post-operatively. **Results:** No complications were observed in any of the 5 patients. Healing was satisfactory in all patients. **Conclusion:** The sutureless technique appears to be a time saving and technically simpler viable alternative to multilayered suturing in orbital trauma with minimal post-operative complications.

Keywords: Orbital fracture, sutureless, transconjunctival

Introduction

The transconjunctival incision is made through the conjunctiva of the inferior fornix, from the caruncle medially to the lateral fornix. It was first described in 1924 by Bourquet for cosmetic blepharoplasty. It was not until 1985 that the first report of trimalar fractures appeared in the literature describing a combined transconjunctival and lateral canthotomy approach for the repair of orbitozygomatic fractures.[1]

The transconjunctival approach has gained wide acceptance in the treatment of orbital fractures because of certain advantages it has over the more traditional transcutaneous approaches.[2,3] The transconjunctival approach gave better esthetic results (no lagophthalmos and minimal external canthal malposition), the same or greater exposure of the orbital floor and caudal part of the lateral and medial walls (performing a retrocaruncular extension), a shorter, less visible scar and shorter surgical time (even shorter with a sutureless transconjunctival incision).[2,3]

However, this approach is technically more demanding especially to the uninitiated surgeons and is associated with certain complications that can be attributed to the challenging task of periosteal and conjunctival closure postfracture repair. The objective of this study is to evaluate the efficacy of “sutureless” repair of orbital fractures using the transconjunctival approach.

Materials and Methods

After obtaining institutional review board approval, five patients with displacement (more than 5 mm) were chosen [Table 1]. The orbital fractures were accessed using a standard preseptal transconjunctival approach. The decision on the requirement of an additional lateral canthotomy was taken peri-operatively. Tarsorrhaphy was performed on the lower lid, the globe was protected by a corneal shield and the eye was lubricated at regular intervals using carboxymethyl cellulose eye gel. Care was taken to identify the periosteal plane and to ensure “crisp” periosteal incision and careful mimimal reflection [Figure 1]. The fracture fragments were reduced and forced duction test was performed to check for motility. Stabilization and fixation of the fracture were done using 1.5 mm titanium orbital plates.

No attempt was made toward periosteal closure. The conjunctiva was allowed to fall back and was “re-draped” into position [Figure 2]. If a cantholysis was performed, the lateral canthus was resuspended to the periosteum of the lateral orbital rim with absorbable suture. A small amount of ophthalmic antibiotic ointment was placed over both eyes. All patients received intra-operative and postoperative intravenous antibiotics and corticosteroids. Patients were put on antibiotic eyedrops (moxifloxacin 0.5%, 1–2 drops

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Table 1: Depicting nature of injury and subsequent mode of fixation

Serial number	Diagnosis (type of orbital fracture)	Approach	Treatment done
Patient 1	Impure type of left orbital blow out fracture	Preseptal transconjunctival approach	Orbital floor reconstruction done using porous polyethylene implant (Medpor®). Infra-orbital rim further stabilized using 1.5 mm stainless steel orbital miniplate
Patient 2	Right zygomaticomaxillary complex fracture (isolated right infra-orbital rim fracture, fracture in the right frontozygomatic suture region)	Preseptal transconjunctival approach for the infra-orbital rim fracture Lateral brow approach to access the fracture in the frontozygomatic suture area	Fractured infra-orbital rim stabilized and fixed using 1.5 mm stainless steel orbital miniplate Fracture in the frontozygomatic suture region fixed using 1.5 mm stainless steel miniplate
Patient 3	Impure type of left orbital blowout fracture	Preseptal transconjunctival approach	Orbital floor reconstruction done using titanium mesh. Infra-orbital rim further stabilized using 1.5 mm stainless steel orbital miniplate
Patient 4	Isolated right infra-orbital rim fracture	Preseptal transconjunctival approach	Fractured infra-orbital rim stabilized and fixed using 1.5 mm stainless steel orbital miniplate
Patient 5	Isolated right infra-orbital rim fracture	Preseptal transconjunctival approach	Fractured infra-orbital rim stabilized and fixed using 1.5 mm stainless steel orbital miniplate

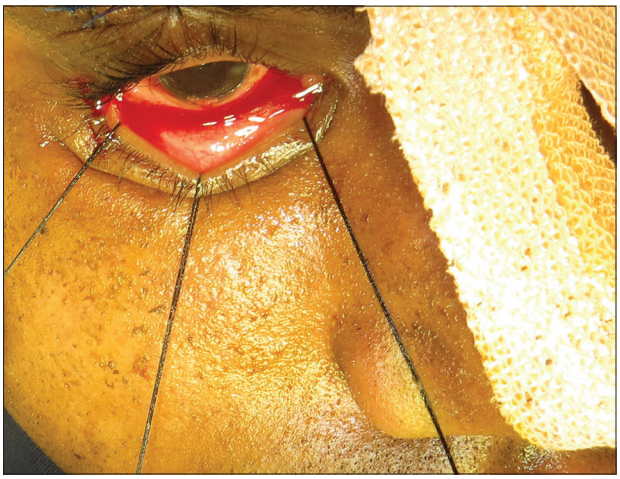

Figure 1: Preseptal transconjunctival incision placement

Figure 2: Two weeks postoperative view showing conjunctival healing and the sulcular depth

4th hourly for 3 days postoperatively). All patients were advised to restrict opening of the eyes for 2 days and to avoid strenuous physical exercises for 2 weeks. All patients were reviewed at the intervals of 1 week, 15 days and a month.

Results

All patients showed good ocular motility. None of them showed any postoperative eyelid dystopia [Figure 3]. No ectropion, entropion, lagophthalmos was observed. None of the patients showed cicatricial scarring of the conjunctiva or shortening of the conjunctival fornix, any implant infection or foreign body granulomas.

Discussion

Orbital fractures represent one of the more common injuries encountered today in our modern mechanized life which produces multiple maxillofacial trauma. Orbit is particularly susceptible to fractures because of its prominence in the facial skeleton.[4] It encloses the ocular globe and periorbital tissues, due to which injuries in this region have profound functional as well as esthetic implications. The choice of approach and the incision placement are guided by the following goals: Good intra-operative visibility, minimal postoperative scar formation and good esthetic results.[2]

There is still no consensus among the surgeons in the selection of the reconstruction material between autogenous and alloplastic grafts. Ilankovan studied a case series of 222 patients and reported successful esthetic and functional outcomes using calvarial bone graft.[5] Prowse *et al*.[6] conducted a study on a case series of 81 patients by employing silicone implant, titanium mesh, Lactosorb, Resorb X, and autogenous bone and cartilage, and reported that contrary to the literature, silicone implants could be used because of low infection and excursion rates as well as high patient satisfaction. Avashia *et al*.[7] performed a systematic literature review to assess and analyze

Figure 3: Two weeks postoperative view

published evidence supporting various materials used for orbital floor reconstruction. Their evidence-based review of the literature yielded the indications, contraindications, advantages and disadvantages of biomaterials and manufactured materials.

Orbital trauma disrupts the periorbital dissection planes and distorts the normal anatomical landmarks. This makes closure of the periosteum and the conjunctiva in some instances very difficult. Such closure, especially in the setting of traumatically disrupted soft tissue planes, may lead to an increase in postoperative eyelid dystopia. Complications like ectropion, entropion, trichiasis, lid retraction, conjunctival irritation, and shortening of the conjunctival fornix can be attributed to inaccurate closure of the periosteum, disruption of the periosteal-orbital septum anatomical relationship during suturing and improper conjunctival approximation. Any event, either iatrogenic or traumatic, which contributes to contracture of the orbital septum will cause it to contract and pull the lower eyelid down from its normal position.[8]

A review of the ophthalmic literature reveals other instances in which the conjunctiva need not be sutured closed, such as after traumatic conjunctival lacerations, strabismus surgery or orbital decompression surgery. In addition, suturing of the conjunctival incision does not appear to have any effect on postoperative eyelid margin position.[9]

Ho *et al*.[10] reported a series of 26 patients who underwent isolated floor fracture repair without closure of the periorbita. Although one patient in the study had early implant migration, there were no incidences of postoperative lid position abnormalities. They concluded that repair of orbital floor blowout fractures with a nonfixed implant through the transconjunctival approach and the sutureless closure provides an excellent functional and cosmetic result.

"Sutureless" repair of orbital floor fractures seems to be an effective alternative to avoid complications. This technique not only reduces the operative time, it also has shown significant decrease in the incidence of complications. It also precludes the daunting task of meticulous identification and closure of the periosteum in trauma cases. Patient's comfort was enhanced because of lack of possible conjunctival irritation due to sutures. The "sutureless" technique also, in theory, acts to decompress the orbit by allowing any hemorrhage a conduit for drainage.

The sutureless technique appears to be a time saving and technique simplifying viable alternative to multilayered suturing in orbital trauma.

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