

Reconstruction of orbital floor fractures with maxillary Bone: a case report

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ABSTRACT

Repair of orbital floor fractures may require the placement of a graft or implant. Both autogenous and alloplastic materials have been used for this purpose. The purpose of internal orbital reconstruction material is to isolate the orbital contents from the antrum or nasal cavity and to provide postoperative support sufficient to prevent enophthalmos. The use of autogenous anterior maxillary wall bone grafts is described as an alternative approach to reconstruction of the orbital floor. This article reports the use of maxillary bone for the repair of orbital floor defect in a 25 years old patient.

Introduction

Blowout fractures of the orbital floor or the medial wall of the orbit cause a well-known post-traumatic syndrome with characteristic clinical symptoms, of which the most serious is diplopia. The ideal management of such floor fractures has been highly controversial. Successful repair of fractures of the orbital and maxillary-zygomatic complex has 4 prerequisites: a thorough understanding of the regional anatomy, accurate diagnosis, an unimpeded exposure and, in some cases, rigid fixation of the fracture.[1,2]

For orbital floor fractures the surgeon has the option of using either alloplastic or autogenous implants. The autogenous sites used in orbital surgery include the calvarial and iliac bone, split rib and cartilage. There are two main types of alloplastic materials: resorbable and nonresorbable. The resorbable include Gelfilm, polygalactin film, and a variety of homografts. The nonresorbable materials include Silastic sheets, Marlex mesh, Teflon, Prolene, polyethylene and metallic alloys.[3,4]

Currently, the trend is to favour the use of autogenous grafts. This article reports the use of maxillary bone for the repair of traumatic inferior orbital defect in 25 years old patient.

Case report

The orbit was approached through a subciliary approach (fig.1). The temporary tarsorrhaphy suture was carried out. The retraction was carried out by malleable retractor to the level of the inferior orbital rim. The periosteum overlying the orbital rim is incised and elevation of the periosteum and orbital floor exploration was accomplished in the routine fashion until the fracture is exposed. Tripodal fixation of right zygomatic complex fracture was done. Reduction of the orbital contents herniated into the maxillary sinus was performed. The maxillary bone graft harvested through

intraoral approach (fig 2) and placed over the orbital floor in order to completely covers the margin of the defect (fig 3). No fixation of the graft was used, but care was taken to ensure that the graft was well behind the inferior orbital margin. The subciliary incision is closed with absorbable 5/0 Vicryl suture and 6/0 prolene suture layer wise. Forced duction test was performed at the end of the procedure to evaluate postoperative ocular motility. Enophthalmos was defined as a 2 mm or greater difference in distance from the apex of the cornea to the lateral canthus between both eyes. It was directly analyzed with the use of Hertl exophthalmometer. The success of the surgical repair and postoperative status has been tested at 1 week, 3 months, and 1 year for postoperative findings.

Discussion

The autogenous bone has been the implant material of choice for the past 30 to 40 years for the reconstruction of orbital blowout fractures. Some investigators have advocated the use of iliac crest bone grafts, rib grafts, and tibial grafts.[5,6] However, the added operative time required to harvest and mold the graft and the donor site morbidity may make these grafts unlikely choices for acute repair. Alternative sites advocated as a source of autogenous bone include the mandibular symphysis, parietal cortex, and maxillary antral wall bone.[7-9] Autogenous grafts have been criticized for their variable resorption, donor site morbidity, limited availability, and lack of malleability.

In 1966, Kaye[9] reintroduced the concept of using bone from the anterior wall of the maxillary antrum. Since then, this useful technique has had relatively little recognition in the literature. Rowe and Killey[10] described a somewhat different version: they used a remaining fragment of orbital floor to bridge a defect by rotating the fragment so that it rested on a stable base.



Figure 1: Picture showing subciliary incision on right sight.

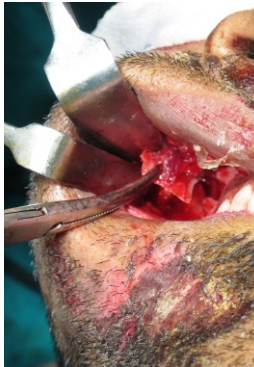


Figure 2: Harvesting maxillary graft from intraoral approach.

There are distinct advantages to use maxillary antral bone, as initially outlined by Kaye. The bone can be readily harvested because it lies in continuity with the orbital floor defect. This procedure obviates the need for a 2-team approach, which is often required for iliac or rib bone grafts, and thereby decreases operating time. Furthermore, in combined zygomaticomaxillary complex fractures, the need for 3-point fixation and exploration of the maxillary buttress necessitates an intraoral exposure; therefore, there is no additional morbidity when this donor approach is used.[3,9]

There are certain limitations to the use of this reconstructive technique, however. Although the antral wall bone graft is ideal for reconstructing an orbital floor defect in the acute setting, because of its insufficient thickness it is not the method of choice for correcting late enophthalmos. The quantity of maxillary bone is limited and lacks the bulk that can be provided by other autogenous bone donor sources. Its usefulness may also be limited in cases of severely comminuted fractures or defects larger than 2.5 cm, and in the unusual instance of a hypoplastic maxillary antrum. The uninvolved contralateral side, however, may still provide an excellent additional source of bone.[10]

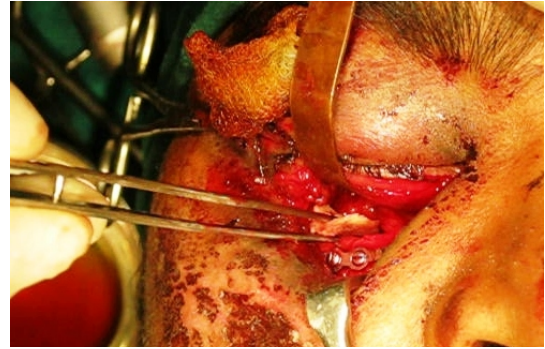


Figure 3: Placement of maxillary bone graft for orbital floor reconstruction.

Conclusion

The anterior antral wall bone is the ideal implant material for the reconstruction of orbital floor defects in the severely injured patient. The bone is thin and membranous and possesses characteristics that are similar to those of the bone of the orbital floor. Because of its biocompatibility and lack of donor site morbidity, the use of an antral wall bone graft is a superior reconstructive option.

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