Iliac Crest Grafting For Orbital Floor Reconstruction To Rectify Enophthalmos-A Case Report

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Abstract: Enophthalmos is a severe complication of inappropriate primary management via reconstruction of zygomaticomaxillary complex fractures including severe injury which require reconstruction of orbital floor. The main goal & objective for secondary reconstruction to correct enophthalmos is function & esthetic. Various treatment modalities are published in literature for achieving symmetric globe position. We here present case report of post traumatic enophthalmos by reconstructing orbital floor using an autogenous iliac crest bone graft. We found it a preferable option for correction to achieve better outcome thereby enhancing quality of life of patients.

I. Background:

Orbital wall fracture is a common outcome of orbital injuries. Fracture of orbit leads to various complications primarily like enophthalmos, diplopia, paresthesia of infraorbital nerve & limitation of orbital movement [1,2]. Enophthalmos can be traumatic or nontraumatic but to correct enophthalmos we must achieve the correct etiology & prompt management. There are various etiological factors which can cause enophthalmos including trauma, reduction in the content of orbital volume, deformity in the orbital bony architecture & orbital fat atrophy. Enormous diagnosis tools are available in the market to diagnoses enophthalmos in which computed tomography scan have won the raccoon section gives the best detailed information about the etiology[3-5]. Indications for surgical intervention for correction of enophthalmos are entrapment of inferior rectus muscle which leads to diplopia, fracture which involves more than 50% of orbital floor. Orbital floor fractures still persist a controversial topic in literature & among clinicians. Therefore, four prerequisites for successful repair of orbital complex fracture that includes regional anatomy, accurediagnosis, unimpeded exposure & fixation of the fracture. The goal of surgery is to reposition the herniated orbital fat & tissues within the orbit & repair of post traumatic defect. [6-8]

II. Case report:

A 17-year-old male patient presented to us with chief complaint of diplopia & perception oh inferior position of globe of right eye. History elicits that he was operated for pan facial trauma of which post traumatic enophthalmos occurred as a complication after 6 months. Reconstruction of the orbital floor with the help of autogenous bone graft under general anesthesia was planned. On exposure orbital floor was herniated which was degloved completely from the floor & lifted up keeping back in correct position. Due to the scarcity of the support by the orbital fat on the floor reconstruction of the orbital floor to prevent the reherination of the orbital fat was required. Autogenous anterior iliac crest bone graft was harvested from the donor site & a single quadrangular piece of cortical bone was derived[Figure-1]. Closure of the donor site was performed in layers. A spoon was used to restrict the herniation of the fat in the recipient site. The quadrangular piece of harvested bone was reshaped according to the curvature & anatomy to adapt in the proper framework on the orbital floor[Figure-2]. Harvested bone was placed above the orbital floor & spoon was removed. The harvested bone was providing an adequate support to the orbital floor to stay in the required position. Symmetry of the globe was checked after achieving the desired result. Closure was done in layers.

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III. Discussion:

Ample of materials are present to reconstruct the orbital floor & keep the repositioned herniated fat in correct position, like several types of autogenous grafts, [9] alloplastic [10-13] implants & allogenic implants. [14-15] This orbital implant ideally should be biocompatible. Autogenousbone grafts are the profound materials of choice to avoid the graft-host reaction but have a drawback of displacement problems, secondary field of surgery, donor site morbidity & unpredictable resorption of graft.Infection,extrusion,tissue reaction,residual diplopia,foreign body reaction is associated with allogenic & alloplastic implants. The rationale of using iliac crest bone graft is its relative resistance to infection, incorporation by the host in the new bone. Lack of host response against the graft & lack of concern for late extrusion. Although there are multiple sites of autogenous grafts, the anterior iliac crest bone remains the most common site & is a favorable reconstructive material as enough bone is always available &also bone can be harvested simultaneously with orbital exploration. Itprovides the gold standard framework for facial skeleton & orbital wall.[16]Other autogenous grafts are calvarium,tibia,ulnar,mandibular symphysis,ribs,coronoid process & so on.Medpore is also used for the same. [17] The desirable characteristic of a bone grafts is sufficient volume, minimal donor site morbidity,obtaining intramembranous bone with high cortical component, proximity to the residual site, ease of harvesting & achieving of reproducible a good results &minimal resorption rate. [18]Kontio stated that reconstruction of orbital walls with iliac bone grafting is reliable.However,as being a fairly rigid material intraoperative three-dimensional assessment & accurate placement of the bone graft were difficult. The resorption rate was high but most of the resorption was advantageous remodeling so a slight overcorrection is beneficial. [19] Several authors compared to different autogenous grafts for their efficacy in reconstructing orbital floor & reducing the enophthalmos.Membranous & endochondral grafts are compared like cranial & iliac grafts respectively. They were used to correct post traumatic globe position, diplopia & stated that there are no differences in the ability of cranial & iliac crest to correct the post traumatic enophthalmos. [9,18]

IV. Conclusion:

In our case iliac crest graft used to reconstruct the orbital floor here corrected the enophthalmos, diplopia & also restricted ocular movement. The quality of contour of bone is very adaptable & it also provides good amount of corticocancellous bone. It provided good esthetic & functional results. It is preferable &cost-effective modality but accompanies donor site morbidity.

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Figure 1: Quadrangular Piece of Ileac Graft

Figure 2: Placement of Graft to Reconstruct the Orbital Floor.