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Short Communication

Kummoona Chrome Cobalt Mesh for Reconstruction of Orbital Floor

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Kummoona chrome cobalt mesh advocated before more than three decades for reconstruction of orbital floor defect of post traumatic injuries. Orbital floor injuries are not seldom but occurred in children playing football, when the ball hit the orbit leads to increase the intra orbital pressure as a safe procedure the orbital floor with thin bone fractured and may fragmented or as trapdoor and the fat of the orbit herniated to underlying maxillary sinus, the child or family does not noticed orbital injuries complication but few days later when oedema subsided the child will complain from diplopia and enophthalmos might noticed by family.

Blow out injuries of orbital floor occurred when globe of eye receive a blow from external source like road traffic accident (RTA) or bicycle accident or football or hit on the orbit, the momentary pressure created inside the orbit by increase of intra ocular pressure tends to fracture the orbital floor and push the fat content into underlying antrum.

There are two type of orbital floor fracture or blowout types:

1. Pure blow out: This type of injury involves the orbital floor only.
2. Impure blow out: This type not only the floor fractured but also with rim fracture.

Radiological assessment and another test:

1. Occipito-mental view of 15 - 20 degree very good view to observe the fracture including the rim and floor and the zygoma and has nous or clouding of the underlying sinus, in recent one due to bleeding.
2. Tomography of the Orbital floor.
3. Three-dimension CT Scan.
4. Forced duction test is positive to test incarcerations of inferior rectus and inferior oblique muscle, this test usually done in theatre by holding the conjunctiva by blunt forceps and moving up and other directions, without free movement of inferior ocular muscles.
5. Hess Chart examination for vision field to demonstrate the muscle in upward quiz, this test usually done before commencing surgery [1,2].

Hess chart is one part of orthoptic assessment and useful for monitoring ocular motility. These charts was applied in investigation of entrapment and strabismus by dissociating the eyes with mirror (Lees Screen), it is possible to locate the position of non- fixing eye when the other eye is fixed on specific points on the screen. Each inner point in the screen represent 15 degree from the central point and each outer point 30° and the field is plotted for each eye [3].

Surgical anatomy of the orbit

The surgical anatomy of the orbit is quite interesting, the orbit is a bony cavity shaped like a 4-sided pyramid lying with its apex posteriorly and its base forming the orbital rims or margins.

It's a cavity containing structures essential for orbital function and vision and this bony architecture contain the globe, extra ocular muscles, fat, vessels, nerves, glandular structures and connective tissue. All these structures were affected by trauma injuries to the orbit further to that the orbit size is fix for its content once blow out happened and orbital fat contents herniated to the sinus this situation leads to enophthalmos. once trauma compress the orbit as in fracture zygoma with displacement inward exophthalmos occurred.

Orbital cavities are pair in shape and symmetrical in relationship to the roof of the nose, they are located between the base of skull and facial bones and there is no pure orbital bone exist but 7 bones belong to cranial bone and facial bones joined to form the walls of the orbit, all these bones forms the orbit in quadrangle pyramid, the anterior base widely opened and the apex posteriorly located. The axis of the 2 orbital pyramids is oblique and goes in medial and posterior direction, the two lateral walls form 90 degree angle and the lateral wall with medial wall or midline forms 45 degree, the inclination of the lateral walls in its posterior portion comes close to medial wall.

The presence of strong supra orbital rim, strong malar bone with fragile nasal bone and a thin orbital floor, forms a good protection from increased traumatic intra orbital pressure and the floor of the orbit play as shock absorber of the impact it act as good protection to eye balls, protecting the eyeballs from un expected blow out injuries.

The inferior wall of the orbit disappeared in the junction of posterior third with anterior two thirds and the orbit in its posterior third has only 3 walls, roof and lateral and medial wall forming triangular pyramid. The width of orbit measured about 40 mm - +, height 35 mm - + and depth 45 mm - + and the interpupillary distance measured 62 mm - +.

It is very important during dissection of orbital floor in blow out, the dissection should not exceed 2.5 cm and insertion of chrome cobalt mesh or Sialastic implant should not exceed 2 cm to prevent any extra pressure on the globe and on vascular or nerves of the globe [1].

Construction of chrome cobalt mesh

The implant was constructed by making a wax pattern on dried skulls of different sizes and the implant casted in advance Dental Laboratories and casted by the usual methods. The implant is biologically inert material due to chromium oxide layer which very thin layer, any damages to this layer leads to rejection of the implant, the implant should be deep seated, we design the implant to extend to cover the rim of orbital floor for stability and to reconstruct fragmented rim and the fenestrations in the implants lead to fibrous tissue invasion and became very stable during force rotation movement of the eyeball [4,5].

We do reconstruct chrome cobalt mesh in 3 sizes small, medium and large, small for children, medium one for ordinary people and the large one for big people.

We used Sialastic sheet (Rubber Silicone material) in cases we do not have chrome cobalt mesh for reconstruction of orbital floor and the sizes were similar to the mesh size but without rim extension and should be deep seated, we does fix it to underlying tissue by resorbable sutures till a layer of fibrous tissue formed around the implant.

The longest fallow up of cases were about 30 years and the patient was quiet happy, X-ray of occipital-mental views showed well tolerated by the orbit with no any sign of rejection or resorptions of bone surrounding or any corrosion of implant periphery, other cases were fallowed between 3 - 5 years and one case after 15 years without any complain.

This study reflects the experience of the author for management of orbital blowout injuries.

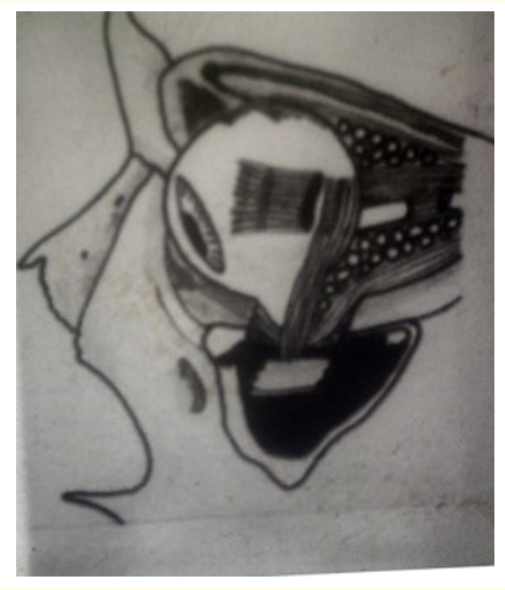

Figure 1: *Diagram showing mechanism of blow out injury with fracture of the floor and the eyeball rotated down due to incarceration of inferior and inferior oblique muscles.*

Figure 2: *Kummoona chrome cobalt mesh designed on dried skull in 3 sizes.*

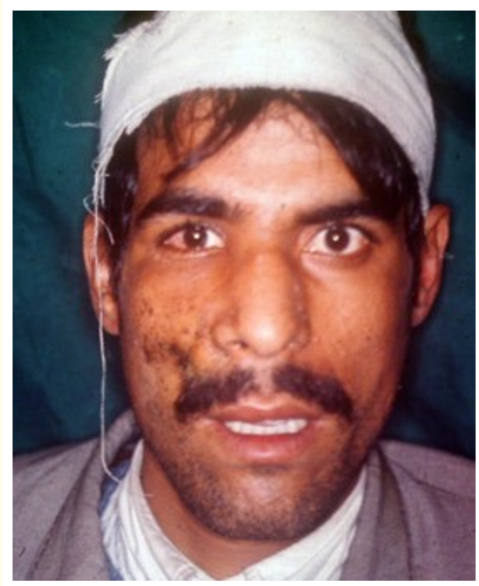

Figure 3A: *Patient with blow out injury of the right orbit showing enophthalmos.*

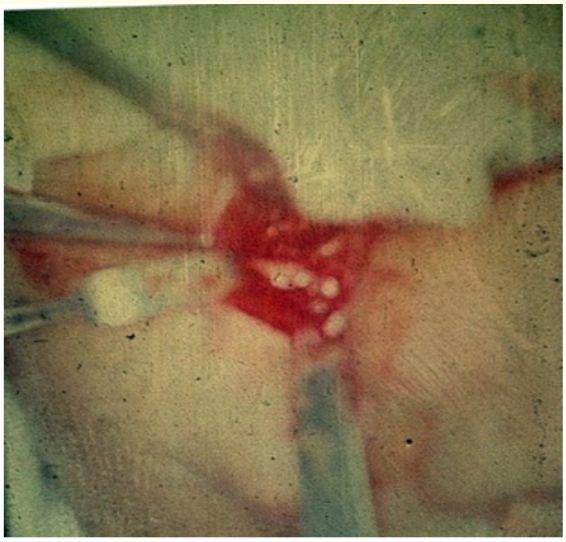

Figure 3B: *Photograph showing fragmentation of lower orbital rim and floor of the orbit.*

Figure 3C: *Photo showing exploration of orbital floor of the same patient through oblique infra orbital incision and insertion of Kummoona chrome cobalt mesh.*

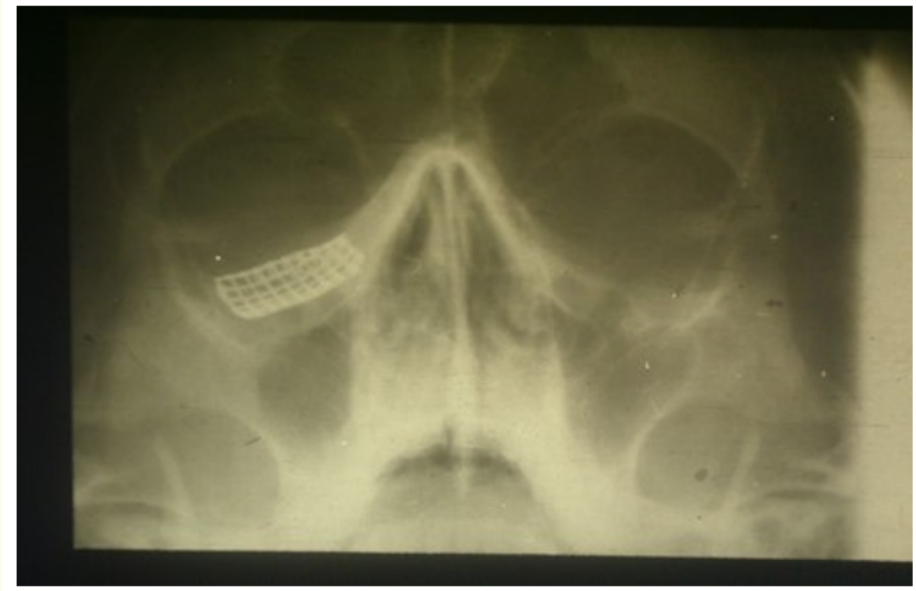

Figure 3D: *X-ray showing Kummoona chrome cobalt mesh cited in the orbital floor.*

Figure 3E: *One year of post-operative photo showing excellent result by reconstruction by Kummoona chrome cobalt mesh with no diplopia or enophthalmos.*

Figure 4A: *Blow out injury with enophthalmos of the left eye in 17 years female.*

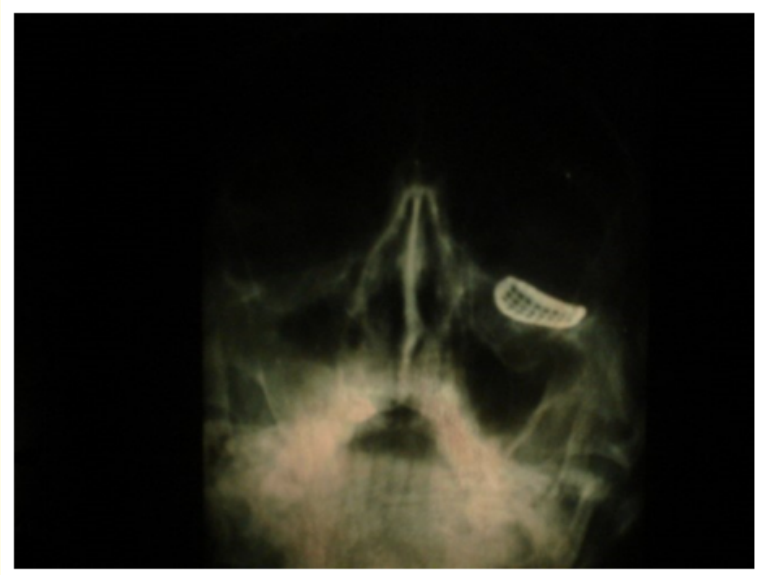

Figure 4B: *Post-operative X-ray showing chrome cobalt mesh cited in the left orbital floor.*

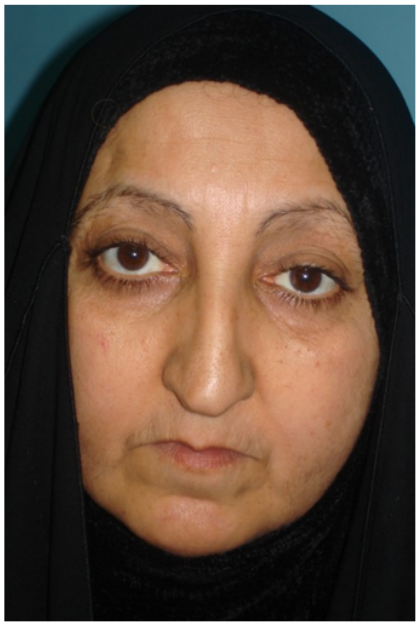

Figure 4C: *Post-operative photo and follow-up of the same lady after 30 years.*

Figure 4D: *Post-operative X-ray of the same lady after 30 years showing the implant well tolerated by the left orbit with no corrosion of the implant or resorption of surrounding bone.*

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