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Short Communication

Orbital Trauma with Special References to Pediatrics and Children

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The incidence of pediatrics and children to traumatic injuries of the orbit is quiet rare but it may happened during fallen down from mother hands which is quiet seldom, we reported only few cases during the last three decades, the body of the pediatrics is fleshy and soft, trauma to his body easily absorbed by high content of the soft tissue in his body and work as shock absorber, even with trauma to the head surprisingly, the child recovered within few hours from trauma, children more liable for injuries of the orbit because they active and unstable may subjected to accidental fall down, home accident or playing boxing and road traffic accident or motorcycle accident.

The bones of the orbit play a vital role in maintaining normal function and aesthetic of the eyes and face. The orbit is unique in its structure and it's an important part of the facial skeleton, it is a bony cavity shaped like 4 sided pyramids lying with its apex posteriorly and its base forming the orbital rims, the posterior wall of the orbit disappeared at the junction of the posterior third with anterior 2/3rd and the orbit in its posterior third has 3 walls only, roof, lateral and medial forming triangular pyramid, the width of the orbit about 40-+, height 35-+ and depth 45-+, the size of orbit is fix for its content any alteration in the fix size of orbit if reduced causing exophthalmoses or expand causing enophthalmos, the orbital size in children might be slightly smaller. It is a cavity containing structures essential for ocular function and the boney architectures that encase them, it content the globe, extraocular muscles, fat, vessels, nerves, glandular structures, lacrimal structures and connective tissues. All these contents can be affected by trauma to the orbit. The orbit of children is more or less with same dimension because the orbit in child face grows before other structures of the facial skeleton.

Orbital cavities are paired shape and symmetrical in relation to the roof of the nose, they are hallowed out spaces located between skull bone and facial bones and no pure orbital bone that exist, seven bones belong to cranial skeleton bones and facial skeleton bones joined to form the walls of the orbit and they are frontal, ethmoid, sphenoid, maxilla, zygoma, lacrimal and palatine bones, these all together forming the orbit in quadrangular pyramid, the anterior base is widely opened and the apex posteriorly located, the axis of the orbital pyramids are oblique and goes in medial and posterior direction. The 2 lateral walls of the orbit forms an angle of 90 degree and the lateral wall with medial wall or mid line forms an angle of 45 degree, the inclination of lateral wall in its posterior portion comes close to medial wall.

The presence of strong supra orbital rim, strong malar zygomatic bone and thin orbital floor with fragile nasal bones forms a good protection to the eye balls and the orbital floor form a shock absorber and safe guard from high intra orbital pressure created by trauma and protecting the eye from unexpected blow out injuries, both eyes moved in synchronized fashion alteration in one eye movement causing diplopia.

During the last 4 decades there have been considerable advances in the diagnosis and managements of orbital injuries. Injuries of the orbit [1,2], either isolating types of injuries of the roof, floor, medial wall and lateral wall or as part of zygomatic complex forming part of lateral wall and inferior wall or to be part of Cranial-Orbital-Facial injuries. Featuring severe displacement of boney segments and functional deficits such as enophthalmous, diplopia and sensory and lacrimal damages, they are also associated with medial wall and dislocation of canthi ligaments, these injuries can cause functional and cosmetic defects.

Reconstruction of severe orbital injuries can be challenging to both Maxillofacial and Craniofacial surgeons. Numerous technique described by using both alloplastic such as Kummoona chrome cobalt mesh and Sialastic rubber silicone [3]. Sialastic materials readily available, easy to handle and undergoes with no resorption or rejection and other biological autologous tissues such as lyophilized dura, gale a aponeurosis, temporalis muscle and iliac bone graft, is well tolerated by the host but bone graft shows some degree of bone resorptions with difficulties of multi contoured defect but it is the most commonly used by us for reconstruction of large bony defect of the orbit.

From our previous studies we reported 236 patients of Orbital Injuries and they are 172 male and64 women, mean age 37 years (range 2 - 72 years) and only few cases were reported within two years. Examination started once the following signs are present such as emphysema derived from fracture medial wall with ethmoid or fracture of frontal air sinuses, flattening of zygoma, paresthesia of infraorbital or supraorbital nerves, subconjectival haemorrhage, ecchymosis around the orbit, limitation of eye movement in upward gaze and downward gaze, diplopia, enophthalmous or visual disturbances or loss of vision due fracture near optic foramen with slight effect on optic nerve as temporary loss of vision once the damage is severe to optic nerve permanent loss of vision expected. Ptosis with dilated pupil and fix eyeball might be a sign of superior orbital fissure syndrome which is a serious status. Examination started by palpation of the rim all around the orbit to detect any step deformity or tenderness also supra orbital and infra orbital nerves examined for sensation and pupil reflex to light should be done to detect the reaction to light if no light reaction, it means serious injuries also the fundus of the eye examined for detection of papillary edema. Radiological examination required waters view for sinuses and CT Scans.

Patients with diplopia, enophthalmos or exophthalmos due to squeezed orbital walls with failure of pupil reaction to light should be referred to ophthalmologist for evaluation of ocular and visual status also the injured orbit might associated with Cranial-Orbital injuries and CSF leakage from the nose or ear should be checked and considered as serious head injuries.

Observation of relevant signs of orbital injuries by evaluation of extraocular muscle function in all cardinal fields of gaze to detect diplopia, the eye was put in full range of movements; Hess Chart was used for evaluation of each patient with diplopia, force diction test for entrapment for inferior oblique and inferior rectus muscles. Quick test for vision by pupil light reflex should be done as routine [4], enophthalmos diagnosed clinically in both preoperatively and postoperatively as present or not and in relation to contralateral eye and facial structures. There are two types of enophthalmos [3,4], simply related to abnormal bony position due to expansion of the orbit or enophthalmos with diplopia was related to boney defect and some tissue insult. Projection of the eye featured as proptosis examined usually by visualized the face from supra orbital ridge or zygomatic eminence.

Considerable advances in the prevention of road traffic crashes and early transport of injured patients via ambulance of highly equipped with high standard of nursing care as urgent transferred by helicopter. There have been great development in the diagnosis and managements through advanced radiological tools, great advancements in the treatment of Cranial-maxillofacial injuries of severely injured patients are those in medication, anesthesia, nursing care and tools of radiological assessment and care following the steps of advanced trauma life support in fully equipped recitation unites. The priority of managements based on 4 Kummoona Golden C (lifesaving steps). Control breathing and maintain patent airway, Control circulation and manage shock, Control bleeding by cauterization of small vessels and ligation of large vessels and Control soft tissue laceration and boney fragments.

Serious cases with head injuries and chest injuries required urgent admission to intensive care units and treatment of maxillofacial injuries and Orbital injuries might delay for few days till recovery from chest and head injuries. The incidence of the mortality rate reduced in road traffic accident (RTA) nowadays because car manufacturer made a safety measures in the cars with safety seat belt, with ballooning and shock absorber stern with spring action these measures reduces the effect of impact [5-7].

We did report 85 cases of lateral wall of orbital injuries (Thirty cases were treated by Sialastic, ten cases by bone graft and 45 cases by reduction and fixation),we reported also 15 cases of medial wall fractures (Ten cases were treated by bone graft and medial canthi ligament fixation and 5 cases by Sialastic). Orbital floor injuries were more common and 110 cases were reported (chrome cobalt mesh were used on 30 patients, 45 patients were treated by Sialastic, twenty five cases by bone graft and ten cases by lyophilized dura), the orbital roof fractures is quiet rare and we reported only 6 cases (three cases were lyophilized dura been used and 3 cases by Sialastic). Also we reported eight cases of skeletal injuries including the roof, six cases were treated by bone graft and two cases by lyophilized dura. We reported failure of two cases treated of the orbital floor by chrome cobalt mesh, these designed for small defect and fracture rim, these been used for reconstruction of large defect, ten cases reported with slight displacement of Sialastic by force action of ocular muscles was treated by excision of excess of Sialastic or trimmed about 2 mm from outside rim, some cases did show bone resorption of the graft leading to enophthalmos, these were corrected by additional layer of Sialastic on the bone graft of the floor.

Surgery of the Orbit is always challenging required expertise, knowledge and skill; it is a difficult task to be approached.

Figure 1: *Diagrammatic photo showing blow out injuries of orbital floor.*

Figure 2A: *Displacement of the eye ball down ward due to fracture roof of the orbit I 4 years boy.*

Figure 2B: *Post-operative photo after reconstruction of the roof by lyophilized dura.*

Figure 3A: *Severe injuries to the medial walls of the Orbit with injuries to the nose in 3 years boy by Dashboard of the car accident.*

Figure 3B: *Three years post-operative photo.*

Figure 4A: *A very severe injuries to the right orbital skeleton with loss of eyeball in 3 years boy.*

Figure 4B: *Six month's Post-operative photograph after series of operation. Showing ptosis of upper eyelid and he required further surgery for nasal bridge remonstration and correction of ptosis of the eye lid.*

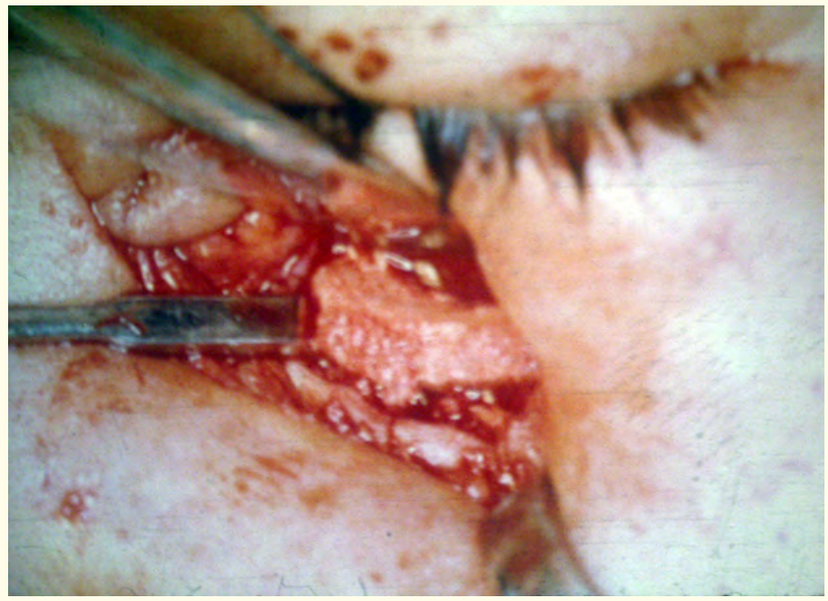

Figure 5: *Photo showing bone graft inserted for reconstruction of orbital floor.*

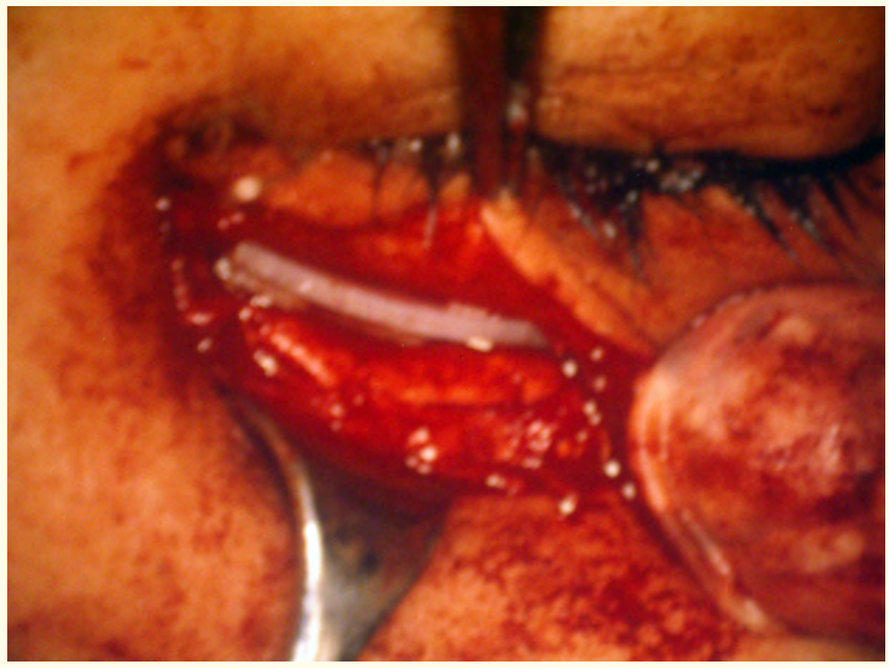

Figure 6: *Photo showing additional Sialastic sheet inserted over previous bone graft to the floor of the orbit.*

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