Surgical Approaches to Infra Orbital RIM Fractures: A Review Literature

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Abstract

In most people, the relationship between the ocular globes and the cheek tissues is such that on lateral view, the cheek projects beyond the eye. This relationship is primarily due to the development of the facial bones beneath the cheek tissues, fractures of the infra orbital rims causes severe deformity to the face with ocular imbalance, so infra orbital rim is essential to maintain the anatomy of the eye and shape of the eye.

Keywords: *Infra orbital rim, diplopia, retro bulbar haemorrhage, sub conjunctival incision.*

Introduction

The zygoma articulates with the frontal, sphenoid, temporal, and maxillary bones and contributes significantly to the strength and stability of the midface. The forward projection of the zygoma causes it to be injured frequently(1). The zygoma may be separated from its four articulations. This is called a zygomatic complex fracture. The terms trimalar or tripod fracture are therefore inaccurate. These termsreflect an inability to easily identify the orbital (zygomaticosphenoid) portion of the injury before the advent of computed tomography (CT). The zygomatic arch may be fractured independently or as part of a zygomatic complex fracture. All zygomatic complex fractures involve the orbital floor, and therefore an understanding of orbital anatomic features is essential for those treating these injuries. The orbit is a quadrilateral pyramid that is based anteriorly. The orbital floor slopes inferiorly and is the shortest of the orbital walls, averaging 47 mm(2).It is composed of the orbital plate of the maxilla, the orbital surface of the zygomatic bone, and the orbital process of the palatine bone. The medial and lateral walls converge posteriorly at the orbital apex. The medial wall consists of the frontal process of the maxilla, the lacrimal bone, the orbital plate of the ethmoid, and asmall portion of the sphenoid body. The lateral orbital wall is the thickest and is formed by the zygoma and the greater wing of the sphenoid. The orbital roof is composed of the frontal bone and lesser wing of the sphenoid.

The sensory nerve associated with the zygoma is the second division of the trigeminal nerve. The zygomatic, facial, and temporal branches exit the foramina in the body of the zygoma and supply sensation to the cheek and anterior temporal region. The infraorbital nerve passes through the orbital floor and exits at the infraorbitalforamen . It provides sensation to the anterior cheek, lateral nose, upper lip, and maxillary anterior teeth. Muscles of facial expression originating from the zygoma include the zygomaticusmajorandlabiisuperioris.

The position of the globe in relation to the horizontal axis is maintained by Lockwood's suspensory ligament. This attaches medially to the posterior aspect of the lacrimal bone and laterally to the orbital (Whitnall's) tubercle (which is 1 cm below the zygomaticofrontal suture. Accompanied by an anti mongoloid downward cant of the lateral canthalregion caused by displacement of the zygomaon the medial aspect of the frontal process of the zygoma). The shape and location of the medial

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and lateral canthiof the eyelid are maintained by the canthaltendons. The lateral canthal tendon is attached to Whitnall's tubercle. The medial canthal tendon is attached to the anterior and posterior lacrimal crests. Zygomatic complex fractures are often accompanied by an antimongoloid (downward) cant of the lateral canthalregion caused by displacement of the zygoma.

Causes and Etiology: Zygomatic fractures are common facial injuries, representing either the most common facial fracture or the second in frequency of facial fractures. Theincidence, etiology, age, and sex predilection of zygomatic injuries vary, depending largely on the social, economic, political, and educational status of the population studied. The common etiological factors for these type of fractures are R.T.A, Altercations, Falls,Sports related injuries.

Pathalogy of Infra Orbital RIM Fracture: In total medial displacement, the orbital rim is completely severed at the frontozygomatic suture. The Zygoma is depressed in the orbital region as well, leading to reduction in size of the orbit. This can lead to exophthalmos, which may be aggravated by further haematoma. On the other hand with a defect of the floor of the orbit, orbital tissue may prolapse into the maxillary sinus so that enophthalmos would result due to medial displacement. The telescoping intrusion of the Zygoma into the orbit and maxillary sinus can lead to incarceration and injury of orbital fatty tissue and musculature causing diplopia as a result of disturbances of mobility. As the medial fracture line is always in the region of the infra orbital nerve, the nerve is pinched or torn in medial displacement fractures.

Inferior displacement arises when force impinges on the body of the Zygoma obliquely from above. Temporal fascia prevents inferior displacement of the zygoma by its broad attachment. The frontal process of the Zygomatic bone may be titled dorsally or forward, In this type of displacement, the orbital cavity is enlarged. This leads to exophthalmos with the eye lowered and double vision. Sagging of the lateral wall of the orbit leads to displacement of the palpebral fissure in the lateral region in a caudal direction (antimongoloid). The total medial fracture dislocation can lead to restriction of mouth opening as a result of impingement of the coronoid process on the zygoma.

Various Approaches for the Management of Infra Orbital RIM: Several approaches to the orbit through the skin surface of the lower eyelid have been described. They differ inthe level at which the skin incision is made and level of dissection to the infraorbital rim. The subtarsal approachis one of the more frequently used approaches for accessto the infraorbital rim and orbital floor. The subciliary approach, also called the infraciliaryapproach, or blepharoplasty, has been favored by anumber of U.S. surgeons over the past 20 years. The skinincision is made approximately 2 mm inferior to the grayline of the lower eyelid, along the entire length of the lid. The transconjunctival approach, also called the inferior fornix approach, was originally described by Bourguet in 1928. Two basic transconjunctival incisions have since been described, the preseptal and retroseptal approaches, which vary in the relationship of the orbital septum to the path of dissection

Dr. P Tessier (1973): He described the transconjunctival approach, both preseptal and retroseptal for the repair of fractures involving the orbital floor and rim. The main advantage to this technique is the lack of visible scar Bromely S. Freeman (1962)[3]: stresses the need for direct exposure to investigate the anatomic position of bony continuity in fractures of the anatomic position of bony continuity in fractures of the midfacial area with the exploration of the orbital floors. He advices the use of a graft material in the reconstruction of orbital floor as against blind elevation of the floor with packs or balloons which do not always maintain the position of the floor, frequently caused reactions are relatively clumsy, often offensive and at best, approximately accurate.

Discussion

Paul N. Manson et al (1987)[4] : state their experience with a single lower eye lid incision with mobilization of the lateral canthus is described for exposure of the zygoma, lower and lateral orbit, zygomaticofrontal suture and the incision may be either subciliary with a skin muscle flap or transconjunctival. Both require mobilization of the canthus. They are of the opinion that reattachment of the canthus is not required in acute zygomatic fracture treatment but is preferred for secondary orbital reconstruction or in patients in whom a simultaneous coronal incision is employed. They also state that the approaches described reduce cutaneous scarring and provide generous exposure of the lower and lateral orbit.KunioIkemura et al (1988)[5] : did a study in fractures of zygomatic complex and found that there is no displacement of zygoma after fixation at frontozygomatic region using a miniplate and additional

wiring at the infra orbital rim. They suggest that there is no need for three point or four pointfixation of zygoma except for complex or comminuted fractures as a bone plate gives stability in three planes.

Vriens JP, Moos KF (1995): They said that open reduction and fixation of an orbitozygomatic complex fracture offer a better prognosis for complete recovery of the infraorbital nerve function than elevation only with or without Kirschner wire fixation.Jan P M Vriens et al 1998[6] presented a study on infra orbital nerve function following the treatment of orbitozygomatic complex fractures. The patients were treated with various available method. Sensory nerve function was assessed using several method for a period of 6.3 months on an average. The study revealed that sensory disturbances were more pronounced in patients who underwent closed reduction without mini plate fixation.

Yonehara et al (2005)[7] studied patients for whom treatment of zygomatic fractures without inferior orbital rim fixation was done. They stated that inferior orbital rim fixation with mini or microplates is recommended for reduction of comminuted fractures and orbital floor fractures with herniation of internal orbit components. They found out in their study that patients who did not undergo inferior orbital rim fixation were free of inferior orbital rim deformity, diplopia, and postreduction rotation.

The main advantages of the subtarsal approach are the following:

1. It is relatively easy;
2. The incision is placed in a natural skin crease so that the scar is imperceptible; and
3 It is associated with minimal complications. It has few disadvantages

The subciliary approach, also called the infraciliaryapproach, or blepharoplasty, has been favored by a number of U.S. surgeons over the past 20 years. The skin incision is made approximately 2 mm inferior to the grayline of the lower eyelid, along the entire length of the lid The incision may be extended laterally approximately 1 to 1.5 cm in a natural crease inferior to the lateralcanthal ligament. The main advantage to this incision is the imperceptible scar that it creates. The disadvantages are the following: (1) the procedure is technically difficult for the novice; and (2) a higher risk of postoperative ectropion exists.[8-12]

The transconjunctival approach, also called the inferior fornix approach, was originally described by Bourguet in 1928[13]. Converse et al[14] have added a lateral canthotomy to the transconjunctivalretroseptalincision for improved lateral exposure. The advantage of the transconjunctival approaches is that they produce superior cosmetic results when compared with any other commonly used incision because the scar is hidden behind the lower lid. Other advantages are the following: (1) these techniques are rapid; and (2) no skin or muscle dissection is necessary. In a study by Wray et al[15] in which the transconjunctival approach was used for orbital floor and rim fractures.

Conclusion

Incisions and approaches are always on the hands of the surgeons. If the fracture can be treated with existing laceration, it gives positive result with proper closure, age, sex and severity of the injury also plays a vital role in reduction and fixation. Always subconjunctival and subcillary incisions are better when compared to the infra orbital incisions. Since it is place in Rstl lines of the face which gives minimal scar with less post operative complications.

Conflict of Interest: Nil.

Source of Funding: Self.

Ethical Clearance: Not required.

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