Review Of Management Of Orbital Floor Fractures

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Abstract

Otolaryngologists are commonly called to evaluate and manage patients with facial trauma. We have described an overview of the work-up and treatment of orbital floor fractures.

INTRODUCTION

Orbital floor fractures are a common result of facial trauma. They may occur as isolated fractures after localized blunt trauma, or as part of massive facial trauma. Over 50% of patients with facial fractures will have accompanying systemic injuries.[1,2] These patients must be subjected to a comprehensive evaluation by a multidisciplinary trauma team. Immediate management should consist of airway management, treatment of shock, and control of hemorrhage. After the patient has been stabilized, further work-up of facial trauma can proceed.

HISTORY AND PHYSICAL EXAMINATION

An extensive and careful history, physical examination, along with both axial and coronal computed tomography (CT) scans is vital for the diagnosis of orbital floor fractures. The etiology for the facial trauma is commonly a motor vehicle accident or an interpersonal altercation. Commonly, patients will complain of periorbital pain and a change in vision (blurriness or possibly diplopia).[3,4,5] The history should include an estimate of visual acuity prior to and immediately following the injury. It should be noted whether any visual loss was slowly progressive or sudden in onset. Immediate diplopia or vision loss points to a more traumatic injury. An intraocular foreign body must be suspected if there is a history of hammering, grinding, or explosions.[2]

Physical exam findings associated with an orbital floor fracture include hypesthesia in the V2 distribution, eyelid ecchymosis, subconjunctival hemorrhage, or changes in visual acuity. If the patient does complain of visual changes, a thorough ocular examination, including light projection, two-point discrimination, and the presence of an afferent pupillary defect should be performed. If extraocular muscle limitation is found, a forced duction test under anesthesia should be administered to evaluate for muscle entrapment. The orbital rim should be palpated to evaluate for bony defects or step-offs. Enophthalmos and exophthalmos can be determined by viewing the profiles of the corneas from over the brow. Enophthalmos can be seen after a large orbital floor fracture because of the increase in orbital cavity volume. Exophthalmos can be a presenting sign of a retrobulbar hematoma. If any abnormalities are found on physical examination, it is highly recommended to obtain an ophthalmology consultation for further ocular examination, including slit-lamp examination and exophthalmometry.[1,4,5,6,7]

A CT scan of the face is vital for the evaluation and treatment of orbital floor fractures. Axial and coronal planes with both soft-tissue and bone windows should be obtained in order to discern the extent of the orbital cavity injuries along with any other facial fractures that might be present. An orbital floor fracture is best evaluated in the coronal formats. The two most important characteristics of the fracture to determine are the size of the fracture and whether or not any orbital contents have prolapsed through the fracture into the maxillary sinus.[4,5] Small linear fractures tend not to lead to enophthalmos; however, an orbital “blow out” fracture that is greater than 50% of the orbital floor has a high chance of causing visually significant enophthalmos. Orbital cavity contents, such as fat or the extraocular muscles can prolapse into a fracture site. In some cases, particularly children, a trapdoor phenomenon can occur where the floor has a medially-hinged greenstick fracture that allows herniation of orbital contents through the fracture and then entraps these herniated contents. Trapdoor fractures can lead to tissue ischemia and necrosis, particularly of the inferior rectus and oblique muscles.[7,8]

TREATMENT

Treatment of orbital floor fractures can be divided into three subsets: conservative treatment, early surgical intervention, and delayed surgical intervention. Not all orbital floor fractures require exploration and repair. Conservative treatment may be considered in a small subset: small, non-blow-out fractures without entrapment or diplopia.[49] These patients should be followed closely as an outpatient to evaluate for late-forming enophthalmos that manifests after the swelling resolves.

Immediate surgical intervention may be required in several instances. An orbital floor fracture causing soft tissue entrapment can exacerbate the oculocardiac reflex, which can manifest as bradycardia, heart block, nausea, vomiting, syncope, and possible death.[10] A large orbital floor blow-out fracture resulting in significant enophthalmos, hypoglobus, and facial asymmetry also warrants early intervention.

In most cases of orbital floor fractures, however, the surgeon can delay intervention to allow the initial edema and hemorrhage to subside. The ideal time for the repair is often 7–14 days after the injury. Delaying surgery until this time helps the surgeon to assess whether any diplopia present at the time of injury will resolve without intervention. The repair technique will also be easier to precisely gauge. Longer delays decrease the likelihood of successful repair of enophthalmos because of progressive scarring and fat atrophy. In cases of a blow-out fracture that encompasses greater than 50% of the orbital floor, the patient is at risk for late enophthalmos. Repair of these fractures would be more easily accomplished within a few weeks of the injury rather than months later, when scarring will cause the procedure to be more difficult.[169]

For fractures that do require open repair, the surgical approach is generally via a transconjunctival or subcilliary incision. After the orbital contents are raised out of the fracture, the surgeon can choose from several alloplastic and autogenous materials for the reconstruction. Absorbable plates are preferred in patients with developing skeletons (i.e., children); while in the adult trauma patient, a rigid titanium mesh or porous polyethylene (Medpore) implant is generally used. Split calvarial, rib, or iliac crest bone grafts are utilized when the patient has an extremely large defect. If an orbital exploration is performed and only a small linear fracture is found, a small sheet of gelfilm can be placed over the fracture site to prevent scarring of orbital tissue into the fracture line. Recently, several studies have examined endoscopic repair of orbital floor fractures using a transantral approach.[2345671112]

CONCLUSIONS

Orbital floor fractures are common results of facial and systemic trauma. Knowledge of the evaluation and management of these injuries is germane to the otolaryngologist who treats these patients.

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