The role of c.t and mri imaging in evaluation of orbital trauma

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The orbit may be injured directly or indirectly, with both blunt and penetrating trauma occurring with equal frequency. Soft tissue swelling often obscures direct clinical evaluation of the globe, limits ocular motion, and may limit clinical assessment of vision.All parts of the orbit may be subjected to traumatic injury. Common posttraumatic orbital injuries include anterior chamber injuries, injuries to the lens, open-globe injuries, ocular detachments, intraorbital foreign bodies, carotid cavernous fistula, and optic nerve injuries.The assessment of these capabilities may sometimes be difficult due to the severity of the head injury, the extent of periorbital soft tissue edema, inadequate cooperation in alert patients, and a reduced level of consciousness in obtunded individuals. Consequently, computed tomography (CT) beside magnetic resonance images (MRI) have come to play a major role in the orbital examination of acute trauma patients., however others radiological modalities may have a role in diagnosis of orbital trauma complication but in the same time their values are limited ; for example Plain radiography is quick, inexpensive, and universally available in any hospital emergency center. As plain film evaluation of the orbit may accurately depict the presence of bony injury, as well as the presence of radiopaque foreign bodies. However, the plain radiography is limited in their ability to delineate soft tissue structures or to decipher the extent of bony deformity and displacement.Also the value of orbital ultrasonography has not generally become a component of the initial work up for orbital trauma, This is due to its insensitivity for the delineation of fractures and lack of soft tissue differentiation of the contents of the traumatized globe, and the relative difficulty of performing the procedure, particularly in those presenting with severe facial injury, Orbital ultrasonography is also contraindicated if a ruptured globe is suspected In addition, ultrasonography is operator-dependent and may not be available at all times.The radiologist should do the following: (a) evaluate the bony orbit for fractures, note any herniations of orbital contents, and pay particular attention to the orbital apex; (b) evaluate the anterior chamber; (c) evaluate the position of the lens (the lens may be displaced, and it may be either completely or partially dislocated); (d) evaluate the posterior segment of the globe, look for bleeds or abnormal fluid collections, retinal detachment, choroidal detachment and evaluate for any foreign bodies; and (e) evaluate the ophthalmic vessels and the optic nerve especially at the orbital apex.Computed tomography (CT) and magnetic resonance imaging (MRI) are excellent imaging modalities that have significantly enhanced orbital imaging in the diagnosis of ocular and orbital lesions including orbital trauma.Most commonly seen sequels of orbital trauma are fractures of the walls of the orbit. the orbital floor and medial orbital wall most commonly affected.Orbital fractures may cause extraocular muscle entrapment , the significance of describing entrapment of muscles with these injuries lies in the persistence of diplopia when the muscles are prevented from normal motility and for the potential for scarring, leading to permanent malpositioning. These fractures are usually accompanied by soft-tissue swelling and/or fluid levels in the maxillary and ethmoid sinus for floor and medial wall fractures, respectively.Up to now the gold standard in imaging of orbital fractures is the C.T-scan as C.T is excellent in the evaluation of the bony orbit and is the imaging modality of choice for orbital trauma.When the medial and lateral walls are affected the best imaging seen in the axial plane, the orbital roof and floor are optimally visualized on coronal images, when fractures are present, three-dimensional reformation is a useful tool to guide treatment.The orbital CT examination was performed using axial 1-mm and coronal 3-mm slices with both soft tissue and bone windows, Coronal images are indispensable in evaluating the superior orbital surface, the floor of the orbits, and the superior and inferior rectus muscles, as well as in helping to elucidate the presence of optic nerve sheath hematoma, also the Coronal reformation images were prepared if the patient was unable to tolerate the prone position for direct coronal imaging, three-dimensional reconstructions are not routinely required., Early diagnosis is important for preservation of vision.Whoever The weak points of C.T imaging modality, are the restricted soft tissue depiction as well as the radiation exposure dose, with especial importance in children, because of the high rate of trapdoor fractures and the radiation to the lens as the MRI is not associated with radiation exposure so it was a primary diagnostic radiological modality of pediatric orbital fractures and to visualized soft tissue depiction by using a special orbital coil in the same time.Hemorrhage into the anterior chamber which is called hyphema, may be demonstrated by increased attenuation within the anterior chamber on CT scan and may has variable signal intensity on MR imaging, also it can demonstrated by widening of the AP distance from the lens to the anterior margin of the globe.Traumatic lens complication including traumatic cataract, subluxation and dislocation of the lens .In the traumatic cataract; the lens appears in lowering of its CT density. This may be detected by comparing Hounsfield unit measurements from side to side.The subluxation of the lens occurs secondary to rapid equatorial expansion of the globe. The zonular fibers that normally hold the lens in place may be incompletely torn resulting in lens subluxation, or completely torn resulting in lens dislocation. Subluxation of the lens is more common than dislocation of the lens, The imaging finding of a lens subluxation is suggested by abnormal biconcavity or maligned position of the lens. A lens dislocation is seen as a bilentiform or elliptical hyperdensity within the vitreous humor.Intraorbital foreign bodies are almost always detectable by CT any type of foreign bodies in the same time the metal foreign bodies in contraindicated in MRI . When seen the foreign bodies their exact position usually can be determined. It is important to assess whether the foreign body is intraocular (anterior chamber or posterior chamber), within the sclera, or extraocular, although this assessment may be uncertain if the foreign body is very close to the orbital wall.Choroidal detachment and retinal detachment can be seen as bilentiform collections along the margins of the globe within the vitreous humor. The retinal detachment with subretinal hemorrhage will posteriorly extend to the optic disk.. These types of intraocular hemorrhage are typically hypderdense to muscle on a noncontrast CT scan and, depending on the blood products present, may have variable signal intensity on MR imaging.Optic nerve injury may result from direct or indirect injury. In patients with immediate or rapidly declining visual acuity after the time of injury should be rapidly assessed for possible surgical intervention in the event of impingement of the optic nerve for possible bony fragments utilizing thin section CT with bone algorhythms in the axial and coronal planes. With the advent of multislice detector CT, isotropic sagittal reconstructions are possible, Hemorrhage into the sheath may be seen by CT as an asymmetry comparing side with side. Optic nerve avulsion is rarely demonstrated by CT because the sheath may appear continuous, If there are no contraindications to MR imaging which is best radiological modality to visualized optic nerve, visualization of the optic nerves with high resolution T2-weighted images in the coronal plane may be used to demonstrate abnormal increased signal intensity within the optic nerve.