Orbital fractures

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Orbital fractures may be isolated or more commonly occur in conjunction with zygomatic or maxillary complex fractures. They most frequently involve the orbital floor, followed by the medial wall, lateral wall or the roof, which may present in combination or as isolated injuries. Isolated orbital injuries are described as ‘blow-out’ or ‘blow-in’ fractures. An example of a blow-out fracture is shown in Figure 31.14 . Orbital floor fractures may lead to restricted upward gaze owing to trapping of orbital fat and fibrous septae resulting in diplopia on looking upwards. Occasionally , the inferior rectus or inferior oblique muscles may also be trapped. Inferior rectus muscle entrapment in childr en may present as the oculocardiac reflex: a triad of bradycardia, nausea and syncope. This needs to be treated as an emergency because irreversible damage related to muscle necrosis can occur within hours. In these cases, on imaging, the orbital floor may appear undisplaced or minimally displaced, which means that a trapdoor defect has opened and then closed again, entrapping the muscle. They are also described as a ‘white eye’ blow-out fracture as children often present with no subconjunctival haemorrhage (Figure 31.15). In addition to the restricted eye movement, orbital wall fractures can lead to changes in globe position, with inferior positioning of the globe (hypoglobus) or sinking in of the globe due to an increase in orbital volume (enophthal mos). These globe position changes may only become visible after the initial swelling has subsided; the true extent is only revealed 2–4 weeks after the injury . The indications for surgical repair of orbital fractures include enophthalmos or persistent diplopia resulting from restricted eye motility as a result of extraocular muscle entrap - ment within the fracture line. It is important to seek orthoptic assessment; this is helpful in di ff erentiating between muscle entrapment and muscle dysfunction (secondary to inflamma - tion), both of which may cause diplopia. Diplopia secondary to muscle dysfunction is likely to resolve spontaneously with time. Repair of the orbital rim is usually accomplished with ORIF techniques and the orbital walls repaired with preformed or patient-specific titanium implants or less commonly autolo - gous materials such as cranial bone grafts. - A retrobulbar haemorrhage is an acute surgical emergency as it can lead to blindness secondary to pressure-induced reduced flow on the retinal artery , leading to ischaemic damage to the optic nerve (Figure 31.16). It presents with tense proptosis, incr easing pain, reduced visual acuity and loss of the pupillary response. One of the early signs may be altered perception of red colour in the a ff ected eye. If this is suspected, preparation should be made for immediate bedside lateral canthotomy and cantholysis under LA to allow the globe to bulge forwards and relieve the pressure posteriorly . Con- comitant medical management should also be initiated with mannitol, acetazolamide and steroids. Summary box 31.8 Orbital fractures /uni25CF /uni25CF /uni25CF

Figure 31.14 Coronal computed tomography (CT) scan demonstrating a left orbital blow-out fracture, with soft-tissue herniation into the maxillary antrum. Figure 31.15 This 11-year-old boy presented with an oculocardiac re /f_l ex secondary to a ‘white eye’ blow-out left orbital /f_l oor fracture following a rugby injury.

Figure 31.16 An axial CT scan demonstrating left retrobulbar hae

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As frontal sinus fracture signifies a large amount of force applied to the cranium, any concomitant intracranial injuries must also be identified and treated appropriately . Frontal sinus fracture may

be classified according to whether the anterior, posterior or both tables are involved with or without fracture of the sinus floor, which raises concern for possible injury to the nasofrontal duct (Figure 31.17). If combined with a dural tear, there may be cerebrospinal fluid (CSF) rhinorrhoea, which can be confirmed by sending the fluid sample for β -transferrin 2 assay . The aim of fracture management is to achieve a ‘safe sinus’, which means establishing normal sinus function, pro tecting intracranial structures and preventing short- and long- term complications such as meningitis, Pott’ s pu ff y tumour and mucocele. Minimally displaced (<2 /uni00A0 mm) fractures of the anterior or posterior table can be managed conserva tively with nasal decongestants and long-term observation to exclude complications. The indications for surgical interven tion include anterior table disruption with significant forehead deformity , frontonasal duct involvement/obstruction and sig nificant displacement of the posterior table with underlying neurological injury . Isolated anterior table fractures are usually accessed via a coronal flap; they are reduced and fixed with low-profile titanium miniplates. Posterior table fractures are jointly treated with neurosurgeons and r equire cranialisation of the frontal sinus with obliteration of the sinus cavity and frontonasal duct. A pericranial flap is placed between the brain and the cranial vault to add an additional barrier against potential postoperative infection. A CT scan at 6 months to 1 year is rec ommended to ensure that there are no signs of complications. Summary box 31.9 Frontal sinus fractures /uni25CF /uni25CF /uni25CF

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