COMBINED ANTERIOR AND POSTERIOR SEGMENT TRAUMA
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Ocular trauma is a leading cause of monocular blindness, with an estimated half million blinding ocular injuries worldwide each year.

Closed Globe Injuries. Closed globe injuries can affect both the anterior and posterior segment. Manifestations of closed globe trauma include traumatic hyphema, lens subluxation and dislocation, vitreous hemorrhage, commotio retinae, avulsion of the vitreous base, retinal tears, macular hole, retinal detachment, traumatic optic neuropathy, and optic nerve avulsion. While some of these injuries can lead to devastating irreversible vision loss, most do not require urgent intervention, but rather full evaluation and thoughtful management. It is critical to monitor IOP in the setting of hyphema, and to perform ultrasonography to look for retinal detachment when visualization of the retina is impaired.

Open Globe Injuries. On the other hand, open globe trauma often necessitates emergent surgery. It is important to obtain a history and perform as complete an exam as possible to determine the extent of the injury and to prepare properly for surgery. Important prognostic factors include visual acuity and the presence or absence of an afferent papillary defect.

Primary Repair. The first step in managing an open globe injury is repair of the laceration or rupture. The goals are to restore the structural integrity of the globe, with watertight closure of all wounds and restoration of normal IOP, protecting the visual axis if possible, and avoiding iatrogenic damage. Before repairing the laceration, it is critical to determine the extent of the injury. Repairs should be performed with nonabsorbable sutures, usually starting at the front of the eye and working posteriorly. If an injury crosses the limbus, it is easiest to first reapproximate the tissue at this location. Incarcerated tissue should be reposited when possible, unless it appears extremely necrotic. If it is apparent that a sclera laceration is present, a peritomy should be performed and the sclera explored carefully to determine if the laceration is either located or extending under the rectus muscles. If vitreous has extended through the laceration, it should be cut with a sharp scissors flush with the sclera. The value of sclera buckling surgery at the time of primary repair is controversial. Several studies suggest this may be beneficial by supporting the vitreous base, reducing vitreoretinal traction, and reducing the risk of subsequent retinal detachment.

Intraocular Foreign Bodies. Intraocular foreign bodies (IOFBs) should be removed at the time of repair of the entry site or soon afterward, both because they rapidly become encased in a fibrous capsule, and because they have a higher association with traumatic endophthalmitis. Most IOFBs will require pars plana vitrectomy for removal, whether magnetic or nonmagnetic. Extremely large foreign bodies, such as BB pellets, can post great difficulty for the surgeon.

Lens damage. Management of cataract after penetrating injury is controversial, with some advocating primary lensectomy and others suggesting a second procedure. In more severe injuries, lens removal may be necessary for visualization of the posterior segment so as to remove a posteriorly located IOFB or repair a retinal detachment. If the injury is limited to the anterior segment, however, deferral of cataract surgery following primary repair permits clearing of fibrin and inflammation and allows proper determination of lens position, capsular integrity, and IOL power.

Role for vitrectomy. Despite advances in management of eyes with penetrating injuries, the eyes with more severe injuries involving the posterior segment still carry a poor prognosis. Vitreous surgery is often indicated in this setting, however it is controversial as to whether it should be performed at the time of the primary repair or deferred 7-10 days to allow further diagnostic evaluation, reduction in inflammation, and clearing of anterior segment hemorrhage. Early vitreous surgery is encouraged for eyes with IOFBs, endophthalmitis, and obvious retinal detachment. Deferred vitrectomy may be beneficial otherwise; however, most authors believe that such surgery should not be delayed beyond 14 days.

Once the decision has been made to perform a vitrectomy, surgical goals include clearing the ocular media through removal of cataractous lens or vitreous hemorrhage, removing the vitreous scaffold from the laceration site, removing the posterior hyaloids that could provide a future scaffold for vitreoretinal traction or epiretinal membrane formation, removal of any IOFBs, and identifying and treating retinal breaks and detachment. From the onset of the case, the surgeon will be making critical decisions that can have a profound influence on outcome, including management of preexisting hemorrhagic choroidal detachment, management of anterior segment hemorrhage and cataract, and placement of the infusion cannula. Management of the posterior segment injury can not be addressed until the anterior segment is cleared. In some cases, severe corneal injury complicates the ability to perform this surgery. Visualization through a scarred cornea can be improved with the use of a wide angle viewing system, but more severe anterior segment injuries may require use of a temporary keratoprostheses.

Perforating injuries. Perforating injury represents a small subset of ocular trauma, where there is both an entry and exit site. If both sites are easily accessible, they should be closed at the time of primary repair. However, it is more common for the exit site to be inaccessible, in which case the anterior entry site is closed and the posterior exit allowed to close spontaneously. Vitrectomy surgery is delayed for 7-10 days, at which time such surgery is performed to prevent transvitreal proliferation.

Conclusion. As the vast majority of ocular trauma is preventable, physicians should emphasize the importance of protective eyewear for all recreational or occupational activities that may lead to eye injury. In addition, polycarbonate spectacles should be prescribed for all individuals who are monocular, regardless of the etiology.