

# BLAST INJURIES

## Eye Blast Injuries



### Background

Ocular injury is a frequent cause of morbidity in terrorist blast victims, occurring in up to 28% of survivors. The eye, with its protective orbit, tarsal plates, and tough sclera, is resistant to traumatic rupture resulting from a blast overpressure wave. Given enough force, however, rupture can occur. Only one case of pure **primary blast injury** to the eye has been reported in the literature. Lesser force can result in internal ocular disruption. **Secondary blast injury**, caused by flying debris or fragments, is a particular threat to exposed and unprotected heads and eyes. Rapidly accelerated sharp particles, large or small, can lacerate or rupture the cornea or sclera and enter the eye.

Glass is a major source of lacerations and foreign bodies (FBs) affecting the eye. Concrete, metal, wood, and other materials from explosions in buildings can create FB eye injuries. Explosions in open spaces tend to accelerate metallic fragments from the bomb and may also propel soil and organic matter. Ocular injuries occurring from terrorist bombs may be extensive, and may involve blunt or penetrating trauma injury to the tissues of the globe, lids, orbit, or ocular adnexa. Frequently, injuries are bilateral and may range from minor corneal abrasions and foreign bodies to extensive eyelid lacerations, open globe injuries, intraocular foreign bodies (IOFB), or orbital fractures.

### Clinical Presentation

- Blast eye injuries may present with a wide range of symptoms, from minimal discomfort to severe pain or loss of vision
- It is critical to appreciate that significant eye damage may be present with normal vision and minimal symptoms; these may include eye irritation or pain, foreign body sensation, decreased or altered vision, bleeding, or periorbital swelling or bruising
- Minor blast-related eye injuries include corneal abrasions, conjunctivitis, and superficial foreign bodies
- Open globe injuries, including penetrating and perforating injuries to the cornea or sclera, are the most common serious blast-related eye injuries (up to 20%–50% of those with eye injuries)
- Eyelid lacerations, often extensive, account for 20%–60% of blast-related eye injuries
- Serious non-penetrating eye injuries include hyphema, traumatic cataract, vitreous hemorrhage, retinal detachment, choroidal rupture, and optic nerve injuries

### Diagnostic Evaluation

- Assume all eye injuries harbor a rupture of the globe
- Ruptured globes or IOFBs may be very subtle—signs of a ruptured globe include 360-degree conjunctival hemorrhage; misshapen pupil; brown or pigmented tissue outside the globe; clear, gel-like tissue outside the globe; or abnormally deep or shallow anterior chamber
- Intraocular foreign bodies may be large and obvious, or small and difficult to detect; may be located in any part of the eye

### Diagnostic Evaluation (continued)

- Obtain visual acuity of each eye if possible; test for light perception (LP), hand motion (HM), and count fingers (CF)
- Thin-cut computed tomography (CT) of the orbits may be helpful in identifying foreign bodies
- Magnetic resonance imaging (MRI) is contraindicated until it is proven no metallic FBs are present; MRI may be helpful in identifying non-metallic (wood, plastic, organic) foreign bodies

### Initial Management

- Do not force the lids open to examine the eye; defer examining the eye if there is massive swelling or hematoma of the lids
- Assume all eye injuries harbor a ruptured globe; do not put any pressure on an eye that may be ruptured
- Do not apply a patch or bandage to the eye—use a convex plastic or metal shield, or the bottom of a clean paper or Styrofoam cup be taped to the surrounding bones to protect the globe
- Do not remove impaled foreign bodies; the distal aspect of the foreign body may be in a location that requires special extraction techniques
- Administer tetanus if warranted
- Administer anti-emetics to reduce nausea and vomiting
- Administer intravenous (IV) broad-spectrum antibiotics if a ruptured globe is suspected; current suggestions include the combination ceftazadime/vancomycin; consider IV clindamycin for dirty soil/organic material-contaminated wounds

### Disposition

- The examination of blast victims should be approached with a high level of suspicion for occult eye injuries and a low threshold for referral; consult an ophthalmologist as early as possible
- After initial stabilization of the patient and protection of the eye, rapid transport to facilities with ophthalmic operating room (OR) capabilities should be the main goal

*This fact sheet is part of a series of materials developed by the Centers for Disease Control and Prevention (CDC) on blast injuries. For more information, visit CDC on the Web at: [www.emergency.cdc.gov/BlastInjuries](http://www.emergency.cdc.gov/BlastInjuries).*