"A Mechanic's Eye-opening Experience"

DALHOUSIE UNIVERSITY Inspiring Minds

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John's Case

John, a 46-year-old mechanic, presents to the ED with acute 10/10 pain and a foreign body sensation in his eye. He was grinding a piece of metal when the sudden pain came on. In a rush at the end of the day, he had forgotten to wear eye protection for this routine work he had done numerous times previously. He also notes decreased vision in the injured eye.

Read on for more on John.

Questions and Answers

1. What are the key questions to ask when completing a patient's history?

It is important to take a complete history to ensure that no other injuries have been sustained. A focused history of the eye should include:

- Timing and location of injury
- Mechanism (metal-on-metal is particularly worrisome as this is indicative of a high velocity particle)
- Type of material involved: organic matter has a higher rate of infection, iron-containing foreign bodies can cause siderosis, copper may lead to cheilosis (a rapidly developing sterile endophthalmitis), and lead-containing products may cause lead poisoning if left in place.
- Vision changes: acuity, floaters, flashing lights, diplopia
- Pain
- Nausea or vomiting
- Discharge
- Past ocular, medical, and surgical history
- Tetanus status
- Use of protective eyewear

In this case, the mechanism of injury, vision changes, pain and failure to use protective eyewear are all causes for concern regarding a penetrating globe injury.

2. What are the key elements of the physical exam?

A systematic approach to the physical examination is important. It can be easy to overlook other extraocular injuries that may not be as noticeable as the acute trauma to the eye. A consistent approach to eye examination is important to ensure no findings are missed. The following approach begins with examination of external eye structures and then moves on to internal eye structures.

Prior to beginning the examination, it is important to avoid placing pressure on the globe, as this may lead to extravasation of intraocular contents if there is an existing globe rupture.

External eye examination

- Note deformities: periorbital trauma or laceration, exophthalmos (bulging eye), enophthalmos (recessed eye).
- Perform an examination of visual acuity (*e.g.*, Snellen chart), and document results before any manipulation of the eye.
- Look for herniated intraocular contents.
- Inspect conjunctivae for blood, chemosis (swelling), foreign bodies and exposed tissue.

Internal eye examination

- Examine iris and pupil: size, shape, symmetry, reaction to light, Relative Afferent Pupillary Defect (RAPD).
- Perform fundoscopy: decreased red reflex may indicate cataracts, vitreous hemorrhage, or retinal detachment.
- Measure intraocular pressure (do not attempt if ruptured globe is suspected).

Slit-lamp

- Examine cornea using fluorescein staining under cobalt blue light to look for irregularities, lacerations and foreign bodies.
- Perform Seidel Test (streaming fluorescein) to determine full thickness corneal perforation or globe injury.
- Assess for injury to anterior chamber, cornea, iris and lens. If a slit-lamp exam is unavailable, examine using a penlight, looking for visible hyphema (blood in anterior chamber), laceration or shrunken appearing globe.

3. *What investigations might you consider (especially if you suspect metallic foreign body globe penetration)?*

Orbital CT scan is the imaging modality of choice to detect foreign body globe

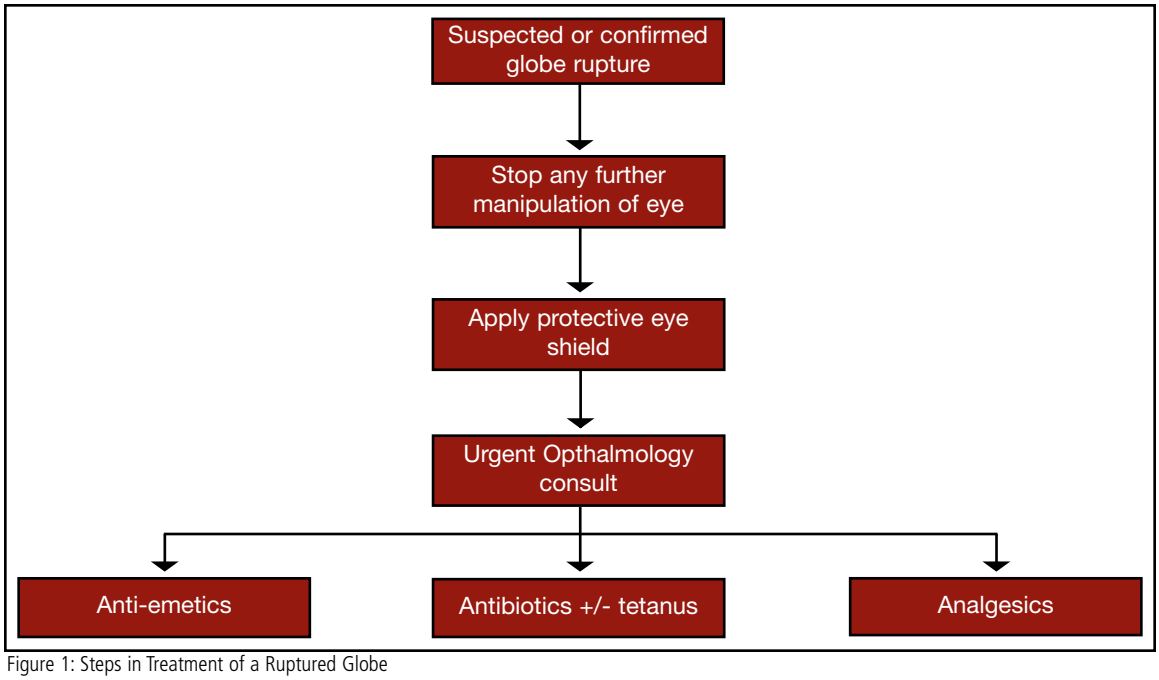

Figure 1: Steps in Treatment of a Ruptured Globe

Back To John

The patient was noted to have significantly decreased visual acuity in the affected eye. On examination with a slit lamp, he had a positive Siedel's sign. The patient was given parenteral metoclopramide, cefazolin, morphine and was given a tetanus shot. A plastic shield was taped in place over the injured eye. An urgent CT was arranged which showed a metallic foreign body within the globe. The patient was admitted to the opthomology service for surgical management of his injury.

penetration. It has a sensitivity of 65% for intraocular objects < 0.06 mm^3 and 100% for objects > 0.06 mm^3. Note that non-metallic objects may be missed on CT. MRI is also a very sensitive test; however, its use is controversial due to the risk of metallic object movement during the test, which may cause further intraocular damage. Plain X-ray is less commonly used, due to a high false negative rate of approximately 60%. Ocular ultrasound is a relative contraindication if globe rupture is suspected due to the increased pressure exerted on the eye during the test.

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Publication Mail Agreement No.: 40063348
Return undeliverable Canadian addresses to:
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4. *How would you treat a ruptured globe?*

Once diagnosis of a ruptured globe is confirmed or if the clinician is unable to rule this out, further manipulation of the eye should stop. Subsequent steps include applying a protective eye shield and requesting an urgent consult to opthamology. The patient should be positioned in bed at a minimum of 30 degrees, and advised to refrain from eating or drinking. Anti-emetics should be given to reduce the possibility of increased intraocular pressure from a Valsalva manoeuver; systemic antibiotics should be given to prevent infection, and analgesics are important for pain management (Fig 1). As well, tetanus status should be confirmed and updated if required. Dx

Resources

1. Bord SP, Linden J. Trauma to the Globe and Orbit. Emerg Med Clin North Am 2008;26(1):97-123.
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