Chapter 13: Eye Injuries and Disorders

Eye injuries and Disorders

This chapter will train you to recognize and treat eye injuries and disorders according to the following criteria:

- How to best treat injuries to tissues surrounding the eye, to include those that are worrisome for a more significant injury
- To recognize ocular injuries and to understand their basic management in the wilderness
- To describe evaluation and treatment of the patient with a red eye
- To understand the possible diagnoses associated with visual loss
- To describe evacuation criteria for the patient with an eye injury or complaint
Case 1

A 29-year-old male is fishing with friends at a river 3 hours distant from the nearest hospital. The hike from the car is 10 minutes on a flat trail. After a cast, the man falls down, writhing in pain. His friends notice that the fishing line is attached to the hook, which has punctured the victim’s eye. He has difficulty holding still and cannot open the eye because of pain and anxiety.

1) What is the next step in management of this patient?
2) What do you do with the fishing hook?
3) Can this be dealt with in the wilderness?
4) If evacuation is necessary, what is the best way to proceed?

Case 2

A 59-year-old male complains of sudden decrease in vision in his left eye. He was fine several minutes previously, but then saw flashing lights in the left eye, followed by “floaters.” He is able to see, but his vision seems decreased. On examination, his eye appears to be completely normal and he is easily able to count fingers at six feet in front of him.

1) What is the next step in management of this patient?
2) Can you manage him in the wilderness or does he need to be evacuated?
3) If evacuation is necessary, should you place a shield over his eye?

Case 3

A 32 year-old woman is struck in the right eye by a rock while climbing up a cliff. Other than a small contusion on her eyelid, there is no external trauma. Examination of her eye shows normal counting of fingers at six feet and a very small layer of blood overlying the iris along the lower border of the cornea. The remainder of the exam is normal.

1) What is the injury?
2) What are the potential complications from this injury?
3) Is it reasonable to give the victim ibuprofen for pain?
4) Can you manage the victim in the wilderness or does she need to be evacuated?
5) If evacuation is necessary, should you place a shield over her eye?
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Periocular Trauma

Superficial lid laceration
- A superficial lid laceration does not penetrate the full thickness of the eyelid and does not include the lid margins or the eye itself.
- Penetration of the eye by a foreign object must be ruled out.
- Treatment of superficial lid lacerations is the same as that for other minor lacerations.
  - Use clean gauze to apply pressure to the cut to stop the bleeding. However,
  - It is important not to put pressure on the eye but rather on the surrounding bones of the orbit.
  - After the bleeding stops, strongly irrigate the wound with clean water or saline solution to remove dirt or foreign objects.
  - Apply bacitracin ointment in a thin ribbon to the wound and attempt to close the laceration with tape strips. Cover the wound with a sterile non-adherent dressing or gauze and tape the dressing in place.
  - Monitor daily for signs of infection, such as redness, swelling, pain, and pus. Depending on the severity of the laceration, evacuation may be necessary for definitive repair.

Complex lid laceration
- A complex lid laceration penetrates the full thickness of the lid and/or includes the lid margins.
- Penetration of the globe must be ruled out.
- Use sterile gauze to stop the bleeding. Irrigate the cut with saline solution or clean water if saline is not available. Saline is preferable, since irrigating a complex lid laceration will most likely include irrigating the eye.
- Most health care providers are not comfortable closing complex lid lacerations. There is a considerable risk of poor outcome if the laceration is not closed appropriately. In cases where the treating health care provider is not qualified or confident about closing the wound, the wound should be treated with antibiotic ointment and then kept covered.
- Due to the need for repair, patients with complex lid lacerations should be evacuated if possible.

Blunt trauma
- Blunt force to the globe or surrounding bony orbit and soft tissues can fracture the thin bones that hold the eye in place.
- In most cases, significant periocular bruising and swelling will occur.
- There may also be restriction of eye movements, called entrapment.
- Significant swelling, restricted eye movements, clear fluid leaking from the nose, and decreased vision following blunt trauma to the orbit suggest considerable damage. The victim should be evacuated for evaluation and treatment.

Ocular Trauma

Penetrating foreign body
- If a foreign object has penetrated the eye, do not try to remove it. Stabilize the object by taping a sterile dressing in a donut shape around the eye and then taping a cup or pair of glasses over the eye to prevent any jarring of the embedded object.
- You may consider patching the other eye shut to prevent eye movement if the victim does not have to use his or her sight to navigate out of the wilderness. However, in most cases this is unpractical.
- If the eye has been punctured, resulting in an open globe, and no foreign object is present, a protective shield should be taped over the eye. Sunglasses can function as a shield by being taped over both eyes.
- In any possible case of globe penetration, it is important not to put any pressure on the damaged eye. External pressure may raise intraocular pressure, resulting in expulsion of intraocular structures. An open globe injury is a true emergency and should result in immediate evacuation to prevent infection and vision loss.

Corneal abrasion
This is disruption of the epithelial layer of the cornea. It is most commonly caused by trauma, although it may occur “spontaneously” in individuals who have had a recently healed abrasion. A corneal abrasion may result in moderate to severe pain, tearing, and sensitivity to light. Treatment:

- Evaluate the eye to ensure there is not a globe perforation or retained foreign body on the cornea.
- Apply a topical ophthalmic antibiotic ointment or liquid if such is available. If an antibiotic is not available, the abrasion should still heal well.
- Consider patching the eye for comfort. This is done by tightly taping a piece of gauze from the forehead to the cheekbone. Eye patching is not a necessity, but some victims report that this gives relief from their symptoms. Others may find that the eye patch is irritating and request to remain without the patch, which is fine.
- The epithelial layer of the cornea heals rapidly, usually within 24 to 72 hours.

Ultraviolet radiation burns (UV keratitis)
- The protective epithelial layer of the cornea is easily damaged by exposure to ultraviolet radiation from direct sunlight, reflection off snow, or reflection off water.
- Symptoms are mild to severe eye pain, reddened eyes, sensitivity to light, tearing, blurry vision, and foreign body sensation in the eye 6 to 10 hours after exposure.
- These symptoms commonly involve both eyes, which is a clue to this diagnosis.
- This injury is easily prevented with sunglasses with side shields. Always wear proper eye protection in bright light, especially when light is reflected off snow or water.

Non-penetrating foreign body
- Non-penetrating conjunctival or corneal foreign bodies can result in pain and irritation. If natural tearing does not clear the eye of the foreign body, irrigating the eye with saline solution is sometimes successful. Larger chunks can be removed from the conjunctiva with a cotton swab.
- Do not attempt to remove foreign objects embedded in the cornea. If an object persists in the cornea or cannot be removed from the conjunctiva, apply a strip of bacitracin ointment to the lower lid. If necessary for pain control, patch the eye as for a corneal abrasion. If there is any suggestion of an infection, do not patch the eye. Evacuation will be necessary because corneal foreign bodies can cause permanent scarring and conjunctival foreign bodies can become infected.

Hyphema
- A hyphema is a collection of blood in the anterior chamber of the eye. The anterior chamber is the fluid-filled space between the cornea and iris. A larger hyphema may be noted by visualizing a layer of blood overlying the iris along the bottom margin of the iris.
- Hyphema is a serious condition that mandates evacuation due to its potential complications, which include acute glaucoma and rebleeding. Use an eye shield to protect the eye from any further trauma. Avoid aspirin, ibuprofen, or any other medications that may cause more bleeding. Activity should also be restricted as much as possible during evacuation.

Acute vision loss in a normal appearing eye

- It is possible for a victim to lose vision in an eye that looks completely normal. There are various causes of acute vision loss. Each is serious and can result in permanent vision loss. Whenever visual acuity dramatically decreases, or there is sudden loss of vision, evacuate the victim immediately.

Retinal detachment
- Retinal detachment occurs when the retina (the innermost, posterior layer of the eye) detaches from the choroid (the posterior middle layer). This may be because of trauma or may occur spontaneously. It is more common in people with severe near-sightedness, because of the shape of their eyes.
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- Initial symptoms commonly include a sensation of flashing lights followed by a shower of “floaters.” Over time, this may lead to a shadow in any part of the visual field. Left untreated, this can spread to involve the entire visual field within a short period of time. Surgical intervention can help to preserve vision, so prompt evacuation must ensue shortly after initial symptoms are noted.

**Acute Red Eye**

**Subconjunctival hemorrhage**
- Subconjunctival hemorrhage is accumulation of blood in the space between the conjunctiva and sclera.
- This results in an extremely red looking (“bloodshot”) eye, but is rarely a serious condition.
- This condition may occur spontaneously or as a result of increased intrathoracic pressure, such as occurs with straining or coughing.
- It normally resolves over a period of a few days to two weeks without treatment.
- If this occurs from trauma, examine the eye for other more serious conditions, such as a foreign body or puncture.

**Conjunctivitis**
- The major causes of conjunctivitis are viral, bacterial, and allergic.
- Acute bacterial conjunctivitis is much less common than viral conjunctivitis.
- Viral and allergic conjunctivitis usually require no treatment. In the wilderness, the most practical treatment for the symptoms of these conditions is cold compresses if ice or a cool wet cloth is available.
- Bacterial conjunctivitis is most often treated with a broad-spectrum ophthalmic ointment or suspension.
- Since the cause of conjunctivitis may be difficult to diagnose, if inflammation becomes worse after a few days, it may be appropriate to evacuate for evaluation and treatment.
- If a red eye is accompanied by decreased visual acuity or if the cornea becomes opaque or cloudy, evacuation is necessary because these latter symptoms possibly denote more serious ocular disease.

**Evacuation Guidelines**
- Evacuate immediately if the globe has been perforated.
- Evacuate immediately if there is sudden loss of vision in a normal appearing eye.
- Evacuate as soon as possible if there is a complex lid laceration or hyphema, or if the cornea becomes cloudy.
Questions

1) You are on a camping trip, when a 60-year-old male awakens in the morning up with a red eye. He does not complain of vision loss and in fact does not notice any problem until you bring it to his attention. What is the next best step?
   a) Apply direct pressure to the eye
   b) Evacuate immediately
   c) Monitor for signs of vision loss or pain
   d) Apply ointment and patch the eye
   e) Irrigate the eye with saline or clean water

2) On a youth wilderness excursion, a young man is struck in the forehead with a tree branch during a robust game of tag. The victim falls on the ground and complains of severe eye pain. A small dry twig is lodged in the white part of the eye and does not fall out. Before evacuating, what should be done?
   a) Apply direct pressure to the eye
   b) Give the patient aspirin
   c) Remove the twig and patch the eye
   d) Apply ointment and patch the eye
   e) Do not remove the twig and tape a shield over the eye

3) The morning after a long day of river rafting, a 58-year-old female complains of having seen light flashes during the night even with her eyes closed. Now, in the daytime, with her eyes open she sees dark dirt-like spots in one field of vision. What is the next best step?
   a) Apply direct pressure to the eye
   b) Evacuate immediately
   c) Monitor over time for signs of vision loss
   d) Apply ointment and patch the eye
   e) Irrigate the eye with saline or clean water

4) It is beginning to become dark on a trail and you accidentally walk into a low-lying branch that scrapes your eye. You feel intense pain that makes it difficult to open your eye. During the brief moments when you eye is open you notice your vision to be unchanged. What is the next best step?
   a) Apply direct pressure to the eye
   b) Apply ointment, patch the eye, and evacuate immediately
   c) Apply ointment, patch the eye, and reassess in the morning
   d) Take Tylenol for pain control and keep hiking
   e) Rinse the eye with river water, apply ointment, patch the eye, and reassess in the morning

5) A young man slips while rock climbing. During the fall, he scrapses his face on a sharp rock and is cut on his right upper eyelid below the brow. The cut is bleeding profusely but his eye movements are normal and the only pain is felt on the surface. What is the best treatment?
   a) Apply direct pressure to the cut, with pressure over the bone, and treat like a normal skin laceration
   b) Apply direct pressure to the cut, with pressure over the eye, and treat like a normal skin laceration
   c) Give aspirin for pain control and evacuate
   d) Apply ointment, patch the eye, and reassess in the morning

Answers:
1. c
2. e
3. b
4. c
5. a