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OCULAR TRAUMA

Ocular Trauma

 The eye is protected from direct injury by lids, eyelashes and the projecting margins of the orbit. Nevertheless, it can be injured in a variety of ways; by chemicals, heat, radiation and mechanical trauma.

Some key features of ocular trauma:

- It is number one ocular emergency.
- Leading cause of blindness, irrespective of age, sex and geographical status. (40% of monocular blindness)
- Male & young age group is greater in incidence rate.
- Efficient referral expected from the professionals.
- Every persons should know about the importance of quick response to an ocular injury.
- Prophylactic measure is always better than management.

Classification of Trauma

Classification according to nature-

1. Physical trauma a. Perforating b. Nonperforating c. Blunt trauma 2. Chemical trauma a. Acid b. Alkali c. Dye (Salt of acid or alkali)

3. Thermal trauma a. Heat b. Cold 4. Radiation trauma a. lonizing agents b. Ultra violet rays c. Laser burn 5. Miscellaneous



Eyelid trauma

- Periocular Haematoma :
 - Generally innocuous but it is very important to exclude -
 - 1. Trauma to the globe or orbit
 - 2. Orbital roof fracture
 - 3. Basal skull fracture





Fig. (A) Periocular haematoma and oedema;(B) periocular haematoma and subconjunctival haemorrhage; (C) 'panda eyes'





• Laceration :













Fig. Lacerated eye injuries

Repair







Fig. Repairing lid margin lacerations

Canalicular lacerations repair:



Orbital fractures

Types :

- Blow-out orbital floor fracture
- Blow-out medial wall fracture
- Roof fracture
- Lateral wall fracture

Blow-out orbital floor fracture

Cause:

Sudden increase in orbital pressure by an impacting object greater in diameter than the orbital aperture (>5 cm) e.g.- Fist, tennis ball etc.

Mechanism of an orbital floor blow-out fracture



Signs of orbital floor blow-out fracture

- Periorbital ecchymosis, oedema and emphysema may also present
- Infraorbital nerve anaesthesia
- Ophthalmoplegia tipically in up and down-gaze (double diplopia)
- Enophthalmos if severe







Investigations

Coronal CT scan

Hess test



• Right blow-out fracture with 'tear-drop' sign

- Restriction of right upgaze and downgaze
- Secondary overaction of left eye

Surgical repair of orbital floor blow-out fracture





a. Subciliary incision

- b.Periosteum elevated and entrapped orbital contents freed
- c.Defect repaired with syntheticmaterial
- d. Periosteum sutured

 Coronal CT scan following repair of right blow-out fracture with synthetic material

Medial wall blow-out fracture

Signs & Investigation



 Ophthalmoplegia - adduction and abduction if medial rectus muscle is entrapped • CT coronal view shows fractures of the medial wall (red arrow)

Treatment

- Release of entrapped tissue
- Repair of bony defect

Trauma to the Globe

Blunt Trauma

Pathogenesis of ocular damage by blunt trauma



Anterior segment complications of blunt trauma

Corneal complications



- Corneal abrasion
- Stromal oedema
- Tears in Descemet membrane



• Traumatic hyphaema







Pupillary complications



- Vossius ring
- Radial sphincter tears
- Iridodialysis

Lens complications of blunt trauma



- Cataract
- Subluxation
- Dislocation



Rosette cataract





Angle Recession



Rupture globe

Posterior segment complications of blunt trauma

Commotio retinae



(A) Peripheral

(B) central

(C) macular hole following resolution

Choroidal rupture



Acute with subretinal haemorrhage



Old with secondary choroidal neovascularization

Retinal breaks and detachment



Avulsion of the vitreous base with Dialysis

Equatorial breaks

Macular holes



Traumatic optic neuropathy (TON)



Optic nerve avulsion

Penetrating trauma

Complications of penetrating trauma

Penetrating corneal wounds



Small shelving with formed anterior chamber



Flat anterior chamber

Penetrating corneal wounds



with iris involvement



with lens damage



Scleral laceration with iridociliary prolapse



Anterior scleral laceration with ciliary and vitreous prolapse





Tractional retinal detachment

Vitreous haemorrhage

Foreign body

Superficial foreign body



Subtarsal foreign body



Corneal foreign body with surrounding cellular infiltration

• Management:

- a. Careful slit-lamp examination for exact position & depth
- b. Removal under slit-lamp with 26-gause needle
- c. Magnetic removal for a deeply embedded metallic foreign body
- c. Residual 'rust ring' may remove with sterile 'burr'
- d. Antibiotic oint. with cycloplegic and/or NSAIDs

Intraocular foreign body

Intraocular foreign body



(A) In the lens



(C) in the anterior vitreous



(B) In the angle



(D) on the retina

- Management:
 - a. Accurate history- helpful for nature of FB
 - b. Examination
 - Entry exit point
 - Gonioscopy & fundoscopy must
 - Documentation for damaged structure
 - c. CT scan
 - d. MRI contraindicated for metalic FB

Removal technique





- Removal with magnet or by pars plana vitrectomy
- with forceps either through the pars plana or limbus

Chemical Injury

Key features:

- Majority of injuries are accidental
- Few due to assault
- 2/3 rd of accidental burns occur at work place
- Alkali burns are twice as common as acid
- Alkali burns more severe than acid

Grading of severity of chemical injuries

Grade I (excellent prognosis)

- Clear cornea
- Limbal ischaemia nil
- Grade II (good prognosis)
- Cornea hazy but visible iris details
- Limbal ischaemia <1/3

Grade III (guarded prognosis)

- Hazy cornea with no iris details
- Limbal ischaemia 1/3 to 1/2
 Grade IV (very poor prognosis)
- Opaque cornea
- Limbal ischaemia >1/2

G - II

• G - III







G - IV

Medical Treatment of Chemical Injuries

- 1. Copious irrigation (15-30 min) to restore normal pH
- 2. Topical steroids (first 7-10 days) to reduce inflamation
- 3. Topical and systemic ascorbic acid to enhance collagen production
- 4. Topical citric acid to inhibit neutrophil activity
- 5. Topical and systemic tetracycline to inhibit collagenase and neutrophil activity
- 6. Cycloplegia to improve comfort

Surgical Management of Severe Chemical Injuries



Division of conjunctival bands



Correction of eyelid deformity



Re-establish the fornices



Treatment of severe corneal opacity by keratoplasty or keratoprosthesis

Primary Rx for occular injuries

- Every eye injury should be given medical attention; do not touch, rub or try to remove any object in the eye If the eye has been cut or there is an object in the eye, rest a protective shield – such as a paper cup – on the bone around your eye
- In minor cases of trauma, such as a black eye from a sports injury, applying cold to the affected area can help bring swelling down, and allow the affected area to heal faster.
- In case of chemical injury wash eyes with distilled water
- In general, if a person is not sure if they have a serious eye injury, they should call an ophthalmologist or see an emergency-medicine doctor, preferably at a large hospital that has an ophthalmologist on call, for advice and/or treatment. IIEI&H Primary Rx for Ocular Injuries

Take Home Messages

- Wear protective eyewear during risky activities.
- Wear goggles when exposed to chemicals.
- Supervise your child's use of tools.
- Protect your eyes while doing yardwork.
- Keep children away from flying debris.
- Use caution with chemicals and cleaners.
- Be careful when cooking or using hot objects.
- Keep sharp kitchen tools and utensils away from small children.
- Use car seats. Avoid certain children's toys.
- Wear protective eyewear during sports.
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Thank you

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