Injuries of the eye

The eyeball is well-protected by the bony orbit, the nose, the lids, eyebrows, eyelashes and a good cushion of fat behind the eyeball.
The incidence of injury to the eye is high specially in the industrial towns. The common causes of injury in the children include playing with bow and arrow, throwing stones, ball, sharp pointed objects like pen, pencil, stick, etc. Chemical injuries are common in the laboratory and industry. Protective goggles are available for industrial workers. An eye injury is an emergency and requires immediate medical or surgical treatment.

TYPES OF INJURY

1. Extraocular foreign body
2. Chemical injuries and burns
3. Blunt injury (contusions)
4. Penetrating and perforating injury
5. Perforating injury with retained foreign body.

Extraocular foreign body:

It is usually a small particle of coal, dust, emery (hard stone), steel and glass. At times wings of insect and husk of seeds may also involve the limbus.
The most common cause is brushed metal, without goggles

Complications :

1. Conjunctivitis may occur due to secondary bacterial infection.
2. Corneal ulcer may be present as a result of corneal erosion due to foreign body.

Symptoms :

1. There is sudden discomfort in the eye.
2. Reflex blinking due to foreign body sensation is very troublesome.
3. There is great irritation and gritty feeling if the foreign body is embedded in the cornea.
4. Lacrimation and photophobia are present in cases of corneal involvement.

Signs:

1. There is marked reflex blepharospasm.
2. Foreign body is visible on the bulbar conjunctiva, limbus, cornea, sulcus subtarsalis and fornix by the naked eye, oblique illumination with a loupe or slit-lamp examination.
3. It may be single or multiple, superficial or deep.

Treatment:

-use local anesthetics release blepharospasm
-if there is the foreign body in the cornea remove it with a sharp needle
-if the foreign body is below the upper eyelashes make her eversion and foreign body removed with a cotton swab
-We use antibiotic drops and gel epithelization.

The corneal ulcer after corneal foreign body with significant inflammatory changes, vascularity of limbo and threatening perforation of the cornea.
Primarily we cover with defect with amniotic membrane.
At an advanced stage, treatment is surgical and perforating keratoplasty.

CHEMICAL INJURIES AND BURNS:

The burn injury can be caused by hot water, steam, explosive powder, molten metals, etc. The chemical injury may be due to lime, acid, and alkali. • Alkali burns—The common alkalies responsible for causing injury are lime, caustic potash or caustic soda and liquid ammonia. These can cause considerable damage to the eye because they tend to penetrate deeper. They cause necrosis of the

surface epithelium in a few seconds with occlusion of the limbal vasculature. This leads to a diminished vascularity of the anterior segment, corneal opacification and melting, cataract and symblepharon.

Acid burns—The common acids responsible are sulphuric acid, hydrochloric acid and nitric acid. These are less serious than alkalis burns because they coagulate the surface proteins and do not penetrate the eye.

Symptoms:

1. There is red eye with marked swelling of lids and conjunctiva.
2. Marked reflex blepharospasm is present usually.
3. Photophobia and lacrimation are present when there is corneal involvement.

Signs:

1. There is severe congestion and chemosis of conjunctiva.
2. Marks of burn over surrounding skin are noticed.
3. Cornea is dull and opaque or may get sloughed off.
4. Fluorescein staining—It is positive and it demarcates the denuded epithelium.

I.Grading of Chemical Injuries:

Grade I—Clear cornea and no limbal ischaemia.

Grade II—Hazy cornea but with visible iris details and less than one-third (120°) of limbal ischaemia.

Grade III—Total loss of corneal epithelium, stromal haze obscuring iris details and between one-third and half (120° to 180°) of limbal ischaemia.

Grade IV—Opaque cornea and more than half (> 180°) of limbal ischaemia

Complications:

1. Symblepharon, i.e. adhesion of the lid to the globe due to conjunctival ulceration is a common complication. A glass rod well-coated with a lubricant or ointment is swept around the upper and lower fornix several times a day to break and prevent the formation of adhesions.
2. Corneal ulcer is usually present which and it may easily perforate.

Blunt Injury-contusios:

1.Trauma by a blunt object like fist, ball, etc. can cause an injury from simple abrasion to the rupture of the globe.

Closed globe injury without full-thickness defect of the coats

1.Contusions – there is injury due to blunt trauma

2.Lamellar laceration – there is partial thickness wound of the coats due to a sharp object or blunt trauma

Treatment:

1. Immediately wash the eye thoroughly with plenty of clean water..
2. If there is corneal erosion, treat it like a corneal ulcer.
3. If cornea is not involved, steroid drops and ointments should be used to prevent symblepharon formation and to reduce congestion and chemosis of the conjunctiva
4. Dark glasses are comforting.

Injury with full.thickness defect in the corneoscleral coat

1.Rupture – there is full thickness wound of the eyeball due to blunt trauma

2. Laceration – there is full thickness outside to inside break in the ocular coats.

It includes:

a.penetrating injury – the object traverses the coats only once
b.perforating injury – both an entry and exit wound are present.

Sclera
1.. Rupture of the globe may occur with prolapse of uveal tissue.
2. This may lead to subconjunctival dislocation, expulsion or dislocation of lens in vitreous cavity.
3. Intraocular haemorrhage.

Iris and Ciliary Body :
1. Traumatic mydriasis—There may be dilatation of pupil after trauma.
2.Radiating lacerations of iris may occur occasionally.
3. Iridodialysis—Iris is torn away from its ciliary attachment.
4.Aniridia or irideremia—The iris is completely torn away from the ciliary attachment. It contracts and forms a minute ball which sinks to the bottom of the anterior chamber.
5. Cyclodialysis—Ciliary body is ruptured near its anterior attachment and it may retract.
6. Hyphaema, i.e. blood in the anterior chamber may be present.

After absorbing the blood hunt for damage to the iris and retina or corpus cilliare.
Lens:
1.Vossius's ring—Circular ring of stippled brown amorphous granules is seen on the anterior surface of the lens.
2.Traumatic cataract or concussion cataract—Typical rosette-shaped cataract may form early or late, i.e. after 1-2 years in the posterior cortex usually. An accumulation of fluid marks out the star-shaped cortical sutures and lens fibres.
3.There may be dislocation of the lens in the vitreous or anterior chamber.
4. Subluxation of the lens may occur due to the partial rupture of zonule
5.Total lens opacification may occur.

Vitreous
1.Clouds of fine pigmentary opacities may be present in fluid vitreous. ii. Intravitreal haemorrhage may occur occasionally.
2.Vitreous herniation in the anterior chamber causes secondary glaucoma.
3.Vitreous loss may occur in cases of globe rupture.

Choroid:
1.Choroid rupture may be single or multiple. It is situated on the temporal side usually. It is crescent-shaped and is concentric with the optic disc margin. The white coloured sclera shines through along with pigmentation at the edges.
2. Choroidal haemorrhage may be small or large.
3.Choroidal detachment may be present.

Retina:
1.Macular oedema (Berlin's oedema or commotioretinae)—There is milky white cloudiness at the posterior pole with cherry red spot in the centre. It disappears after few days or may be followed by pigmentary deposits.
2.Macular degeneration—It may lead to macular cyst and hole formation.
3.Retinal tear may occur resulting in retinal detachment.
4.Proliferative retinopathy usually occurs following large haemorrhage in the vitreous. There is dense proliferation of fibrovascular tissue forming traction bands.

Optic Nerve
1.Optic atrophy may occur due to injury to the optic nerve.
2.Avulsion of optic nerve can occur due to complete section of the nerve.

Penetrating injury—There is single full-thickness break or wound of the eyeball caused by a sharp object such as knife, needle, iron particle, small stone, glass, etc.
Perforating injury—There is dual or double full-thickness break or wound (entrance and exit wounds) in the eyeball caused by sharp objects. A perforating injury is likely to cause severe and serious damage to the eye due to the immediate trauma and the infection. It is an ocular emergency.

Signs of Perforation of the Eyeball :

1. Decreased visual acuity
2. Marked hypotony or low IOP
3. Shallow anterior chamber or hyphaema
4. Alteration in pupil size, shape and location
5. Marked conjunctival oedema (chemosis)
6. Subconjunctival haemorrhage
7. Hole in the iris as confirmed by transillumination
8. Wound track in the corneal, lens or vitreous

Treatment:

1. Proper suturing and apposition of the ocular tissues is done promptly
2. Control and prevention of infection by suitable broad-specturm antibiotics.
3. Close follow-up with topical antibiotics, atropine and corticosteroids is essential.

The foreign bodies which are likely to penetrate the eye and are retained include minute chips of iron and steel (90%), stone, glass, lead pellet, wood spicules, etc.

1. Siderosis bulbi - It is due to the electrolytic dissociation of the iron metal by the ‘current of rest’ in the eye. Ferrous ion combines with cellular protein causing atrophy of the cells. Ferrous ion + cellular protein → atrophy of the cells.
2. Chalicosis - A foreign body with pure copper content gives rise to a violent suppurative reaction with shrinkage of globe.

Diagnosis and Localization of Intraocular Foreign Body:

1. Slit-lamp examination and gonioscop
2. Ophthalmoscopic examinatio
3. Radiographic examinatio
5. Ultrasonography

Treatment :

The composition of foreign body and its magnetic strength determine the type of treatment. Foreign body should be removed,unless-
1. It is inert and sterile.
2-.Little damage has been done to vision.
3. The process of removal will invariably destroy sight.

Currently in operation with intraocular penetration injury to the body only by PPV,
under visual control,
Pars plana vitrectomy where it enters the eye through the three knife cuts and vitrectomy vitreous water loss.
Severe eye fill gas or silicone oil.

SYMPATHETIC OPHTHALMITIS –

It is a condition in which the normal eye gets seriously inflamed after injury to the other eye. It is rare in recent years due to better and early care of the injured eye and the use of corticosteroids and modern broad-spectrum antibiotics.