Eye Health Care and Eyes Sports Related Injuries

Introduction

The human eye is one of the most beautiful and delicate organ systems of human being, without which the existence of human kind and its domination over other species is impossible. Every part of it is made of characteristic tissues having its own characteristic specific functions. By knowing its complexity, delicacy and importance it is also not very surprising to know the fact that visual impairment is a leading and largely preventable cause of disability worldwide.

According to WHO, 39 million people are blind globally in 2010. 285 million people are affected by visual impairment and 246 million people are having low vision. India accounts for about 20% of blind globally.

Vision 20:20

Vision 20:20 is a global initiative for the elimination of avoidable blindness, a joint programme of the World Health Organization (WHO) and (IAPB) International Agency for the Prevention of Blindness professional associations, eye care institution and corporations. According to the vision 20:20, eliminating avoidable blindness would be achieved by integrating and equitable, sustainable, comprehensive eye care system into every National Health System. India is also committed to this initiative.

India has launched National Programme for Control of Blindness (NPCB) in the year 1976 as a 100% centrally sponsor scheme with a goal to reduce the prevalence of blindness from 1.4 to 0.3%. This survey that was conducted in 2006-2007 showed reduction in the prevalence of blindness form 1.1% to 1%.

Some more project in this category can be listed as follows:

1. World Bank assisted Cat Blindness Control project
2. Danish assistance to National Programme for Control of Blindness
3. World health Organization assistance for prevention of Blindness.

Anatomy and Physiology

The eye ball, generally referred as a globe is an ablate spheroid, cystic structure located in front of skull protected by a bony cavity called orbit. It is about 7 gm. in weight and 24 mm in antero- posterior diameter. The eye ball compresses three coats.

a. Outer Fibrous Coat: the anterior (front) $1/6^{th}$ of the fibrous coat is transparent and is called *cornea*. Posterior (back) 5/6 part is called sclera.

b. Vascular Coat: Consists of iris, ciliary body and choroid. It supplies nutrition to various structures of eye ball.

c. Nervous Coat: It consists of nerve fibres which captures light signals and convert it into electrical signals and transmits to brain via optic nerve.

The eye ball can be divided into two segments

1. Anterior segment: Include cornea, iris, crystalline lens.
2. Posterior Segment: Includes structure posterior to lens Viz, Vitreous humour, Retina

Other structures:

1. Extra ocular muscles; there are 6 EOM in each eye which are attached on the wall of eye ball. These muscles help in movement of eye.
2. Eye ball is protected anteriorly by two shutters called eye lids. and posteriorly by bony cavity of skull orbit
3. The anterior part of the sclera and posterior surface of lids are lined by a thin membrane called conjunctiva.
4. Conjunctiva and cornea are kept moist by tears which are produced by lacrimal gland.
5. Eye brows help in facial expression and protection of eye ball.

How the human eyes see / work?

Any objects are seen by human eyes when the light from the object is transmitted to the eye. As we also know that a person is not able to see in absence of light. So, when the light is transmitted from an object to eye, the light is focused by the cornea and passes through the iris of functions like a diaphragm and controls the lens.

The lens further focuses the light. The light then reaches the retina by passing through vitreous humour. The retina converts the optical images to electronic signals. The optic nerve then transmits these signals to the visual cortex the part of the brain that controls our sense of light.

COMMON EYE PROBLEMS

1.REFRACTIVE ERROR
2.VIRAL/ EPEDEMIC KERATOCONJUNCTIVITIS
3.ALLERGIC CONJUNCTIVITIS
4.PTERYGIUM
5.SUBCONJUCTIVAL HAEMORRHAGE
6. CORNEAL ULCER
7.PTOSIS
8.CHALAZION
9.EXTERNAL HORDEOLUM
10.SQUINT
11.CATARACT
12.GLAUCOMA
13. OCULAR TRAUMA

1.REFRACTIVE ERROR : These are the conditions in which the light rays coming from the object(which the observer wants to see) passes through the refractive pathways of eye (cornea, AC, pupil, lens, vitreous) instead of focusing exactly on retina focuses either away or before the retina. The former condition leads to myopia (near sightedness) and the later condition leads to hypermetropia (far sightedness). These conditions are treated by simple corrective glasses. Biconcave lenses in myopia and biconvex lenses in hypermetropia. Other newer modalities of treatment includes contact lenses or LASIK surgery.

Another condition of refractive error that we commonly found is Presbyopia. This is a condition in which older people (>40 years of age) are not able to see near/ small objects like reading a news paper. This is basically a physiological condition in which the accomdation power of eye/lens decreases as age the increases. This is also corrected by glasses(plus lenses).

2.VIRAL/ EPEDEMIC KERATOCONJUNCTIVITIS:

This is a highly communicable disease which is usually presents with tearing, discharges, redness, FB sensation, itching, pain and sometime swelling of eye lids. Treatment is usually done by counseling the patient that it is self limited diseases that typically get worse for the first 4 to 7 days after onset and may get resolved by 2 to 3 weeks. Other things to be done are frequent hand washing, cool compresses, prophylactic antibiotic drops and ointment. Patient should stop touching their eyes, shaking hands, sharing towels and pillows, restricting work and school.

3.ALLERGIC CONJUNCTIVITIS:

These is a condition in which patient presents face the problems of intense itching, redness, photophobia usually after exposure to dust , wind, sun, or any other form of allergen. It is usually treated

conservatively with antiallergic medicines. Patients are advised to avoid likely allergens. Wearing dark goggles is a good idea.

4.PTERYGIUM:

This is a condition in which conjunctival tissue grows over the cornea making the cornea opaque and obstructing light rays coming to eye. Patient usually presents with growth of a red mass over eye. Other usual complains are FB sensation, itching, tearing, discharges, photophobia. Treatment is primarily surgical. Most common procedure is conjunctival excision with conjunctival autograft.

5.SUBCONJUCTIVAL HAEMORRHAGE:

This is a condition in which haemorrhage occurs below the conjunctiva. Usually detected by a closely associated person as it is painless. This may be due to high BP, chronic severe cough, trauma.

This get resolved by itself.

6. CORNEAL ULCER:

Ulcer in cornea can be due to bacteria, fungus, virus or protozoa. Presents with history of pain, tearing, FB sensation, discharges in the eye. Typical history and Specific clinical signs, diagnostic test like KOH mount, culture sensivity test, etc are required for diagnosis and specific treatment.

7.PTOSIS:

This is a condition in which the upper eye lid drops below normal level and touches pupil or even covers. It can be congenital or acquired. Treatment is usually surgical.

8.CHALAZION:

It is a well defined, firm, palpable, non tender, nodular swelling on eye lid. It is due to obstruction of a meibomian gland or gland of zeiss (gland present in eye lid) leading to focal chronic inflammation. Treatment is medical or surgical drainage according to clinical assement.

9.EXTERNAL HORDEOLUM (STYE):

It is an acute infection of gland of zeiss on lid margin which is usually tender on palpation. Patient usually presents with pain and swelling of eye lid margin. Treatment is done by warm water fomentation on lid margin with oral and topical antibiotics.

10.SQUINT:

This is a condition in which the normal alignment of both eye is disturbed. This can be congenital or acquired. Surgical treatment is usually required.

11.CATARACT:

This is a condition in which normal crystalline lens present in our eye becomes opaque. Patient presents with gradual painless loss of vision. It can congenital, acquired, traumatic, senile cataract. Treatment is surgical in which contract lens is removed and artificial lens is

implanted. Newer technique of cataract surgery is Small Incision cataract\Surgery, phacoemulsification surgery.

12. GLAUCOMA:

This is a condition in which the intraocular pressure of eye increases beyond normal limits slowly leading to death of nerve fibres of optic nerve. Patient suffers from gradual loss of vision. Treatment is done by reducing the pressure by medicine or by surgery.

According to the latest survey on Blindness following are the data of common causes of blindness.

Cataract	62.6%
Uncorrected Refractive Error	19.7%
Glaucoma	5.8%
Post segment pathology	4.7%
Corneal opacity	0.9%
Other causes	4.19%

Eye Trauma and sport related Injuries

Besides common blinding conditions of eye, Eye trauma is an important cause because it commonly affects the productive and younger age groups of our society and most of which is avoidable and can be prevented. Children are especially vulnerable as they often have under developed depth precipitation and may have difficulty in judging the position of flying ball.

Sports and recreational activities cause more than 40,000 eye injuries each year. According to American academy of Ophthalmologist, out of 1 lakh eye injuries resulting from sports each year, an estimated 42,000 people are treated in emergency room and 13500 ends up legally blind. About 90% are considered preventive, most injuries occur in children of school aged group.

Sports related injuries and its types:

1. Radiation Injury (Injuries by U.V. rays. e.g. Skelly in ice)
2. Chemical Burn
3. Orbital Blow out fracture
4. Eye lid injuries
5. Globe Injuries

Emergency management

Blunt trauma

i. Quick Torch Examination
ii. Check the vision (If possible). Do a finger counting test. Close the good eye and ask the patient to count the finger in various distance.

iii. Check the eye lids. Tear / laceration of eye lid is very obvious.
iv. Check the Conjunctiva and sclera for conjunctival tear, sub conjunctival haemorrhage, sclera tear , foreign body.
v. Check the cornea for abrasion, foreign body, cornea tear.
vi. Check the AC for hyphaema (Blood in AC).
vii. Check the iris, pupil, light reaction
viii. Check ocular movement in all direction. If not possible, suspect orbital fracture.

Examination beyond this (Lens, Vitreous Retina) is difficult for Non Ophthalmologist and Paramedics.

2. Chemical Burns

i. Diagnosed by history

ii. Copious and gentle irrigation / wash using saline or Ringer lactate for at least 30 minutes. Never use acidic solutions to neutralize alkalis or vice versa, as acid base reactions themselves can generate harmful substrate.

iii. Topical anesthesia (proparacaine can be used)

iv. Immediate referral to nearest Ophthalmologist.

3. Foreign Body (Conjunctiva or cornea)

i. Do not rub the eye.

ii. Topical anesthesia may help the patient in examination.

4. Sub Conjunctiva Hemorrhage

i. Usually subsides by itself

5. Conjunctiva and Sclera Tear

i. Refer to nearest Ophthalmologist.

6. Hyphaema (Blood inside eye)

i. Put him in sitting or upright position.

ii. Refer to nearest ophthalmologist.

7. Iris Trauma (Change in Shape of pupil which is normally round)

All the conditions / trauma should be referred to Ophthalmologist after the first aid and should not underestimate for any eye injury.

8. Corneal Abrasion (A scratch on the outer surface of cornea)

i. It is painful and difficulty in opening eye (Scratch by finger nail while playing basket ball)

ii. Put an antibiotic eye drop and refer to Ophthalmologist.

Prevention and Precaution

According to American Academy of Ophthalmology's Public Education Programme, following points should be noted as precautionary measure:

1. Wear appropriate eye protection, such as Polycarbonate lenses that meet the American society of testing materials (ASTM).

2. People who wear contact lens or glasses should wear appropriate protective eye wear, as C.L. offer no protection and glasses are not sufficient protection.
3. For sports in which face masks or helmets are used, eye protector or shield must be worned.
5. Sports eye protector should be replaced when damaged as they have weakened and are no longer protective.

Conclusion

By knowing the delicacy and complexity of eye, we are always reminded of the old saying, prevention is better than cure. We can also see that most of the Blindness can be prevented if people are aware of its importance and common blinding conditions. We should also not forget that something is always better than nothing. Therefore we should not hesitate in taking medical help in any case because a low vision is always better than total blindness.

Considering the increasing number of sports related eye trainer and other recreational and professional eye injuries and the lesser importance taken by the national and world bodies, it is left to the general public and teaching institutions to take up instance health education programme primarily focusing in eye Trauma**.**