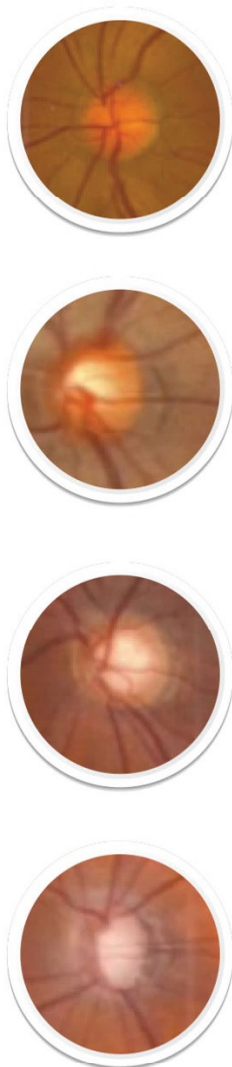


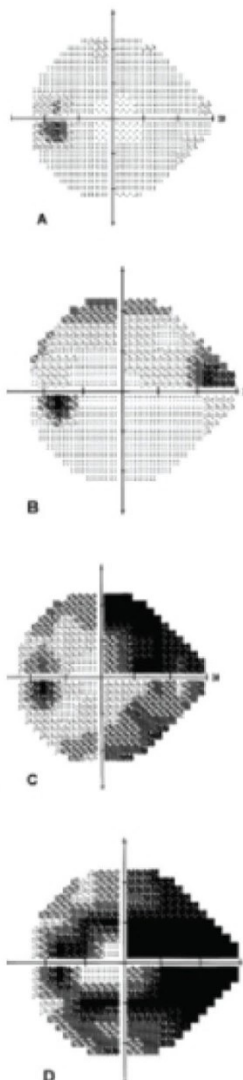
GLAUCOMA IS A CHRONIC DISEASE



Progressive Optic Nerve Damage



Progressive Of Loss Vision



NORMAL VISION



EARLY GLAUCOMA



ADVANCED GLAUCOMA



EXTREME GLAUCOMA



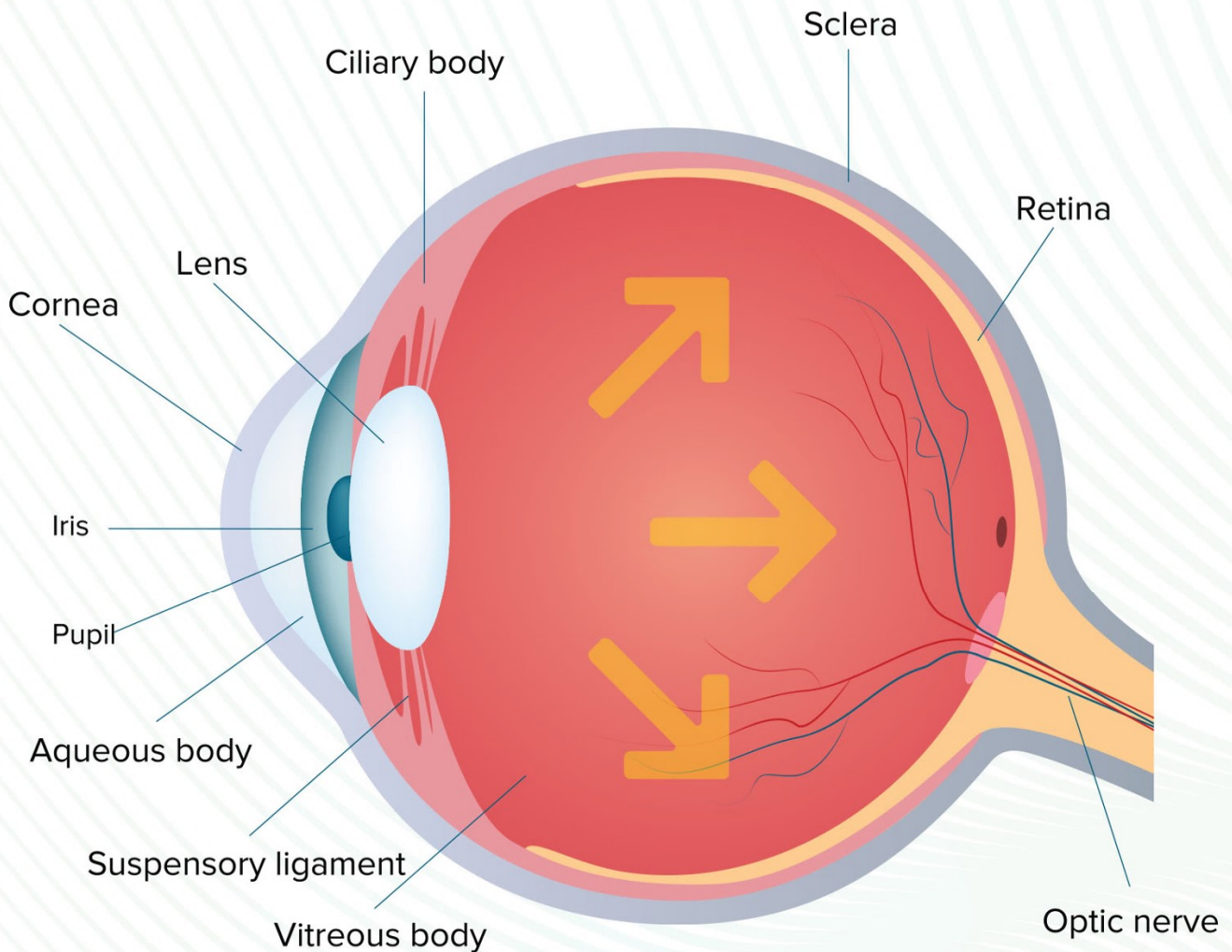
The end result is irreversible total blindness

Glaucoma

A group of disorders of the eye that may result in optic nerve damage and cause loss of sight.

Effects on the optic nerve

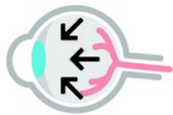
In glaucoma, the aqueous humor that regularly flows from the ciliary body to the anterior chamber of the eye cannot drain normally, causing the pressure in the eye to rise. Such increased pressure can damage the optic nerve and lead to the loss of vision.



The aqueous humor is formed by the ciliary body. It circulates forward to the anterior chamber and it helps to maintain ocular tension as well as nourish the eye tissues, including the crystalline lens and cornea. It exits the eye via the iridocorneal angle where it drains through the trabecular meshwork towards the canal of Schlemm.



WHO ARE AT RISK OF GLAUCOMA?



High Intraocular Pressure

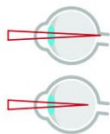


Family history of glaucoma



40+

Age more than 40 years



Refractive error:
Hyperopia and high myopia



Eye injury



Eye diseases eg. Chronic inflammation,
Retinitis Pigmentosa, Pseudoexfoliative



Systemic diseases
eg. Diabetes, Hypertension



Medications - Steroid



OPEN ANGLE GLAUCOMA

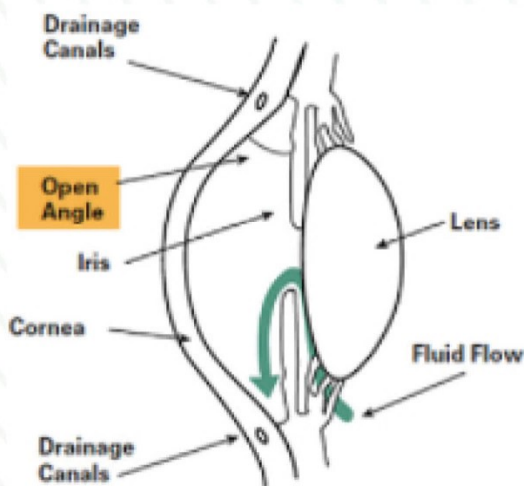


Fig: Cross section of the front portion of the eye with open Angle.

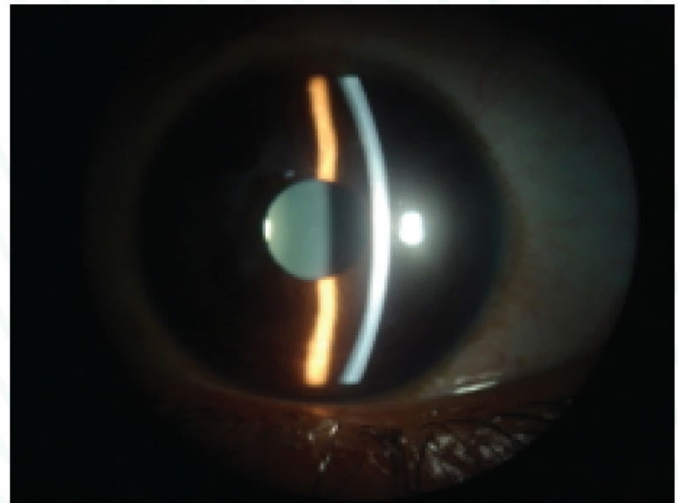


Fig: In Primary Open Angle Glaucoma, the eye looks normal with deep anterior chamber

- 1.** Primary open angle glaucoma is the most common type of glaucoma.
- 2.** It has an open and normal appearing anterior chamber angle (where the iris meets the cornea) of the eye.
- 3.** Although the angle of the eye is wide open, the eye's drainage canals become inefficient and clogged over time. As a result, the eye pressure rises slowly and causes damage to the optic nerve.
- 4.** Patients do not feel any pain in the eye nor notice any changes in their vision at the beginning because the initial loss of vision is of peripheral vision.
- 5.** Visual field loss is typically constricting from peripheral to the centre point. The sharpness of image they see only become blur at the advanced stage of the disease.
- 6.** High eye pressure causes chronic, progressive damage to the optic nerve and eventually patients suffer irreversible blindness.

ANGLE CLOSURE GLAUCOMA

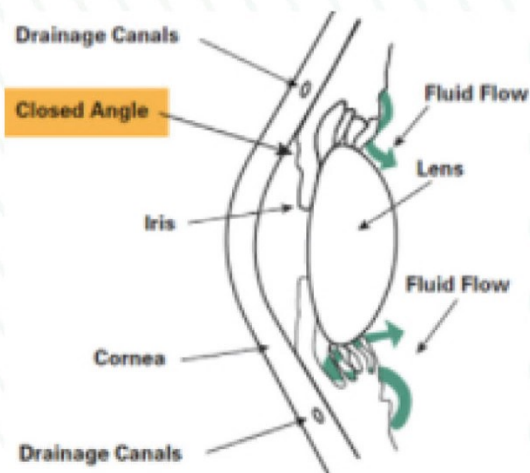


Fig: Cross section of the front portion of the eye with Narrow Angle.

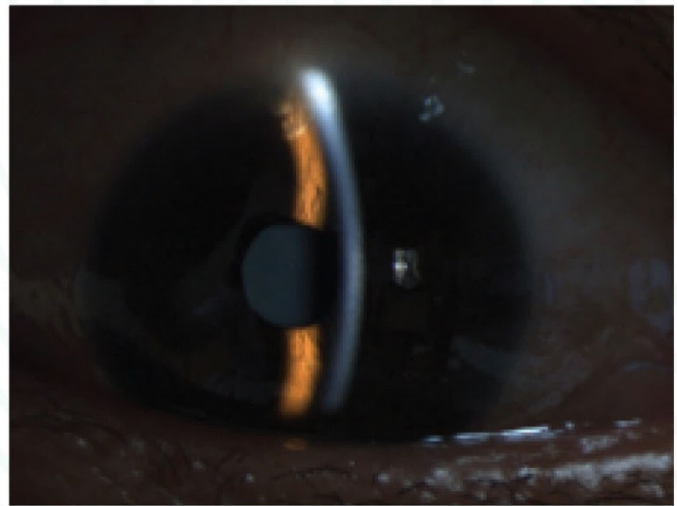


Fig: The anterior chamber is very shallow. A laser peripheral iridotomy at 12 clock-hour of the eye is a measure to prevent or to treat acute angle closure attack.

- 1.** Patients have narrow or closed angle between the iris and cornea. Sudden blockage of the aqueous / fluid drainage can occur in the presence of narrow angle. The eye pressure usually rises up to 50 mmHg or more.
- 2.** Patients usually come to Emergency Room with complaints of sudden onset of painful red eye and blurry vision. They also see haloes and rainbow colours around a light. The pain could be so severe that it causes headache, nausea and vomiting.
- 3.** This condition is an eye emergency; it is called acute angle closure attack. Very high eye pressure can cause blindness in just a few hours. You should seek treatment immediately if you experience similar symptoms.
- 4.** Although Angle Closure Glaucoma contributes to about 20-30% cases of glaucoma, it is responsible for up to 80% of blindness in all Glaucoma cases.



SECONDARY GLAUCOMA

High eye pressure can be secondary to eye and systemic diseases or medicines and results in secondary glaucoma.

Lens-induced Glaucoma

Cataract that is too mature can result in high eye pressure

Neovascular Glaucoma

Occurs in uncontrolled diabetic and hypertension. This may also occur in some vascular diseases, with impairment of blood supply to the eyes like SLE and retinal artery occlusion. In this type of glaucoma, abnormal vessel grows in the angle of the eye and causes obstruction of outflow of the fluid/aqueous from inside the eye.

Uveitic Glaucoma

Occurs in eyes with severe inflammation. The inflammatory cells block the drainage canals and result in high eye pressure.

Glaucoma secondary to Injury

It can occur after open eye injury or close eye injury. Blood and Inflammation cells would clog the drainage canals and cause eye pressure to rise. A dislocated lens could obstruct the outflow of fluid of the eye.

Glaucoma secondary to Medicines

Steroid-induced secondary glaucoma is commonly seen in young adults with itchy eyes who have been abusing steroid eyedrops. It also occurs in patients on oral or topical steroid prescribed by their doctors for eye or systemic disease.

CHILDHOOD GLAUCOMA

Childhood glaucoma is a type of glaucoma occurs in children as young as 3-4 months old. It could be Primary Congenital Glaucoma or secondary to syndromic diseases such as Irido Corneal Endothelial Syndrome, Sturge Weber Syndrome, Neurofibromatosis and Peter's anomaly.

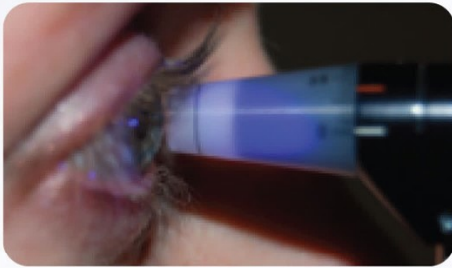
Childhood glaucoma has different clinical presentations compares to adult glaucoma. Their problems often are reported by parents who notice their child's persistent tearing and shunting from bright light. The child's eye would appear hazy and larger than the normal eye.

GLAUCOMA TESTS



A. TONOMETRY

Eye pressure is most accurately measured by using **Goldman Tonometer**.



B. SLIT LAMP EXAMINATION

Slit lamp is an instrument with magnifying lens used to do detailed examination of the optic nerve, macula and the retina of the eye.



C. FUNDUS PHOTOGRAPHY

Optic disc image can be captured with fundus camera for documentation and for monitoring of progress of the disease.



Fig: Normal optic disc

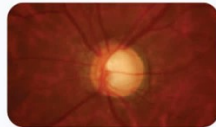


Fig: Glaucoma optic disc

D. GONIOSCOPY

Gonioscopy is a procedure where a Gonio lens is used to visualize the angle structure of the eye. It is useful to look for causes that obstruct the aqueous outflow and to grade the width of the angle. It is an important procedure to help glaucoma specialists to diagnose or determine the type of glaucoma that you have.

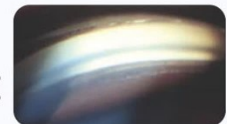


Fig: Gonioscopy view of Eye with Open Angle

E. VISUAL FIELD TEST

Humphrey Visual Field test is the gold standard of visual field test for glaucoma. It helps to map-out the visual field defect of a glaucoma patient.

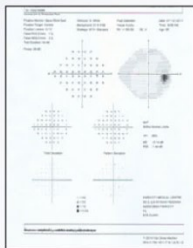


Fig: Normal visual field test

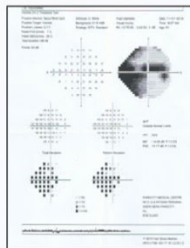


Fig: Visual Field Defect in Glaucoma

F. OPTIC NERVE STRUCTURE ASSESSMENT

The structure of the optic nerve head/optic disc could be analysed by various diagnostic instruments. One of them is Optical Coherence Tomography (OCT).

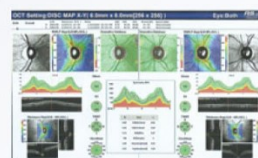


Fig: OCT of normal optic disc shows normal thickness of neuro-retina rim

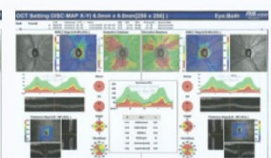


Fig: OCT of Glaucoma optic disc shows very thin neuro-retina rim

TREATMENT OPTIONS FOR GLAUCOMA



A. MEDICAL THERAPY

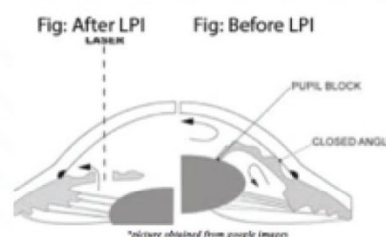
Medical treatment is the first line of treatment for most type of glaucoma. There are a few pressure lowering eyedrops which work in different mechanism; either by reducing production of fluid in the eye or/and by promoting drainage of fluid from the eye.



B. LASER THERAPY

Angle closure glaucoma can be treated with Laser Peripheral Iridotomy or Laser Iridoplasty. These procedures helps to open the angle / drainage site of the eye and to prevent pupillary block. It helps to reduce the eye pressure in a narrow angle eye.

Argon Laser Trabeculoplasty and Selective Laser Trabeculoplasty are laser procedures to treat Open Angle Glaucoma. These procedures help to stimulate the trabecular meshwork/drainage site of the eye to drain fluid/aqueous more efficiently and thus lower the eye pressure.



C. GLAUCOMA SURGERY

i. Trabeculectomy

This surgical procedure involves making a small hole in the eye wall/sclera to drain the aqueous from inside the eye to a small reservoir under the skin of the eye/conjunctiva.



ii. Glaucoma Tube Shunt Surgery with Glaucoma Drainage Devices
This involves implantation of Glaucoma Drainage device on the eye surface to drain the fluid (aqueous) from inside the eye. These devices are made up of a small silicone tube attached to a plate. The silicone tube is to be inserted into the eye to drain the aqueous.

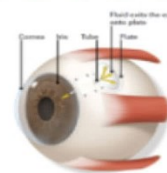


Fig: Diagram shows the Baerveldt Implant on the eyeball
*picture obtained from google images