

# Understanding Glaucoma



Patient Education Booklet

Joint Initiative of



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# Understanding Glaucoma

Released on occasion of the  
**World Glaucoma Week**

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# FOREWORD

**“Knowing the enemy is half the battle won”.** No victory or defence can be devised or pursued without knowing whom one is fighting. The "enemy" in this case is **glaucoma**, also known as the silent thief of sight.

Glaucoma is a chronic, progressive disease characterized by damage to optic nerve in which IOP is a major risk factor. It is the leading cause of irreversible blindness and is estimated to affect more than 15 million people in India and 80 million people worldwide.

Glaucoma poses an enormous physical, mental and economic burden on those affected as well as their caregivers. Faced with the knowledge of irreversible loss of vision and a disease which often needs lifelong treatment and follow up, patients have a large number of questions which are often difficult to answer in busy clinical settings. In addition, risk and progression of glaucoma can be affected by many other diseases and treatment often requires modifications and special considerations.

This booklet aims to give answers to the most frequently asked questions about glaucoma in a precise and easy to understand manner so as to inform patients and their caregivers about the basic knowledge of the disease to help them cope with it throughout their lifetime.

We hope that this information will be of immense help to glaucoma patients and their families and also improve general public knowledge about the disease.

**Dr Namrata Sharma**

Chairman Scientific Committee  
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## How Common Is Glaucoma?

Glaucoma is the leading cause for irreversible blindness in India and the world. Glaucoma is estimated to affect more than 16 million people in India and 80 million people are affected worldwide.

The main problem is that more than two-thirds of the people who have glaucoma, are not aware of the disease and are not diagnosed. This booklet is aimed to increase the public awareness about glaucoma and help people in understanding and living with glaucoma.

## How Does Our Eye Work?

Our eye is similar to a digital camera. It has a pupil which behaves like an aperture, a lens similar to the lens of a camera to focus the image, a retina which is similar to a film that receives the image and converts it into electrical impulses, an optic nerve (Fig. 1) that is comparable to a connecting cable which conducts the electrical impulse from the eye to the brain and a brain which is analogous to a computer as it analyses and gives a visual perception.

## What Are The Parts Of Our Eye?

If we have a closer look at our eyes we can see a white area with few red vessels over it and central round transparent area. The former white area is referred to as sclera which has overlying translucent film known as conjunctiva with blood vessels in it. The latter transparent area is the cornea through which the light passes into the eyes. If you still have a better look you will be able to appreciate a

brown circular frill which is referred to as iris and a central black area which is the pupil (Fig. 2). Behind the pupil lies the lens, retina and optic nerve.

The area between the cornea and the iris is known as the anterior chamber and that between the iris and lens is the posterior chamber. The large space between the lens and retina is called the vitreous cavity.

The posterior chamber has ciliary body which forms the aqueous humor, a water like fluid that irrigates and nourishes the cornea, iris and lens. It flows from the posterior to the anterior chamber through the pupil and drains out from the eye through a sieve like system known as the trabecular meshwork in the angle (Fig. 3). The angle of the eye is referred to that area where the iris meets the cornea. Structures in the angle of the eye cannot be normally visualized and require a special instrument the gonioscope. The aqueous humor also provides the necessary pressure to maintain the shape of the eye. This is called the intraocular pressure or IOP.

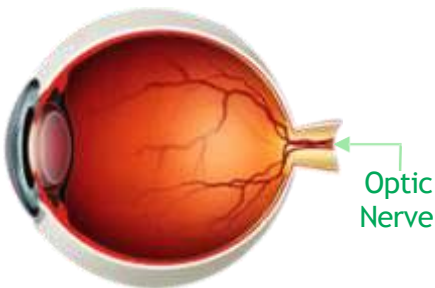


Fig. 1 Optic Nerve

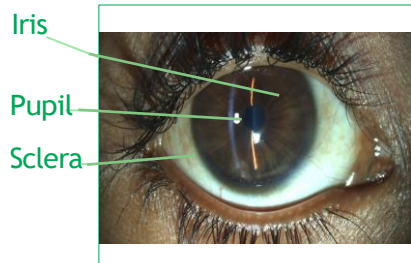


Fig. 2 Front of the eye

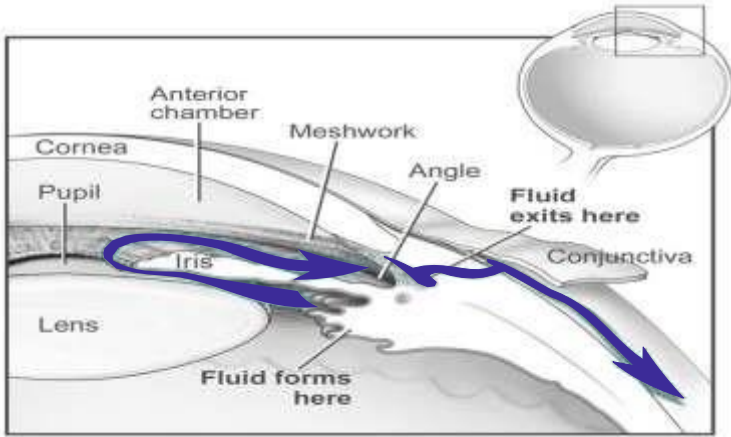


Fig. 3 Path for Drainage of Fluid

## What Is Glaucoma?

Glaucoma is a disease characterized by progressive irreversible damage to optic nerve of the eye in which increased intraocular pressure is a major risk factor.

The aqueous fluid formed from the ciliary body in posterior chamber flows between the iris and lens and through the pupil enters the anterior chamber from where it is drained out through the sieve-like trabecular meshwork in the angle. However, if this flow is interrupted by a block in the pupillary area or due to clogging of the trabecular meshwork, the IOP builds up within the eye. When the pressure builds up the optic nerve gets compressed and damage to the optic nerve leads to visual loss and if not treated in time to blindness.

Through an early detection of glaucoma and timely treatment you can preserve your vision for your life time.

## What Are The Types Of Glaucoma?

According to the age of the patient, glaucoma may be classified as:

1. Congenital (from birth to 3 years)
2. Juvenile (3 years to 35 years)
3. Adult (after 35 years)

Adult glaucoma is primarily of two types:

1. Open angle glaucoma
2. Angle closure glaucoma

### Open Angle Glaucoma

This entity as the term suggests is characterized by an open angle (angle formed when the iris meets the cornea and which includes the trabecular meshwork). There is no obstruction of flow till the trabecular meshwork but as debris accumulates within the spaces of the trabecular meshwork, the resistance to flow of fluid increases. The fluid pressure within the eye (IOP) rises slowly and it is a painless disease so the patients may not realize their loss until the later stages. Increased IOP is the most important risk factor for glaucoma and **normal eye pressure varies from 12 mm Hg to 21 mm Hg**. In glaucoma pressure generally rises above 21 mmHg but a variant of glaucoma exists wherein the pressures are below 21 mmHg - known as **Normal Pressure Glaucoma** or **Low-Tension Glaucoma**. This form of glaucoma is related to a decrease in blood supply to the optic nerve. (Fig. 3 a and b).

## Angle Closure Glaucoma

In a primary angle closure there occurs a relative block at the pupillary plane which causes pressure to build up behind the iris and it causes anterior bowing of the iris and results in a narrow angle. The iris gets closer to the cornea closing off the trabecular meshwork from free drainage of the aqueous humor. The angle containing the drainage system -trabecular meshwork is closed by the iris and hence the term angle closure glaucoma. (Fig. 4 a and b).

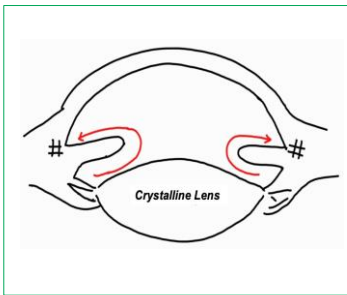


Fig. 3a. Open angle glaucoma

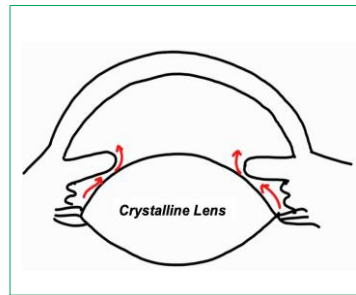


Fig. 4a. Angle closure glaucoma

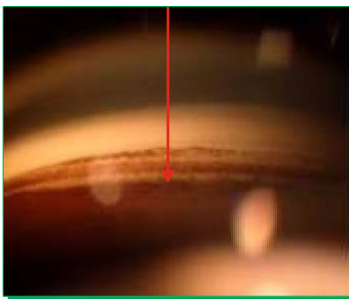


Fig. 3b Open Angle as seen on gonioscopy



Fig. 4b Closed Angle as seen on gonioscopy

Red Arrow points to trabecular meshwork (drainage area in the angle)

## Can Glaucoma Develop As An Acute Attack?

There is a form of angle closure glaucoma in which there is a sudden rise in pressure within the eye associated with eye symptoms of pain, redness, decrease in vision and there may be severe headache and vomiting. This is known as an **acute attack of angle closure glaucoma** and is a medical emergency which if not treated in time can cause optic nerve damage and loss of vision.

## Can Glaucoma Occur Due To Any Medicines?

Yes, steroid induced glaucoma is a type of glaucoma which develops with the use of steroids. It is most commonly noticed with steroid eye drops taken for allergic conjunctivitis but can occur with use of steroid containing **inhalers** (taken by patients who suffer from asthma), **skin ointments** and any **oral medication** containing steroids. Thus steroids should be used cautiously and the patients who are using any form of steroid therapy must consult their ophthalmologist (eye specialist) and have their IOP checked regularly.

## Is Glaucoma Associated With Trauma (injury to the eye)?

When an eye sustains an injury there can be an increase in IOP immediately due to hyphema (blood in anterior chamber) or later in life due to mechanical disruption of the trabecular mesh work. This form of glaucoma can occur even up to 10-20 years after injury and is known as **angle recession glaucoma**.

It is therefore essential that any person who has sustained an injury to the eye should get him/herself evaluated for glaucoma at regular yearly intervals by an ophthalmologist even up to 20 years after the injury.

## Is There An Increased Risk Of Glaucoma In Patients Who Have Diabetes?

Yes, diabetic patients are at increased risk of both open angle and angle closure glaucoma and need regular checkup. **Neo-vascular glaucoma** is a severe type of glaucoma that occurs more commonly in Diabetes and Hypertensives. These individuals are prone for vascular (blood vessels) occlusions in retina which leads to neo vascularization (new leaky fragile vessels formation) of the angles. These blood vessels finally cause angle closure and glaucoma.

## Is Glaucoma Associated With Cataract?

Glaucoma can be caused due to cataract.

1. When the lens has dislocated or subluxated from its normal position it can close the angles and cause glaucoma- **Phacotopic Glaucoma**
2. When the lens has become cataractous and intumescent (very thick) it can cause pupillary block and angle closure - **Phacomorphic Glaucoma** (Fig. 5).
3. When the cataract has become mature there can also be micro leaks from the capsule of lens and this can induce glaucoma by inflammation or there can be lens protein deposition in trabecular meshwork and induce increased IOP- **phacolytic and lens protein induced glaucoma**.

Vice versa glaucoma can also lead to cataract and is especially seen after acute attack of angle closure glaucoma. In addition, glaucoma surgery can also lead to development and progression of cataract.

## Can Glaucoma Occur In Children?

A child can have glaucoma from birth (congenital glaucoma) and if the child develops glaucoma within 3 years of age he/ she may develop a large hazy cornea (Fig. 6) associated with photophobia (does not tolerate light). This requires immediate attention and referral to a glaucoma specialist as the treatment which is usually surgical has to be done under general anaesthesia.



Fig. 5. Phacomorphic Glaucoma induced by cataract



Fig. 6. Child with congenital glaucoma with enlarged eye ball

## Who Should Be Checked For Glaucoma?

1. All individuals between **35-40 years** should undergo a preliminary ophthalmic examination like IOP measurement and fundus examination (examination of the optic nerve) at least once a year. After the age of 40 years, checkup should be done every 2 years and yearly checkup is advised after the age of 60 years.
2. All individuals with a **positive family history of glaucoma** should also have comprehensive examination every year.
3. Any individual who is using **steroids**, has sustained an **eye trauma**, has **high myopia** or has **frequent change of eye glasses** should also get his examination done at least once a year.

4. Patients with **diabetes, hypertension, thyroid disorders, obstructive sleep apnea (history of snoring) and low blood pressure** must come to the ophthalmologist for a yearly checkup.
5. **Siblings** of glaucoma patients have 10 times the risk to develop glaucoma as compared to the normal population and must be called for checkup once glaucoma is diagnosed in the family.

## Are There Any Symptoms Of Glaucoma?

Unfortunately, glaucoma is a “**silent killer**” and is typically associated with painless and progressive loss of vision that may not produce any symptoms. In open angle glaucoma patient may notice that he cannot see objects at his side (due to loss of peripheral visual field) and there may be frequent change of glasses but largely the patients are not able to detect any symptoms until a very advanced stage. Angle-closure glaucoma may be associated with a red and painful eye with blurred vision and colored halos around light bulbs.

## Does Increased Eye Pressure Mean That One Has Glaucoma?

Although the normal pressure lies between 12-21 mmHg, even if your pressure is more than 21 mmHg you may not have glaucoma as your optic nerve is stronger and can sustain a higher pressure. In addition, if your cornea is thicker, then the eye pressure may be over-estimated by the measuring instrument. A person is diagnosed to have glaucoma only if the optic nerve is damaged. If you have increased eye pressure but no damage to the optic nerve, you do not have glaucoma but you are at an increased risk and should get an annual checkup.

## What Are The Tests Done To Diagnose A Case Of Glaucoma?

Glaucoma is diagnosed by performing the following 4 essential tests:

1. Tonometry (Measurement of intraocular pressure)
2. Gonioscopy (to view the drainage angle-trabecular meshwork)
3. Ophthalmoscopy (examination of the structure of the optic nerve)
4. Visual field Test (assessment of function of the optic nerve)

These tests are very simple and it takes about 30 minutes to do all the tests. These tests do not cause any damage to the eye and are not painful.

In addition to these, the ophthalmologist may perform

- Pachymetry (corneal thickness)
- Imaging of the optic nerve and retinal nerve fiber layer by using new technology like the HRT, GDx or OCT

## How Is Tonometry Done?

Tonometer is an instrument that measures the IOP. This can be done by contact or non-contact method. The contact method known as Goldmann applanation tonometry is the gold standard (Fig. 7a). This is usually performed on each follow up of a glaucoma patient.

1. Your doctor will put a drop in your eyes to anaesthetize the cornea so that you do not feel any discomfort during the procedure.
2. You will be asked to place your chin and forehead on the slit lamp on the support.

3. The illuminating lamp and viewing system is adjusted so that doctor can see magnified image of your eye.
4. A fluorescent dye will be put in your eye.
5. The tonometer with the plastic prisms will be moved forward till it barely touches the cornea.
6. This is a quick and painless procedure which takes 3-4 minutes to perform in both eyes.

Non-contact tonometer uses a puff of air directed towards cornea to measure IOP (Fig 7b). It is non-invasive, quick and does not require cleaning of apparatus in between examinations. These advantages have made it investigation of choice for screening glaucoma, in children and sensitive adults.

Some new techniques such as rebound tonometer and dynamic contour tonometer have also become available.



Fig. 7a- Goldman Applanation tonometry



Fig. 7b- Non contact tonometry

## How Is Gonioscopy Done?

The Technique of Gonioscopy involves placement of the patient on the slit lamp (a machine with an illumination and viewing system), putting a lens (gonioscope) on the eye ball

and visualization of the drainage structures-trabecular meshwork in the angle. Our aim is to primarily see if the angle is open or closed and to identify other problems in the drainage system (Fig. 7 c).



Fig. 7c  
Placing the Gonioscope

## How Is The Optic Nerve Examined?

The optic nerve or optic disc is evaluated by using an instrument known as the Direct Ophthalmoscope. The examiner views inside the eye by coming close to the patient (Fig. 8a) and examines for any damage to the optic nerve. The optic nerve is also examined at the slit lamp by using special lenses (Fig. 8b). After this examination only can one confirm if the optic nerve is normal or damaged by glaucoma (Fig. 8c, 8d)



Fig. 8a  
Direct ophthalmoscopic examination



Fig. 8b  
Evaluation of Optic Nerve with a 90D lens

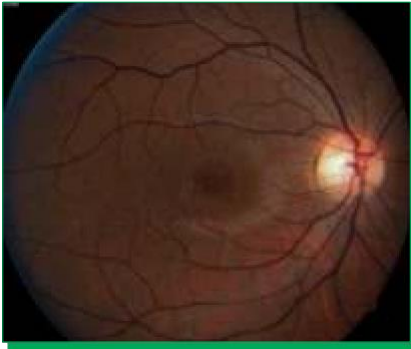


Fig. 8c Normal Optic Nerve

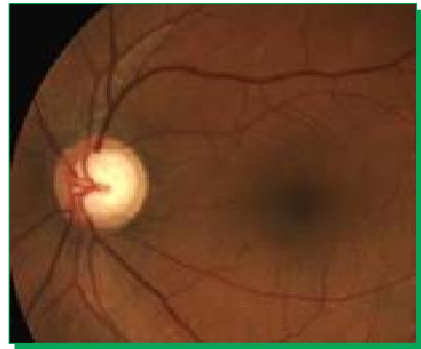


Fig. 8d Glaucomatous optic nerve

## How Is The Visual Field Examined?

The visual field is examined with an instrument known as the Perimeter (9a) and it evaluates the function of the optic nerve. In this test the patient has to identify light stimuli at different locations in the visual field, so that any defect (scotoma) in the visual field can be identified. Glaucoma is associated with characteristic visual field loss which gradually progresses to blindness if not treated in time (Fig. 9b-d).



Fig. 9a Perimetry

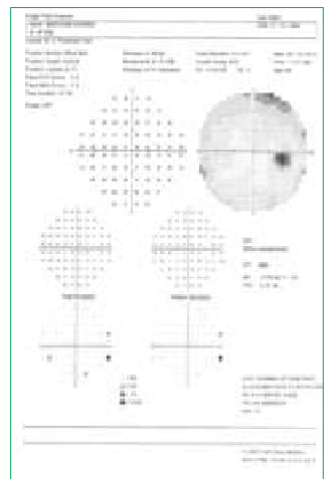


Fig. 9b Normal Visual Field

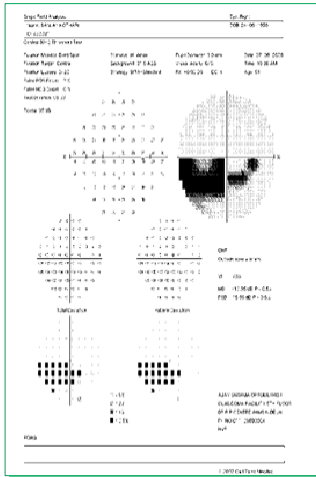


Fig. 9c. Early Scotoma

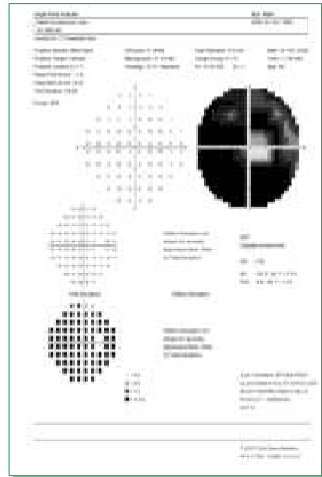


Fig. 9d. Advanced Glaucomatous visual field damage with only central island of vision remaining

## Are There Any New Investigation To Pick Up Glaucoma At An Early Stage?

Glaucoma initially manifests as damage to the optic nerve and its fibers- known as the retinal nerve fibers. With recent advances in technology, very early changes in the retinal nerve fiber layer and optic nerve can be picked up. The tests (Fig. 10a, b) used for these include:

### 1. OCT (Optical Coherence Tomography)

- a) Retinal Nerve Fibre Layer b) Ganglion Cell Complex

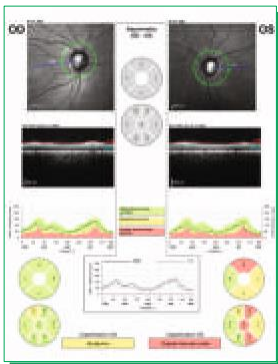


Fig. 10a- RNFL-OCT image showing glaucomatous damage



Fig. 10b- OCT showing ganglion cell complex thickness

## How Frequently Should I Get My Eyes Examined?

If you have been diagnosed as glaucoma, you will require a 3-12 monthly follow up depending on the severity of disease and IOP control achieved. More severe the disease, more frequent the follow up. After the initial diagnosis you will have to get the visual field test repeated at least 3 times at a short interval to get a good baseline and then repeated every 4-6 months in case the disease is advanced or if your pressure is not under control. Once the disease is well under control and there is no sign of progression a yearly follow up will suffice. **You will have to follow up with your doctor once a year for your entire life.**

## How can the patient identify visual field loss?

As glaucoma progresses, the visual field gets constricted over time. In advanced glaucoma, only central visual field remains (Figure 11a-d).

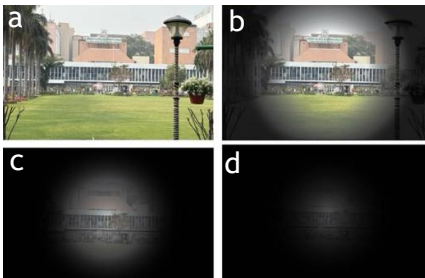


Figure (11a) Normal visual field (11b) constricted visual field in glaucomatous eyes (11c) Only central field is remains with tunnel vision (11d) complete loss of vision

## What Is The Treatment Of Glaucoma?

It is important to understand that glaucoma cannot be cured, **whatever damage has occurred to the optic nerve cannot be reversed.** So, the treatment is aimed at controlling the intraocular pressure, so that whatever vision / visual field is left can be preserved and the patient does not develop a visual handicap in his life time. Various modalities of treatment are available today. These include:

1. Eye drops
2. Tablets
3. Laser
4. Surgery

## EYE DROPS

Eye drops are prescribed as the first line therapy for all types of glaucoma. It is essential to understand that these drops are to be taken on a regular basis for your entire life. You should plan out an exact schedule for taking your drops and schedule your doses around your normal routine, such as when you wake up, brush your teeth, eat meals or when you go to bed at night. Always remember to put only one drop in the eye at one time and never forget to take your medicines while travelling. Remember to tell your doctor if you suffer from any other medical illness like asthma, diabetes, hypertension, thyroid, angina, arthritis, depression etc. or are taking oral medicines or inhalers for any other condition.

### What Is The Correct Way Of Instilling The Drops?

1. Wash your hands.
2. Tilt your head back and look at the ceiling.
3. Using your index finger gently pull down your lower eyelid to form a pocket.
4. Squeeze 1 drop into the pocket.
5. Do not let the bottle tip touch your eye, your fingers or any other surface.
6. Blot out excess solution which flows out with a tissue as some drugs can be irritative to the skin around eye.
7. If you are using more than one eye drop, wait at least 5 minutes before putting the second drop.

8. To minimize absorption of the drug into the blood stream and maximize the amount of the drug absorbed in the eye - close your eye for 1 or 2 minutes after putting the drops and press with your index finger lightly against the inferior nasal corner of your eyelid to close the tear duct which drains into the nose. (Fig. 11)



Fig. 11 Technique for Putting Eye drops with Tear Duct Occlusion

## What Should I Do If I Forget To Take My Eye Drops ?

It is important to keep a stock of your medication at home and while travelling so that you do not miss a single dose. After taking a dose, you can put a mark on the calendar so that you remember that you have taken the medicine. Always schedule your eye drops with a daily activity. **If you forget to take a dose of your eye drops, it is best to instill the drop as soon as you remember it, even if the next dose is due shortly.** Do not stop putting eye drops before you visit your eye doctor for checkup. The important factor in using eye drops for glaucoma is regularity over a long period of time.

## What Are The Different Eye Drops Used In Treatment Of Glaucoma?

There are a number of medicines available for lowering the IOP in glaucoma patients. Commonly used eye drops include the following:

## Prostaglandin Analogues

### Latanoprost, Travoprost, Bimatoprost

To be used as 1 drop- once a day at night.

**Side effects:** May cause redness of eye, darkening of the colour of iris and the skin surrounding the eyes. It can cause the eyelashes to grow darker and longer.

## Beta-Blockers

### Timolol, Betaxolol, Levobunolol

**Dose :** one drop twice a day (like 7am - 7 pm). Some sustained release preparations are available that may be used only in a single morning dose.

**Side Effects:** Can worsen lung disease (like asthma, chronic obstructive airway disease), lower the blood pressure and heart rate and cause dizziness and insomnia and rarely depression, impotence and decrease libido. It may inhibit symptoms of hypoglycemia in diabetics and alter the lipid profile.

## Alpha Adrenergic Agonists:

### Brimonidine

To be used thrice a day if used alone and twice a day if combined with another glaucoma eye drop

**Side effects:** Produces allergic reaction and itching in the eyes. It should be avoided in children (< 6 years) as it can cause excessive drowsiness and respiratory depression (breathing difficulty).

## Carbonic anhydrase inhibitors

### Brinzolamide, Dorzolamide

**Dose:** To be used two to three times a day

**Side effect:** Can cause stinging sensation in eyes and bad taste in mouth. If IOP is very high, Oral medication (Tab. Acetazolamide) can also be given for a short time to control IOP, till the time laser or surgery is done.

Use of acetazolamide is associated with tingling, numbness, altered taste, indigestion, nausea, vomiting, skin rashes. Take food rich in potassium (orange juice, bananas) to reduce side effects.

*Not to be used in patients with sulfa allergy.*

## Parasympathomimetics-

Example- Pilocarpine

Dose- one drop, one to 4 times a day

Side effects: Reduces pupil size, headache (especially in young), blurred/dim vision (especially in darkened places)

## Rho-kinase inhibitors-

Example- Netarsudil, Ripasudil

Dose- one drop twice a day

Side effects: Eye redness (up to 50% patients), stinging, increased lacrimation

Many types of combination drops with more than one type of drugs are now available that can be more convenient to the patients.

## Is There Any Laser Treatment For Glaucoma?

Yes, laser is the treatment of choice for angle closure glaucoma and may also be performed for open angle glaucoma. Lasers

can be done as an outpatient procedure in a few minutes and are used along with eye drops to reduce the IOP.

The following types of laser procedures are generally used in glaucoma:

### Laser Peripheral Iridotomy

This procedure is of importance in angle closure glaucoma where a relative pupillary block prevents the flow of fluid from the posterior chamber into the anterior chamber.

Herein an opening is made in the iris (Fig.12a,b) with a laser machine for the fluid to drain from the posterior to the anterior chamber, bypassing the pupillary block. This procedure is done in eyes with narrow angle to prevent an angle closure attack and also as a treatment if patient is having an acute attack.

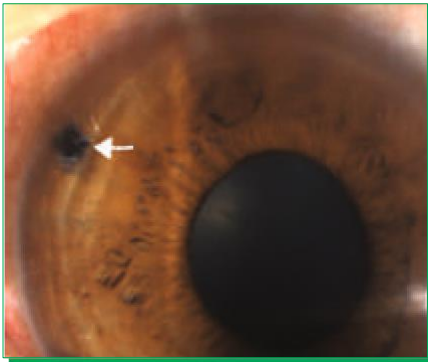


Fig.12a- Peripheral iridotomy  
(note small hole in iris- white arrow)



Fig.12b- Laser machine

### Laser Trabeculoplasty

The laser cleans the pores/spaces in the trabecular meshwork and increases the outflow of aqueous (fluid) thereby decreasing IOP. This is done for open angle glaucoma. Even after laser the patient may require eye drops or surgery and must come for regular follow up.

## Cycloablation

This is a laser procedure to destroy a part of the ciliary body to decrease the aqueous production. This procedure is reserved for eyes that have elevated IOP despite conventional medical and surgical treatment, especially if it is a painful blind eye.

Micropulse transscleral diode laser cyclophotocoagulation is a new technique of cycloablation which can reduce eye pressure with minimal damage to eye.

## What Is The Surgical Treatment For Glaucoma And When Is It Done?

The failure of medications and laser surgery to control the IOP, is an indication for surgery. In this surgery a small guarded hole (fistula) is made in the coats of the eye to drain out fluid from inside the eye, thereby reducing the eye pressure (IOP). The most common surgery performed for glaucoma is known as **Trabeculectomy**. After surgery, a small white coloured blister / scar can be seen in upper part of eye and is called a “bleb” (Fig. 13). This is a sign of successful surgery and can remain for a long time.



Fig. 13. Post trabeculectomy Bleb

Trabeculectomy surgery can lead to several complications like loss of vision, cataract, infection etc. and the patient needs to be on constant follow up with the operating surgeon. After surgery at any time if the patient has increasing redness, pain, sensitivity to light and loss of vision - he should immediately start using antibiotic eye drops (gatifloxacin or moxifloxacin every 1 hour) and report as soon as possible to an eye specialist as this can be an infection in the eye which can lead to irreversible visual loss if not treated urgently. **Operated glaucoma patients should avoid use of contact lenses as they increase the chance of infection.**

Other types of surgery include **Drainage implant surgery** - these implants consist of a silicon tube which is connected to draining plate. The tube is inserted in to the anterior chamber and the drainage plate is sutured on to sclera. The intraocular fluid gets collected in the plate and gets absorbed by the surrounding tissues. Many new surgical techniques for glaucoma are in evolution.

Minimally invasive glaucoma surgeries like ab-interno goniotomy and gonioscopy assisted transluminal goniotomy (GATT) are new, low cost surgeries which can be used to lower eye pressure in early or moderate glaucoma.

## **Is Stem Cell Transplant Done To Repair The Damaged Optic Nerve In Glaucoma?**

This is an area of experimental research and till now this treatment is not possible for glaucoma patients.

## Will Glaucoma Therapy Improve My Vision?

No. Unfortunately glaucoma medicines, laser or surgery cannot improve your vision but can only prevent you from further visual loss.

## If One Has Glaucoma, Any Changes In Life-style Which Can Help To Control The Disease?

A healthy body is good for a healthy eye and a balanced diet with exercise can reduce risk of life-style diseases like diabetes, hypertension etc, which can in turn reduce the risk of glaucoma. **A few changes in our lifestyle can also help to control glaucoma and reduce the impact of this condition.**

1. Patients with open-angle glaucoma who **exercise regularly** (aerobic exercise for ½ hour at least 3 times a week) may be able to reduce their intraocular pressure by exercise alone, as long as they maintain it.
2. Consumption of food rich in Antioxidants (green leafy vegetables, salads) is good for the body in general.
3. Large amounts of caffeine (coffee) drunk in a short period of time can elevate the eye pressure.
4. Drinking large amounts of any liquid within a short time can increase eye pressure. Patients with glaucoma should have plenty of fluids, but they should drink them in small amounts over the course of a day.
5. Avoid wearing **tight neck ties** for prolonged periods as it can also reduce the blood supply to the optic nerve.
6. All systemic diseases like **diabetes and hypertension** should be well controlled in consultation with a qualified physician. Patients who are on anti-hypertensive should

not have a very low blood pressure, as even low blood pressure is harmful for glaucoma.

7. The patients having glaucoma can do all physical exercise and yoga but avoid exercises with head down postures like shirshasana/ sarvangasana (Fig. 14) as these can cause a rapid and steep increase in Intraocular pressure and damage the optic nerve if done on a regular basis.



Fig. 14 Shirshasana

8. Meditation and pranayama can help reduce eye pressure as well as stress associated with this blinding disorder and help you cope with the disease.

## If One Has Glaucoma, Should Driving Be Stopped Or Not?

Patient of glaucoma with visual field defects are at increased risk for motor vehicle accidents, commonly due to their own fault. It is better for glaucoma patients with moderate-advanced visual field loss to avoid driving and use public transport. You must consult your doctor to discuss this issue.

## How Does Pregnancy Affect Glaucoma?

It is very important to understand that any eye drop used for glaucoma by the mother can get absorbed into the circulation and it may affect the fetus and be secreted in breast milk for

nursing mothers. There is risk to the fetus with all glaucoma medications - especially in the first trimester of pregnancy. If at all eye drops are used after the first 3 months of pregnancy in consultation with your eye doctor and physician, the absorption into the body can be minimized by gently pressing on the inside corner of the eye (between the eye and the nose) to occlude the tear duct for 2 minutes.

## How Can The Family Of A Glaucoma Patient Help?

Patients who have lost vision progressively due to glaucoma will be under psychological stress and caring to the needs of the patient may be challenging both to the doctor and family members.

The family can help in multiple ways:

1. Organize the main household items which are of daily use so that it can be easily located and identified by the patient.
2. Remove all items in home that could make the patient trip over- any small stools, tables, loose wires etc.
3. Program important numbers like that of police, ambulance, fire station etc. in your phone with voice activation.
4. Put different number of rubber bands over your various medications so that it can be identified.
5. Add more lights in your house as better illumination can provide better mobility.
6. Carry list and timing of medications in your wallet or purse and remind the patient to use eye drops regularly.

7. Help the patient by bringing him/her regularly to the hospital for checkup.
8. Above all provide the moral support to the patient and encourage community-based rehabilitation with vocational training to overcome the impact of disability.
9. Get all family members screened for glaucoma.
10. Spread the message for glaucoma screening in the community.

### **What Can Be Done For A Patient Who Has Low Vision Or Is Blind Due To Glaucoma?**

Patients with low vision or blindness are eligible to several benefits like railways/ airlines concession, job opportunities etc. from the government of India. " Official site for Rehabilitation council of India can be reached at "<http://www.rehabcouncil.nic.in>" for more information and help in this regard.

After a proper assessment by an optometrist who is qualified in prescribing low vision aids following aids can be advised to the patient.

1. Devices with large letters and numbers: recently there are variety of items manufactured for helping out visually handicapped. There are watches, clocks, telephones, calendars, newspapers with large prints which helps visualization.
2. Computer modification: The letters on computer screen can be modified by increasing the size and contrast so as to aid visualization.

3. Audio enhancements: There are also devices that talk like talking books, calendars, calculators etc. The computers also have audio aids and speech synthesizers which convert spoken words into text format.
4. The other low vision aids that can be prescribed are magnifying glasses with or without illumination, spectacles mounted telescope, CCTV magnifier etc.
5. Special applications that increase font size and can read out written text are available on mobile phones which can be downloaded and used by the patients.

**It is important for you to get yourself regularly screened for glaucoma.** If you have been diagnosed to have glaucoma, excellent treatment options are now available and **regular treatment and follow up can help you to preserve your vision for your life time, without any fear of going blind.** There is a lot of research going on and many new treatments will become available for glaucoma in the near future.

**You can live happily with glaucoma and enjoy an excellent quality of life if the disease is detected early and treated in time.** Always remember that once you have glaucoma, you will have to be under the care of an eye doctor for the rest of your life.



## *The Glaucoma Page*

### Dos

Green Leafy vegetables



Regular Exercise



Meditation



Put Alarm for regular instillation of eyedrops



Avoid Tight Tie

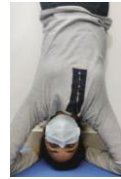


Regular Eye Check Ups



### Don'ts

Avoid Head Down exercises



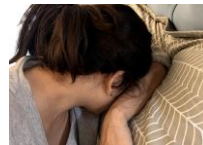
Avoid Smoking



Avoid any form of steroids



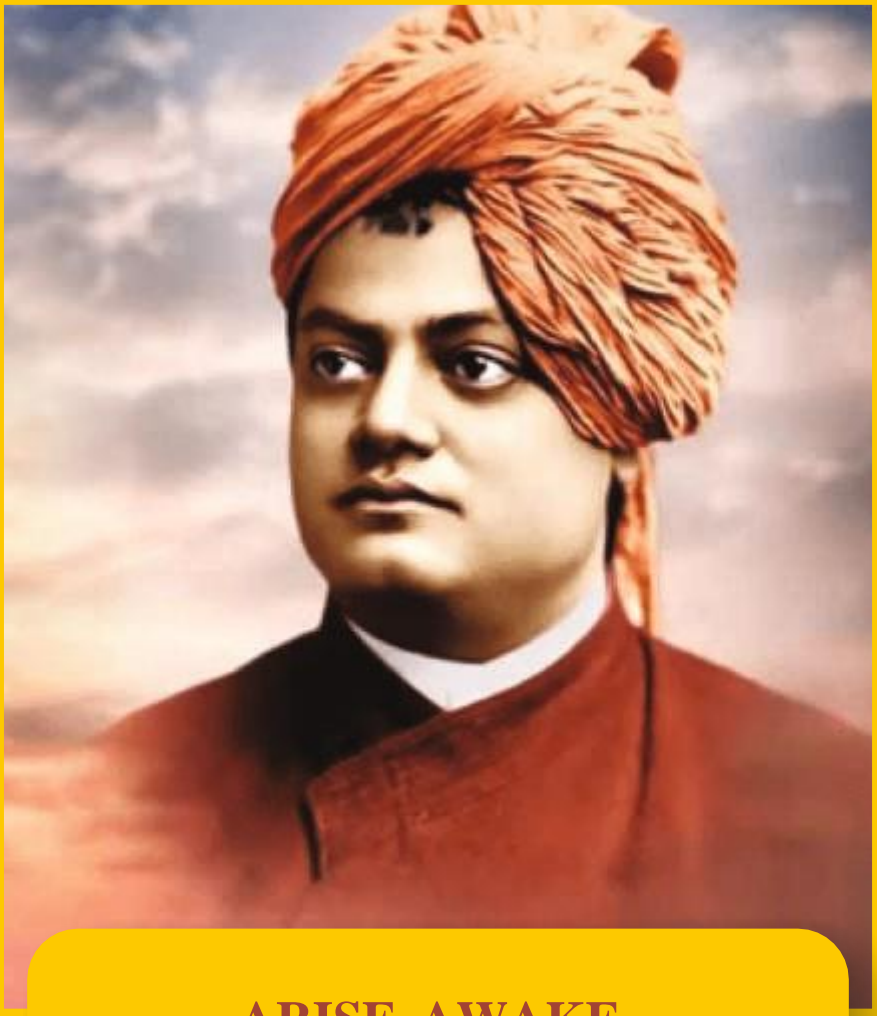
Avoid sleeping down position



Keep your weight under control







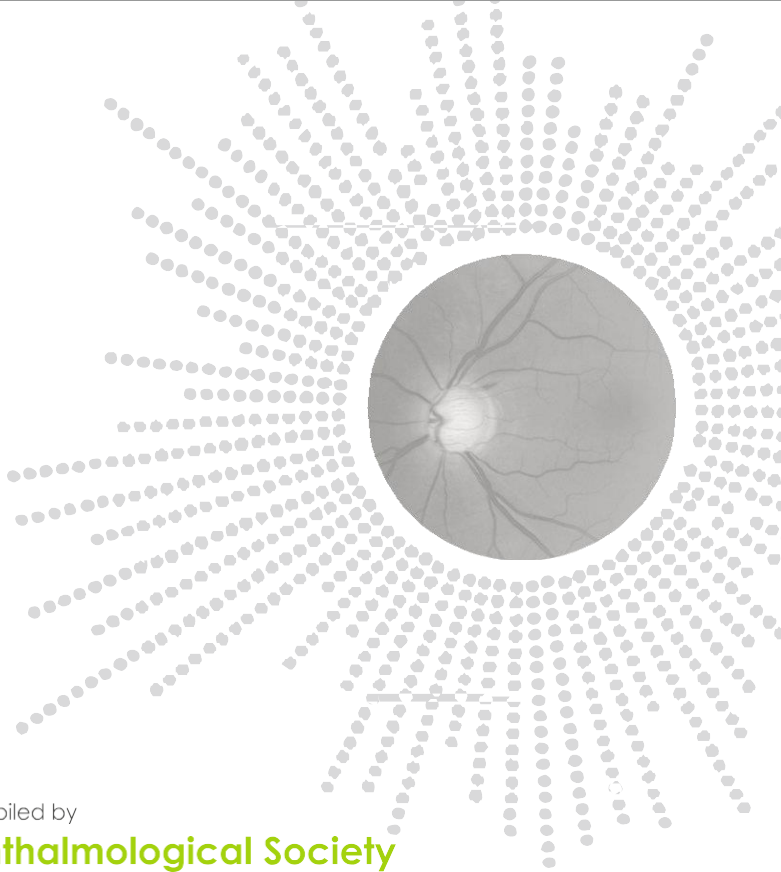
**ARISE, AWAKE  
AND  
STOP NOT  
TILL THE GOAL IS REACHED**

Joint Initiative of



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