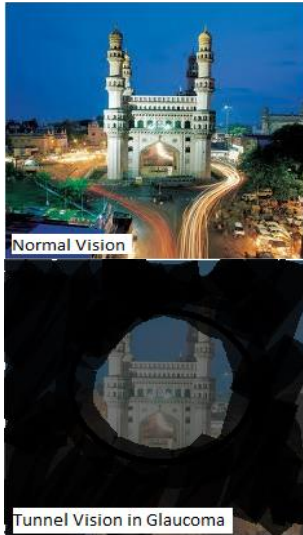


# Understanding Glaucoma



# Table of Contents

The Purpose and Benefit of this Booklet .....	1
Brief Anatomy of the Eye .....	1
What is Glaucoma .....	4
Types of Glaucoma.....	5
Frequently Asked Questions .....	6
Dos' for all.....	12
Glaucoma Patients: Specific Dos'.....	13
Glaucoma Patients: Moderation.....	13
Glaucoma Patients: Specific Donts'.....	14
Summary of Glaucoma.....	15
You Tube link for glaucoma awareness videos.....	15


## The Purpose and Benefit of this Booklet

The purpose of this booklet is to promote better understanding with regards to glaucoma and to spread awareness about this blinding disease.

## Introduction to Basic Eye Anatomy

The eyeball has three coats; the outermost is tough and is called the cornea in front and sclera behind. Cornea is the window of the eye and hence transparent; the sclera is opaque and white in colour.

Inside this lies a vascular and coloured layer, called iris in front and ciliary body and choroid behind. The central hole in the iris is the pupil regulating the amount of light entering the eye. The natural lens of the eye is positioned behind the pupil.




***“The eye is shaped like a ball due to pressure from aqueous from within”***

Most of the eyeball behind the lens is filled with a jelly like structure called the vitreous.

The innermost layer is the nerve layer called retina, fibres from which bundle up to form the optic nerve. The face of this nerve is called the optic nerve head, which is the primary seat of damage in glaucoma.

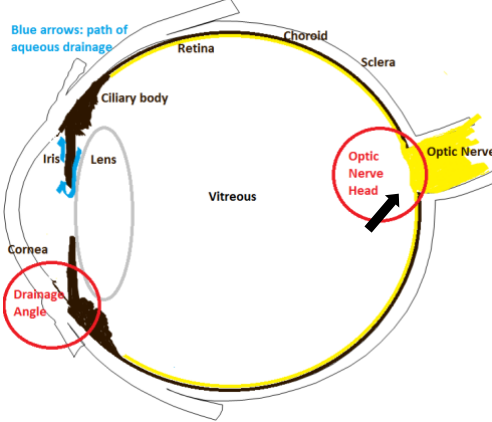
This optic nerve is responsible for vision, colour vision and side vision; it is side vision damage that occurs first in glaucoma.

The eye is shaped like a ball only because there is pressure from fluid (called aqueous) from within.



***“The optic nerve head is the primary seat of damage in glaucoma”.***

This fluid is produced in the eye by the ciliary body, behind the iris, enters the front of the eye via the pupil and is drained away through an area called the drainage angle.

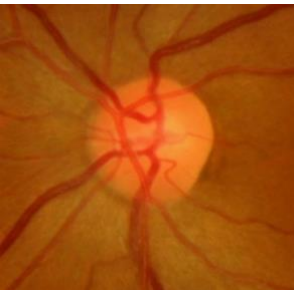


## Anatomy of the eye

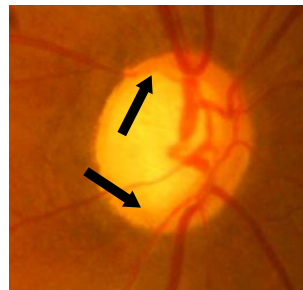
This angle, under normal circumstances, is not visible and requires a special lens to view it; this procedure is called gonioscopy. The eye pressure, called intra-ocular pressure is measured by performing tonometry.

## What is glaucoma?

Glaucoma is a name for a group of conditions in which optic nerve is damaged where it leaves the eye ie at the optic nerve head (see figures below). This damage then leads to very specific type of defects when testing of visual fields is done (explained later).



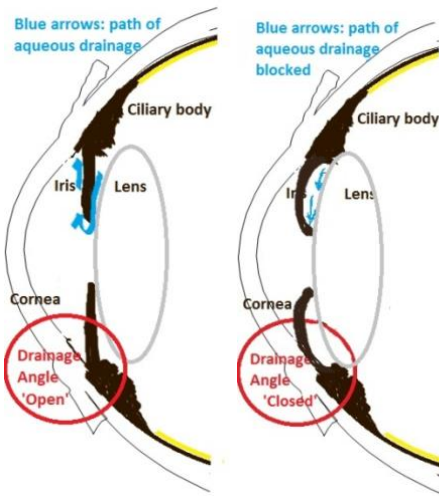
Normal disc (left) and Glaucomatous disc (right) with arrows pointing at damaged neuroretinal rims



This damage was previously thought to be caused exclusively by eye pressure; however there are various other factors that can lead to glaucomatous damage of the optic nerve head, but eye pressure is the most important risk factor.

## Types of glaucoma

Based on the appearance of the drainage angle, when viewed with gonioscopy, glaucoma is divided into **'open angle'** and **'angle closure'** glaucoma (see figures below).



Primary Open angle Glaucoma or POAG and Primary angle closure glaucoma or PACG are **'chronic'** in nature, ie they can take many months to years to develop.

However, Angle closure disease has an **'acute'** variety which can lead to loss of vision in hours, if help is not available immediately.

Glaucoma may also be present at or around birth, called **congenital glaucoma**.

Glaucoma that occurs as a result of some disease in the eye or that following any eye surgery is called **secondary glaucoma**.

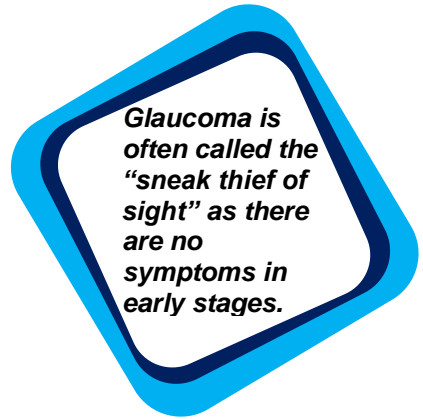
Congenital and secondary glaucomas can be of either type – open or closed.

## Frequently Asked Questions

Q. How can I tell if I have glaucoma? Are there any symptoms?

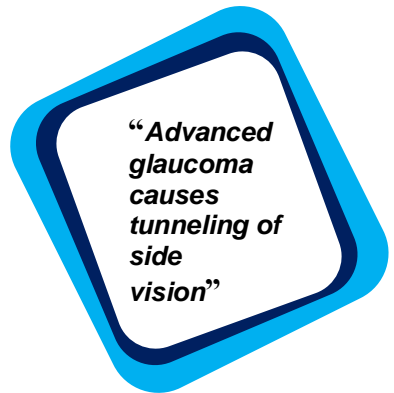
A. Glaucoma has been called the 'sneak thief of sight' as in the early stages of the majority of cases there are no symptoms, except in the acute variety when patients may complain of coloured halos preceding pain and loss of vision.

However, in the majority of chronic glaucoma cases, patients can tell only after side vision is severely affected (tunnel vision – see cover), which occurs in well-established glaucoma.



Q. How does it cause blindness?

A. Glaucoma slowly affects side vision (peripheral vision) first. Glaucoma occurs in both eyes, but usually unequally, as a result the better eye keeps 'filling-in' for the eye that is affected more. Due to extreme constriction of side vision tunneling of vision occurs. Central vision continues to remain relatively good till the very last stage. That is why, early on in the disease, patients fail to realize that they have a problem.



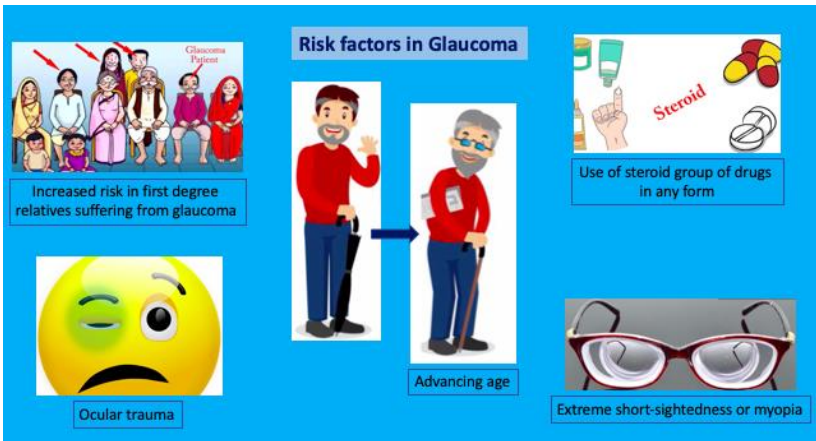
Q. Does glaucoma run in families?

A. Yes chronic glaucoma is 4-10 times commoner in blood relations of patients diagnosed with glaucoma.

Q. What are the risk factors?

A. **Eye pressure is the most important risk factor.**

Other risk factors include: a family history, as mentioned above, increasing age (above 35 years), high degree of short-sightedness (myopia), injury to the eye and usage of any type of steroid medication (eye drops, inhalers, tablets, ointments etc) are all risk factors. In some parts of India, including Telangana and Andhra Pradesh, angle closure disease is quite common.



Q. Who needs to get checked for glaucoma?

A. All individuals above the age of 35-40 should have eye check-ups every 2 years.

If an individual has developed glaucoma, then all his blood relations should undergo

***“Risk factors include increasing age, family history, myopia, eye injury, steroid use.”***

glaucoma tests. These relations include siblings (brothers and sisters), parents and offspring (once they reach the age of 35).

Q. What are the clinical tests required?

A. Clinical Tests that are specific to glaucoma are

1. Tonometry (measurement of eye pressure)
2. Gonioscopy (viewing of the drainage angle)
3. Bio-microscopic funduscopy (viewing of the optic nerve head in 3-D at the slit lamp with special lens)

Q. Are there any investigations to be done?

A. If there is a suspicion of glaucoma, then a visual field test (perimetry) is done to check for peripheral or side vision.

In diagnosed cases of glaucoma, perimetry is usually repeated annually as well. Thickness of the cornea, where eye pressure is measured, is also recorded to estimate eye pressure better.

Imaging (scans) may also be done, especially when there is suspicion of early disease.

Q. Is blood pressure and eye pressure the same?

A. No

Q. How does blood pressure affect eye pressure?





A. Blood pressure can affect eye pressure, but only at sustained high levels. So, it is important that hypertension is controlled.

Low levels of blood pressure (hypotension) can compromise the blood supply to the optic nerve head and also contribute to further damage.

Therefore, it is important that blood pressure is not allowed to rise too high or drop too low.

Q. What is Ocular Hypertension?

A. Ocular Hypertension is merely the presence of raised eye pressure without any evidence of damage of the optic nerve head. However, as eye pressure is a risk factor, if it goes beyond a certain level, it will be treated by your Ophthalmologist.

Q. Can glaucoma be cured doctor?

A. Glaucoma affects the nerve and hence the ensuing damage is permanent. Thus, though there is no cure, we can only control it and help to prevent any further loss of vision.

Q. How is glaucoma treated?

A. Current treatment of glaucoma is directed towards control of eye pressure. We can do this by means of eye drops (sometimes tablets for short duration), laser and glaucoma surgery.



For the majority of chronic open angle disease, it is controlled with eye drops; when this fails then laser or surgery is contemplated.

For **all angle closure disease**, laser is done first. Laser Peripheral Iridotomy helps create a 'hole' in the peripheral part of the coloured

portion (iris) of the eye, in order to try and open up the drainage angle. Once this is done it is treated like open angle glaucoma.

Q. Are there any side-effects of treatment?

A. **ALL** treatment modalities have side-effects; thus, benefit of a modality of treatment is always weighed against the risks before it is advised to a patient.

Q. Why isn't surgery done first?

A. Surgery carries greater risk of complications and morbidity and, in any case cannot restore what is already lost. Moreover, there is no 100% guarantee that it will help control eye pressure in the long term, hence most Ophthalmologists reserve this form of treatment as the last resort.



Q. How long will I have to be on treatment doctor?

A. Treatment, once started, has to be taken indefinitely. As such it has to become a part of one's daily routine. Also, lifelong monitoring is required (follow-up at regular intervals, usually 3-6 months).

Even if surgery is done, lifelong follow-up at regular intervals (3-6 months) is mandatory.

Q. Doctor, will I go blind?

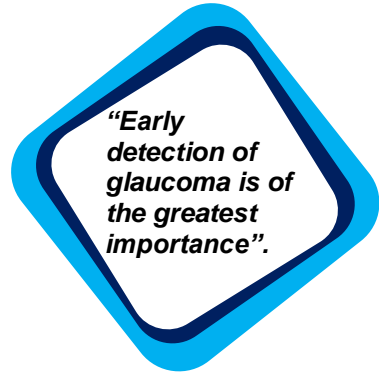
A. If your glaucoma is discovered early enough, and is treated, then the likelihood of losing sight is small. Untreated there is progressive damage, leading to loss of side vision with eventual tunnel vision and lastly loss of central vision also.

If eye drops, as prescribed, are taken regularly and follow-up maintained, then we can hope to arrest further loss.

In chronic glaucoma, the process of damage is slow and so is the side vision loss and therefore it is usually asymptomatic, especially in the early stages.

On the other hand, in acute angle closure it is sudden and dramatic and irrecoverable if there is delay in treatment.

**Thus, in either case, early detection is of the greatest importance.**



**Glaucoma is a blinding disease but can be prevented if detected early.**

Q. How will I be diagnosed?

A. Clinical tests and some, or all, of the investigations as listed before will help your doctor to decide whether you have open angle or angle closure glaucoma.

If you have angle closure, then laser is the first step (as explained).

Q. If I am diagnosed as glaucoma, what do I need to do?

A. If you are a glaucoma patient then the best way to help your condition is to put eye drops regularly, as prescribed, without fail, even during travel or hospital admission unrelated to glaucoma. Keeping regular follow-up appointments also is very important.

Q. What else can I do doctor? What lifestyle changes do I need to make?

A. Glaucoma is not a very lifestyle sensitive disease. However, if you practice yoga, head down position or “shirsasana” should be avoided.

Also, consumption of more than 4 standard glasses of water (approx.1 litre) at any one time should be avoided, keeping in mind that minimum 2 litres should be consumed in a 24-hour period.

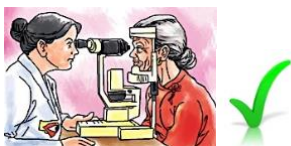
Apart from this, alcohol if consumed should be in moderation. Diet should be normal and balanced. Smoking should be avoided.

Q. How will I know if treatment is working?

A. Only your Ophthalmologist will be able to tell and therefore it is **vital to attend follow-up appointments and do not stop using your eye drops as prescribed.**

## Dos' for all

Regular eye exam, at least annually, especially after 40 years



Regular consumption of coloured fruits and vegetables



## Glaucoma patients: Specific Dos'

Regular eyedrops (as advised) and regular eye exam



Sleep in propped-up position



## Glaucoma patients: Moderation

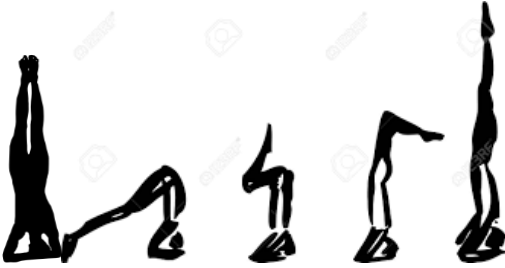


Limit consumption of caffeine / coffee / alcohol



## Glaucoma patients: Donts'

### Stop head down exercises



### Avoid excessive water drinking



Minimum of 2 litres of water in a 24-hour period is mandatory, but no more than 3-4 glasses at any one time



***“Glaucoma is a blinding disease but can be prevented if detected early”.***

***“Majority are treated by medication but 10% of patients may still have progressive loss of side vision despite proper treatment”***

***“Regular check-up with your doctor goes a long way in keeping your disease under control.”***

***“Both, treatment and follow-up, needs to be lifelong.”***

***“Family members of patients with glaucoma are at much increased risk of developing glaucoma themselves, so should have regular eye exam to exclude glaucoma”***

***“With your awareness and help we can beat this invisible disease”***

### **Glaucoma awareness video YouTube link**

‘Stop theft: save sight left’

English version:

[https://www.youtube.com/watch?v=z4q\\_0a50qW8&feature=youtu.be](https://www.youtube.com/watch?v=z4q_0a50qW8&feature=youtu.be)

Telugu version:

<https://youtu.be/ZfTNvxNK0gl>

Hindi version:

<https://youtu.be/XxqaBy1Xz7M>



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