



## Review Article

# An Overview On Glaucoma: Silent Thief Of Sight

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### ABSTRACT

Glaucoma is condition of increase intraocular pressure in the eye that may progress to a loss of vision. The optic is the main whim-whams that to the eye that's responsible for transmitting electrical signals to the brain. This damage generally occurs gradational visual changes and the loss of vision. Glaucoma can do in any age but is more common in aged grown-ups. In this review, we examined the pathophysiology and colorful threat factors of glaucoma.

### INTRODUCTION

Glaucoma is the leading cause unrecoverable blindness. Glaucoma is a group of eye conditions that damages the optical whim-whams. The optical whim-whams sends visual information from your eye to your brain & is vital for good vision. Damage to the optical whim-whams is frequently related to high pressure in your eye. But glaucoma can be indeed with normal eye pressure. The goods is so gradational that you may not notice a change in vision until the condition is in its after stages. It's important to have regular eye examinations that including measures of your eye pressure.

### ANATOMY & PHYSIOLOGY OF EYE

The eyes are responsible for furnishing us with a sense of vision, which is essential for proper navigation.

#### Structure of Eye

The eye is generally round in shape, still, its structure is substantially covered by the Eye Leaves lids which give it a convex appearance. It's important to note that the Eye Leaves aren't part of the eye itself. The deconstruction of the eye is made up of several factors working together. In addition to these factors, there's a secondary structure that helps the eye function easily.

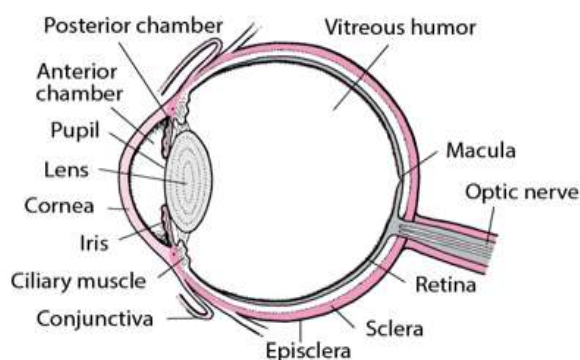
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### Primary factors of Eye-

The eye has several primary factors, including the cornea, sclera, waterless humor, iris, pupil, lens, ciliary muscles, vitreous humor, and retina.

The **cornea** is a indirect, transparent structure located at the front of the eye, while the sclera is the white portion that covers utmost of the eye visible from the outside. The name **Waterless humor** suggests “aqueous ” means water due to the watery nature of this area. It's a jelly- suchlike substance that contains substantially water. It's set up between the cornea and the lens. The **iris** is a indirect region in the middle of the eye made up of fiber- suchlike structures, containing colors (Black, Blue, Brown, etc.) that determine its color. These colors are inherited from the parents of any existent. The **pupil** is a indirect concave in the center of the iris. The main element of the eye that lacks any blood vessels. The name Vitreous humor “suVitreous ” means glass structure as it's transparent like glass. It's a transparent, jelly- suchlike substance inside the eyeball that isn't soft like jelly. The **retina** is the receipting element of the eye which has the only blood vessels of the eye and is connected to the optical whim-whams. It consists of around 130 million cells that are of two different types of cells rod cells and cone cells.

The cone cells work as light- seeing cells. There are nearly 5 million Cone Cells present in the eye. There are three types of cone cells; the Red Light seeing Cone Cells, the Green Light seeing Cone Cells & the Blue Light seeing Cone Cells. Among them, Red light- seeing cells are present in utmost

of the number & Blue light- seeing cells are present least in number. All other colors can be accepted by the combination of those cells. Rod Cells These are also the light- seeing cells present in Retina. There are 125 million Rod Cells present in Retina. These cells can only suitable to accept low bright light and no bright light at all.

### Secondary factors of Eye-

The eye has several secondary factors, including the optical jitters, and layers of the eye.

**Optic jitters** - This is the main element of the secondary eye factors. This is veritably important for imaging anything. Optic jitters intermingled with the Retina in the eyes. Nearly one million whim-whams filaments intermingled with the Retina. Optic jitters are part of the Central Nervous System( CNS). They carry the dispatches from the eye to the brain.

### Layers of Eye –

There are substantially three layers present in the eye. The different factors of the eye intermingled & define similar layers.

**Stringy Tunic** - It's the external subcaste of the eye. It's made with apkins. And it covered the external subcaste of the eyes. The external subcaste of the eye is also made of Sclera & Cornea of the eye.

**Vascular Tunic** - It's the middle subcaste of the eye. Though it isn't girdled by the eye. But it divides the eye into Interior & Posterior portions. It's also made with apkins & filaments. The Ciliary Body & Iris are two factors that developed the Vascular Tunic.

**Inner Subcaste** - The inner subcaste of the eye means the Retina of the eye. There are no apkins present in this area.

### Functions of Eye Components-

**Cornea** - The cornea helps to bend the light shafts. As it's convex in shape, it'll turn the external light source & make coincident shafts of light. It helps to pass through the Pupil of the eyes.

**Sclera** - It helps to give shape to the eyeball. It also helps to cover the eyeballs from any external

pitfalls. Also, it has the muscle Conjunctiva, which helps to move the eyeball up & down.

**Waterless Humour** - It helps to maintain the shape of the Cornea. As Cornea is convex, it provides support to the Cornea. So, the Cornea will noway get deformed. Also, it helps to reduce disunion while moving the Lens of the eye.

**Iris** - The light shafts enter via Cornea. But the complete light shafts aren't necessary to get inside the eye. Iris absorbs the redundant light shafts & reflects them. Depending upon the colors available in the Iris, we can see some multicolored Iris for individual humans. Also, Iris helps to maintain the size of the Pupil. Depending upon the terrain the Pupil size gets changed.

**Pupil** - It has only a single task to enter the coincident light shafts inside of the eyeball. With the help of Iris, Pupil can change its size. Like in darkness, when there's a need to get further light shafts inside of the eyeball, Iris helps to get stretched the Pupil. So by the Pupil, further lights enter the eyeball. In further bright light, Iris contracts the Pupil. So that minimal light shafts can enter the eyeball. else, further bright light can harm the inside of the eyeball. It can suitable to damage the cells also.

**Lens** - This helps to make a clear picture of the Retina. The lens works the same as the camera lens. As it's convex it can make coincident light shafts. It helps to concentrate all the coincident light shafts to a particular point of the Retina. So a clear picture can be available at Retina.

**Ciliary Muscles** - These muscles hold the lens in its place. Also, depending upon the light shafts can change the structure of the lens. However, they will lengthen the lens, If the incoming light shafts are coincident. So that, Lens can make a coincident light ray easily. However, the ciliary muscles compress the Lens, If the incoming lights are divergent. So it can fluently concentrate the coincident light on Retina.

**Vitreous Humor** – It's the fluid suchlike structure present on the inside of the eyeball. It helps to support the shape of the eyeball from the inside. Without it, the shape of the eyes makes gets deformed due to injury.

**Retina** - This helps to collect the light shafts from the outside. also, it'll make the picture of the image from where the light is coming. still, the picture is dependent upon the terrain of the light- receiving cells. After making the image of the object, it provides the details to the Optic whim-whams.

#### **Mechanism of Eye-**

When light shafts from external objects enter the eye, they first land on the cornea. The cornea makes the shafts meet and focuses them on the pupil. The light also travels through the waterless humor to reach the pupil. Some of the light gets absorbed by the iris, but the rest enters the eyeball. The lens also tries to make a coincident light ray, which focuses on a specific point on the retina depending on the nature of the light ray. After being coincident by the lens, the light ray travels through the vitreous humor and lands on a special region of the retina that can make a clear picture. The picture developed on the retina is reversed from the factual object. The image is also converted to a communication and entered by the optical jitters, which transfer the dispatches to the optical lobe of the brain. The brain reads the communication and develops the factual image of the object. The eye works also to a camera, where the iris functions as the orifice, and the retina works like the camera.

#### **HISTORY OF GLAUCOMA**

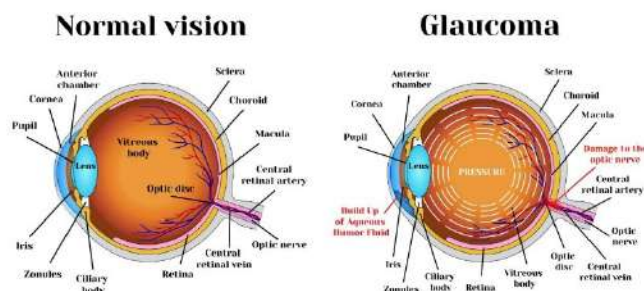
In 370 B.C. Hippocrates notes a type of blindness in the senior & called it glaycoseis, the earlist record of glaucoma. A British Surgeon, Richard Banister in 1622 find a link between eye pressure & glaucoma. In 1862, Dr. Franciscus Donders identifies intraocular pressure as causing the complaint and named it as glaukoma simplex. In 1875, pilocarpine is discovered and used for



treatment of glaucoma. In 2010, 60.5 million people were estimated to have glaucoma. In 2020, this number increased to 79.6 million in the world. I estimate that there are roughly 11.2 million persons progressed 40 times & aged with glaucoma in India. Primary open angle glaucoma is estimated to affect 6.48 million persons. The estimated number with primary angle closure glaucoma is 2.54 million.

### PATHOPHYSIOLOGY OF GLAUCOMA

IOP is a function of product of liquid waterless humor by the ciliary process of the eye & its drainage through the trabecular network. Waterless humor is produced by the ciliary body & inflow into the posterior chamber behind the iris. The trabecular network filters the waterless humor into schlemm's conduit. Where is picked up by the episcleral vessels & mixed with blood.



### SYMPTOMS OF GLAUCOMA –

1. Severe headache
2. Severe eye pain
3. Nausea/ Vomiting
4. Blurred vision
5. Eye redness
6. Increase blinking

### CAUSES OF GLAUCOMA-

1. Genetics Family history of glaucoma
2. Hypertension
3. Eye trauma
4. Diabetes Mellitus
5. Migraine, headache
6. Drugged use of original or methodical use of corticosteroid
7. Extreme dilation of pupil

8. Emotional excitement
9. Age people over 60
10. rotundity
11. Eye injury
12. High position of diplopia or Hypermetropia
13. Sleep Apnea

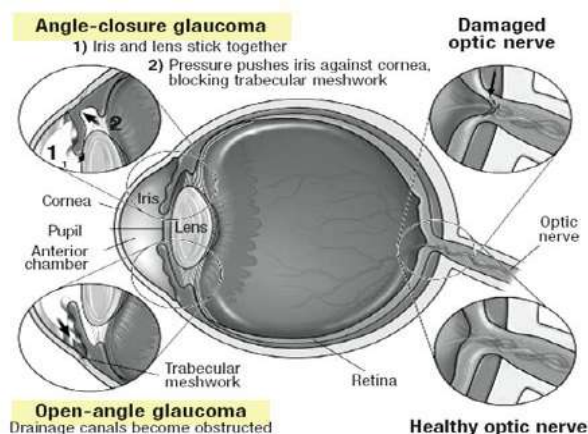
### CLASSIFICATION OF GLAUCOMA

#### A) Primary Glaucoma –

- 1) Open Angle Glaucoma
  - Primary Open Angle Glaucoma
  - Normal pressure Glaucoma
- 2) Angle Closure Glaucoma –
  - Acute Glaucoma
  - Sub-acute Glaucoma
  - Habitual Glaucoma
- 3) Natural Glaucoma –
  - Primary natural Glaucoma
  - Glaucoma associated with redundant optical development abnormalities

#### B) Secondary Glaucoma –

- 1) Pigmentary Glaucoma
- 2) Due to lens changes
- 3) Trauma
- 4) Steroid – convinced
- 5) Exfoliation pattern



#### Open Angle Glaucoma –

- No symptoms occurs in early stages & this type of Glaucoma is effortless
- In after stages, difficulties seeing effects in your central vision.



**Acute Angle- Closure Glaucoma** – This type happens when someone's iris is veritably close to the drainage in their eye. The iris can end up drainage Angle in their eye & block drainage Angle.

**Normal Pressure Glaucoma** – People with normal pressure glaucoma have eye pressure that's within normal ranges, but shows signs of glaucoma, similar as eyeless spots in their field of vision.

#### **Glaucoma in Children –**

- A cloudy eye( babies)
- Increase blinking( babies) & gashes without crying
- Blurred vision, headache

#### **Pigmentary Glaucoma –**

Color dissipation pattern happens in this type. This color can raise eye pressure & lead to pigmentary glaucoma and also seeing halos around sights.

#### **DIAGNOSIS OF GLAUCOMA**

- 1) Glaucoma is dissect via eye test performed by a specialist –
  - Measure your eye pressure
  - check your eye drainage angle
  - Measure consistence of your cornea .
- 2) Tonometry – The objective measures of IOP. Normal readings are between 10 mm hg – 21 mm hg.
- 3) Tomography – Measure the exodus of waterless humor from the eye.
- 4) Gonioscopy – A fashion used to measure angle between the cornea & the iris, to assess whether the glaucoma is open angle or closed.
- 5) Perimetry – opinion of eyeless spot
- 6) Visual field testing by using different types of machines.

#### **TREATMENT OF GLAUCOMA**

Most of the glaucoma specifics are administered topically, but the immersion may occurs systemically as it passes through the drainage system. It can be overcome by applying a digital pressure on the lacrimal sac for 3 min. So that to

enhance the medicine contact time with the eye is dragged . Glaucoma specifics should be avoided in gestation if possible, with systemic carbonic Anhydrase impediments maybe carrying the topmost threat due to teratogenicity enterprises.

#### **By using medicine remedy –**

1. Beta blockers – Timolol (drop waterless product)
2. Adrenergic agonist – Brimonidine (drop waterless product)
3. Cholinergic agonist- Pilocarpine
4. Carbonic Anhydrase impediments – Acetazolamide (Increase tuberculosis exodus)
5. Adrenergic agonist – Epinephrine (to reduce IOP by perfecting waterless exodus)
6. Prostaglandins – Latanoprost (to reduce IOP)
7. Miotics – Increase quantum of fluid that drains out of that eye.

#### **By using Surgery –**

- 1) Laser Surgery – Laser surgery for open angle glaucoma generally refers to ray trabeculoplasty. Laser trabeculoplasty has been used in the operation of open Angle glaucoma for further than 20 times. Advantages – • It reduce IOP in utmost cases (20- 30) • lower dependence on patient compliance to give IOP control.
- 2) Incisional Surgery – In this Surgery, indicated that sufficient reduction of IOP can't be achieved by other remedial means analogous as medical treatment or shaft treatment, cases in which other treatment can't be used because of adverse goods or non- compliance.
- 3) Filtrating Surgery – Full viscosity filtrating Surgery- In this system, a direct arid outpour pathway from the anterior chamber is created underneath the conjunctiva.
- 4) Trabeculectomy – This is the most common type of Surgery. The scleral distraction is a vital step in glaucoma filtration Surgery. It involves creating a thin, triangular –



structured distraction in the outermost caste of the eye, called the sclera. This distraction allows for the creation of an opening or channel through which spare fluid can drain from the eye, reducing IOP.

- 5) Implantation – In this system, an arid outpour pathway is created between the anterior chamber & the outside of the eye using a special implant.

#### **By using Ayurvedic Treatment –**

According to Ayurveda, any problem is caused due to the disturbance of balance in the doshas. It says that the disturbance of Kapha dosha may lead to Glaucoma. So, some of the gravies used in Ayurveda to treat Glaucoma are -

- 1) **Punarnava** (*Boerhavia diffusa*) - It's mainly used to cure the Glaucoma. It has diuretic parcels which help in controlling the complaint by draining the spare fluid from the eyes. It also prevents the damage of optic vagrancy-whams and reduces intraocular pressure of eye.
- 2) **Triphala** – Triphala is another seasoning used in Ayurveda to treat this problem. It's generally used as an eyewash. It also reduces intraocular pressure and prevents vision loss. The seasoning also possesses anti-seditious parcels that cover the optic vagrancy-whams from damage.
- 3) **Amla** (*Phyllanthus emblica*) - It's also a salutary seasoning that treats Glaucoma. It contains vitamin C and has antioxidant parcels guarding the optic kerchief, optic vagrancy-whams, and retina.

#### **PREVENTION OF GLAUCOMA**

- Regular eye examinations – Detects glaucoma before damage occurs.
- Treat Elevated eye pressure – lowering the eye pressure can drop the chances of causing glaucoma.
- Control Weight and eye pressure – Insulin resistance linked to the IOP.

- Wear eye protection – Secondary glaucoma can results from eye injury.

#### **RECENT DEVELOPMENTS**

1. Nanomedicine is the medical operation of nanotechnology and can be used to treat glaucoma furnishing nanodelivery systems (as nanoparticles, nanosuspension, nanodiamonds, liposomes, etc.) to give sustained release and better bioavailability compared to the topical eye drops and plasters.
2. The Bimatoprost implant (Durysta; AbbVie) is the first FDA- approved, dissolvable implant for cases with open angle glaucoma or high eye pressure (optic hypertension), and it has been shown to lower eye pressure for cases for 15 weeks in clinical studies.
3. The 2023 study set up that ophNdi1 gene remedy enhances mitochondrial function in retinal ganglion cells (RGC). This finding is applicable to glaucoma and other neurodegenerative conditions associated with impaired mitochondrial function.

#### **CONCLUSION**

Glaucoma is a complaint that bear a clinical opinion. Glaucoma may be reversible in certain cases and other Non- IOP factors may give farther cures goods in the future. So, the treatment should be given at right time to help glaucoma. Treatment for cases with glaucoma includes specifics, shaft remedy, incisional remedy, filtrating surgery. As per studies I set up that, Glaucoma is a truly complex and dangerous silent complaint.

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