

NGN NCLEX 2026 · SENSORY / OCULAR SYSTEM

Glaucoma — the silent thief of sight

A group of progressive optic neuropathies in which elevated intraocular pressure (IOP) damages the optic nerve, producing permanent peripheral-to-central visual field loss. Early detection and lifelong medication adherence are the only defenses.

SYSTEM · EYE / CNS II

EXAM WEIGHT · HIGH

ACUTE CLOSED-ANGLE = EMERGENCY



DEFINITION · OVERVIEW

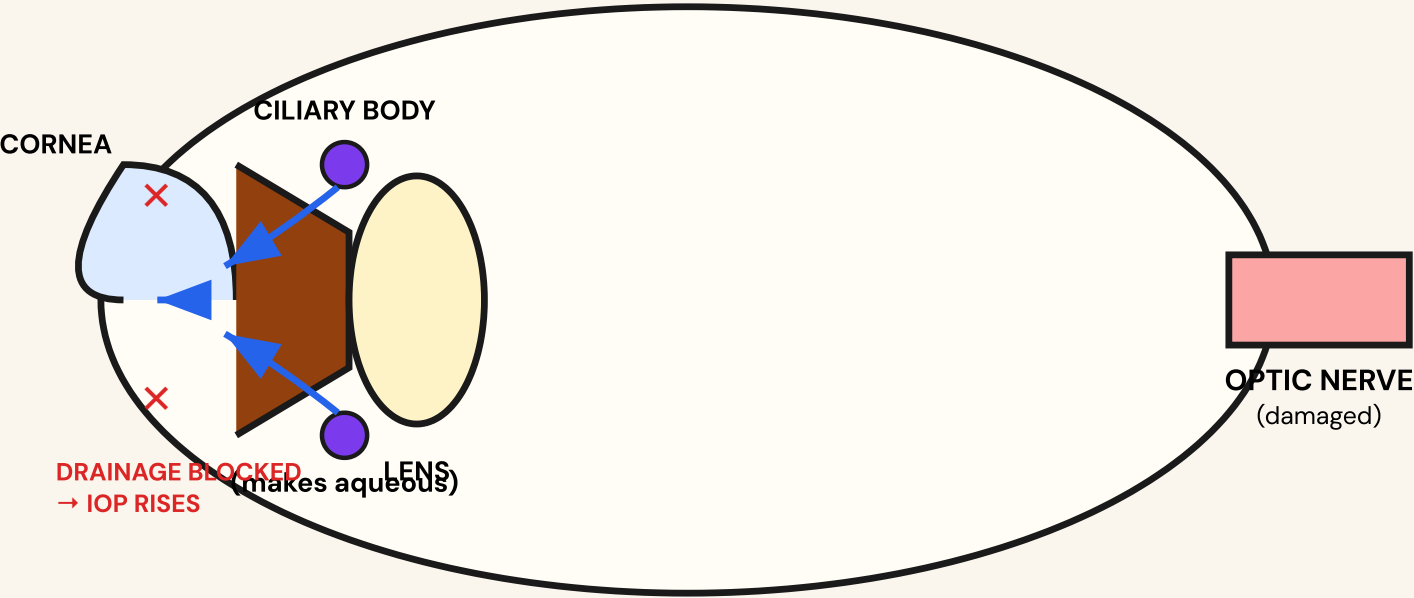
What Is Glaucoma?

- ▶ **Group of eye diseases** that damage the optic nerve, most often from **increased intraocular pressure (IOP > 21 mmHg)**. Normal IOP is 10–21 mmHg.
- ▶ **Second leading cause of irreversible blindness worldwide.** Vision lost cannot be restored — the goal of all therapy is to *prevent further loss*.
- ▶ Peripheral vision is lost first → progresses to **tunnel vision** → central vision last. Often **painless and silent** in the open-angle form, which is why screening is essential.
- ▶ Risk factors: age > 60, African ancestry, family history, diabetes, hypertension, severe myopia, long-term corticosteroid use, prior eye trauma.

2

PATHOPHYSIOLOGY · SIMPLIFIED

Aqueous Humor Gone Wrong



1 **Ciliary body** in the posterior chamber continuously produces **aqueous humor**.



2 Aqueous flows posterior chamber → through the **pupil** → into the anterior chamber.



3 Normally drains through the **trabecular meshwork** → Schlemm's canal → venous system.



4 **Outflow obstructed** (mesh clogged in open-angle, OR iris blocks the angle in closed-angle).



5 Aqueous accumulates → **IOP rises** → compresses retinal blood vessels and the **optic nerve head** → ischemia → **permanent neuronal death**.



COMPARISON · TWO FORMS YOU MUST KNOW

Open-Angle vs Closed-Angle

~90% OF CASES · CHRONIC

Primary Open-Angle (POAG)

- ▶ **Mechanism:** Trabecular meshwork slowly clogs. The angle stays open but outflow is sluggish.
- ▶ **Onset:** Gradual · bilateral · *painless*
- ▶ **Visual changes:** Peripheral loss first → tunnel vision → trouble with night driving · halos late
- ▶ **IOP:** Mildly elevated, 22–32 mmHg
- ▶ **Treatment:** Topical drops for life (prostaglandins first-line)

ACUTE · EMERGENCY 🚑

Acute Angle-Closure

- ▶ **Mechanism:** Iris bulges forward → physically blocks the angle. Aqueous cannot exit.
- ▶ **Onset:** Sudden · usually unilateral · *severely painful*
- ▶ **Triggers:** Dim light, emotional stress, anticholinergic / mydriatic drugs (atropine, antihistamines, decongestants, tricyclics)
- ▶ **IOP:** > 30 mmHg, often 50–80 mmHg
- ▶ **Treatment:** Immediate IOP-lowering meds → **laser peripheral iridotomy**



SIGNS & SYMPTOMS

What You'll See at the Bedside

OPEN-ANGLE · EARLY/INSIDIOUS

Sneaks in slowly

- ▶ Often **no symptoms** until significant damage occurs
- ▶ Gradual loss of **peripheral vision**
- ▶ Difficulty adapting to **darkness**
- ▶ Increased **cup-to-disc ratio** on fundoscopy (> 0.5)
- ▶ Mild eye discomfort or vague tiredness

CLOSED-ANGLE · RED FLAG 🚩

Loud and dramatic

- ▶ **Severe eye pain** + frontal headache
- ▶ **Nausea and vomiting**
- ▶ **Rainbow halos** around lights
- ▶ Sudden **blurred vision** · decreased acuity
- ▶ **Fixed, mid-dilated, non-reactive pupil**
- ▶ **Rock-hard globe** on gentle palpation
- ▶ Reddened conjunctiva · "ciliary flush"



RED FLAG · ACUTE ANGLE-CLOSURE

Severe eye pain + halos + nausea/vomiting + fixed mid-dilated pupil = ophthalmologic **emergency**. Untreated, blindness can occur within **hours**. Notify the provider *before* documenting, before pain medication, before anything else.

5

PRIORITY NURSING INTERVENTIONS • ABC + SAFETY

What to Do — In Order

CHRONIC OPEN-ANGLE

Long-term management

- ▶ **Assess** visual acuity, peripheral fields, IOP trends each visit
- ▶ **Administer** ordered topical drops on schedule — never skip
- ▶ **Teach** punctal occlusion (1–2 min after each drop) to minimize systemic absorption
- ▶ **Wait 5 minutes** between different drops
- ▶ **Avoid** mydriatics, anticholinergics, OTC cold/allergy meds without provider clearance
- ▶ **Promote** annual ophtho exams > age 40; sooner if Black or family history

ACUTE CLOSED-ANGLE • STAT

Emergency cascade

- ▶ **Notify the ophthalmologist immediately** — vision is being lost by the minute
- ▶ **Administer**, as ordered: topical **pilocarpine** (miotic) + topical **timolol** + topical **brimonidine**
- ▶ **Administer** IV/PO **acetazolamide** (Diamox) and IV **mannitol** for rapid IOP reduction
- ▶ Position **supine** — lens falls posteriorly, helping unblock the angle
- ▶ Provide a **quiet, calm environment**; control pain and nausea
- ▶ **Hold** all anticholinergics; clarify any pre-op orders that include atropine
- ▶ Prepare for **laser peripheral iridotomy** (definitive treatment)

6

PHARMACOLOGY · THE GLAUCOMA TOOLKIT

Drugs That Lower IOP

CLASS · EXAMPLE	MECHANISM	KEY SIDE EFFECTS	NURSING PEARLS
<i>Prostaglandin Analogs</i> Latanoprost (Xalatan), Travoprost	↑ Uveoscleral outflow of aqueous humor — first-line	Iris/eyelid darkening · eyelash growth · stinging · macular edema	Once daily at bedtime · warn patient about cosmetic changes (can be permanent)
<i>Beta-Blockers</i> Timolol (Timoptic), Betaxolol	↓ Aqueous humor production	Bradycardia · hypotension · bronchospasm · fatigue	Caution: asthma, COPD, heart block, bradycardia, heart failure. Apply punctal pressure to reduce systemic absorption.
<i>Carbonic Anhydrase Inhibitors</i> Acetazolamide (Diamox) PO/IV · Dorzolamide (drops)	↓ Aqueous humor production by inhibiting carbonic anhydrase in ciliary body	Diuresis · paresthesias · hypokalemia · metabolic acidosis · kidney stones · sulfa allergy cross-reactivity	Monitor K ⁺ and renal function. Avoid in sulfa allergy . Take with food.
<i>Cholinergic Agonists (Miotics)</i> Pilocarpine	Constricts pupil (miosis) → pulls iris away from trabecular meshwork → opens angle → ↑ outflow	Blurred vision · brow ache · poor night vision · diaphoresis · bradycardia (cholinergic effects)	Used especially in acute closed-angle . Warn about dim/blurry vision — safety risk for driving and ambulation.
<i>Alpha-2 Adrenergic Agonists</i> Brimonidine (Alphagan)	↓ Aqueous production AND ↑ outflow	Dry mouth · drowsiness · ocular allergy · hypotension	Avoid in infants and small children (CNS depression). Space from other drops.
<i>Osmotic Diuretic</i> IV Mannitol	Pulls fluid from vitreous → rapid IOP reduction	Pulmonary edema · CHF exacerbation · electrolyte shifts	Acute closed-angle emergencies only. Use in-line filter. Monitor lungs, urine output, electrolytes closely.

7

NCLEX TEST TRAPS

Where Students Lose Points

TRAP	"The nurse expects the patient with chronic open-angle glaucoma to report severe eye pain."
TRUTH	Open-angle is painless and silent . <i>Acute closed-angle</i> is the painful one.

TRAP	"Reassure the patient that vision will be restored once IOP is controlled."
TRUTH	Vision already lost is permanent . The goal of treatment is to <i>prevent further loss</i> .

TRAP	"Atropine drops are appropriate for a patient with glaucoma."
TRUTH	Atropine is contraindicated — it dilates the pupil (mydriatic/anticholinergic) and can precipitate acute closed-angle glaucoma. Same warning for diphenhydramine, scopolamine, TCAs, and OTC decongestants.

TRAP	"Patient can stop drops when IOP is normal at a follow-up visit."
TRUTH	Glaucoma therapy is lifelong . Stopping drops = IOP rebound = more nerve damage.

TRAP	"A mydriatic agent will help lower IOP in acute glaucoma."
TRUTH	The opposite — miotics (pilocarpine) constrict the pupil and open the angle. Mydriatics worsen closed-angle by widening the iris bulge.

TRAP	"Pain medication is the first priority in a patient arriving with acute closed-angle pain."
TRUTH	First priority is IOP reduction (miotics, acetazolamide, mannitol) + notifying the ophthalmologist. Pain resolves when pressure drops.



PATIENT & FAMILY EDUCATION

Living With Glaucoma

- ▶ **Take drops every day — for life.** Even when the eye feels normal. Missing doses = silent nerve damage.
- ▶ **Apply punctal pressure** (finger on the inner corner of the eye, near the nose) for 1–2 minutes after each drop. This reduces systemic absorption (especially important for timolol).
- ▶ **Wait 5 minutes** between different eye medications so the first isn't washed out.
- ▶ Read all OTC labels — **avoid antihistamines, decongestants, motion-sickness pills**, and any "do not use if you have glaucoma" warning unless cleared by your provider.
- ▶ **Avoid activities that raise IOP:** heavy lifting, straining at stool, Valsalva, head-down yoga postures, prolonged coughing or vomiting. Use stool softeners as needed.
- ▶ Wear **sunglasses** outdoors and protective eyewear during sports/yardwork.
- ▶ Tell every healthcare provider (dentist, ED, surgeon) that you have glaucoma **before** any procedure or new prescription.
- ▶ **Get yearly comprehensive eye exams** after age 40 — more often if you are Black, diabetic, or have a family history.
- ▶ **Seek emergency care** for: sudden severe eye pain, halos, nausea/vomiting with eye symptoms, or sudden vision loss.



MEMORY BOOSTERS

Mnemonics That Stick

PUPIL DIRECTION

MIOTIC = MAKE IT TINY

Miotics **constrict** the pupil — they pull the iris *away* from the trabecular meshwork and **OPEN the angle**. Pilocarpine is the classic miotic for closed-angle emergencies.

ACUTE CLOSED-ANGLE

RED • PAIN • HALO

Red eye + ciliary flush

Pain (severe, sudden)

Halos around lights

Nausea / vomiting

+ **F**ixed mid-dilated pupil

+ **R**ock-hard globe

DRUG CLASSES THAT LOWER IOP

B-CALM

Beta-blockers (Timolol)

Carbonic anhydrase inhibitors (Diamox)

Alpha-2 agonists (Brimonidine)

Latanoprost (prostaglandins)

Miotics (Pilocarpine)

DON'T CONFUSE THEM

DOPE ⇌ MIOPE

Mydriatic → "Dilates" → **BAD** in glaucoma

Miotic → "Mini pupil" → **GOOD** in glaucoma

"My **D**iriatric" = **D**ilate

"Miotic" = Make-it-tiny-not-OPEN-wide

10

NCJMM · CLINICAL JUDGMENT SCENARIO

Apply It at the Bedside

Scenario. A 68-year-old woman arrives at the ED with sudden severe right-eye pain, blurred vision, and "rainbow rings" around lights that began 3 hours ago while watching a movie in a dark theater. She also reports nausea and one episode of vomiting. **PMH:** hypertension, generalized anxiety; takes diphenhydramine nightly for sleep and started an OTC cold decongestant this morning. On exam: right pupil **mid-dilated and non-reactive**, conjunctival injection, globe firm on gentle palpation.

BP 168/92

HR 104

RR 22

SpO₂ 97%

Temp 37.0°C

Pain 9/10

IOP R 56 mmHg · L 17 mmHg

1

Recognize Cues

Sudden unilateral severe eye pain · halos around lights · nausea/vomiting · mid-dilated fixed pupil · rock-hard globe · IOP 56 mmHg · trigger of dim theater + anticholinergic medications (diphenhydramine + decongestant) · age and HTN as risk factors.

2

Analyze Cues

Dim lighting caused physiologic pupil dilation; diphenhydramine and the decongestant added *pharmacologic* mydriasis. The dilated iris bulged forward, blocking the trabecular meshwork. Aqueous outflow stopped → IOP rose to 56 mmHg → optic nerve perfusion is now critically compromised. This is consistent with **acute angle-closure glaucoma**.

3

Prioritize Hypotheses

#1 Acute angle-closure glaucoma — emergency. Differentials worth ruling out: migraine with aura (no pupil change, no rock-hard globe), cluster headache (no halos, normal IOP), retinal detachment (painless, "curtain"), corneal abrasion (no halos, no fixed pupil). Highest threat to vision = glaucoma → act first.

4

Generate Solutions

Notify ophthalmology STAT · place patient supine to let the lens shift posteriorly · administer ordered **pilocarpine drops** (miotic), **timolol**, and **brimonidine** drops · give IV/PO **acetazolamide** · prepare IV **mannitol** · provide antiemetic (ondansetron) · control pain · keep patient NPO in anticipation of **laser peripheral iridotomy** · HOLD all anticholinergics.

5

Take Actions

Administer drops in the correct order with 5-minute spacing and punctal occlusion · monitor BP, HR, respiratory status (mannitol can precipitate pulmonary edema; timolol can drop HR) · reassess IOP, pupil size, vision, and pain every 15–30 minutes · reinforce that the patient must **permanently avoid** anticholinergic OTC medications · educate about the importance of follow-up iridotomy of the *fellow eye* as prophylaxis.

6

Evaluate Outcomes

Desired outcomes: IOP drops below 21 mmHg within hours · pain decreases to ≤ 3/10 · pupil constricts and becomes reactive · vision improves toward baseline · nausea resolves · patient verbalizes understanding of medication restrictions and signs of recurrence. **Reassess:** If IOP fails to drop or vision continues deteriorating after pharmacologic therapy → escalate immediately for surgical iridotomy.

SOURCE DISCLOSURE & REFERENCES

Note on source material: Glaucoma as a topic was not present in the uploaded reference notes (the closest item, "Eye Drugs #2," covers individual glaucoma medications but not the disease itself). This infographic is compiled from the standard NGN NCLEX 2026 reference set used throughout this study library: *Saunders Comprehensive Review for the NCLEX–RN* (Silvestri), *ATI RN Adult Medical–Surgical Nursing*, *Lippincott Illustrated Reviews: Pharmacology*, and current clinical guidelines from the *American Academy of Ophthalmology (AAO) Preferred Practice Patterns: Primary Open–Angle Glaucoma and Primary Angle Closure Disease*. Drug content is reconciled with the user’s existing "Eye Drugs #2" notes (Diamox, miotics, mydriatics, administration technique).