

Angle-Closure Glaucoma (Closed-Angle)

A plain-English guide for you and your family

WHAT IS HAPPENING

Normally, your eye makes a clear watery fluid called aqueous humor every minute inside a ring of tissue called the ciliary body, which sits just behind the colored part of your eye (the iris). That fluid flows forward through the pupil — the black circle in the middle of your iris — bathes the lens and the clear window at the front (the cornea) with food and oxygen, and then drains out through a tiny mesh (the trabecular meshwork) in the corner where your iris meets the cornea. Think of it like a sink: water flows in and drains out at the same rate, so the level stays steady and pressure inside your eye stays safe. In angle-closure glaucoma, your iris suddenly bows forward or gets shoved against that drain corner — like a shower curtain falling over the tub drain. Fluid keeps being made but cannot escape, so pressure inside the eyeball shoots up fast, often in minutes. You feel crushing pain in and around your eye, see rainbow halos around lights, your vision goes blurry, and the white of your eye turns bright red. You may feel so sick to your stomach that you vomit. This is a true eye emergency: the skyrocketing pressure squeezes the blood vessels that feed the optic nerve (the cable that sends pictures from your eye to your brain), and without oxygen those nerve fibers start to die within hours. If the blockage is not opened right away, you can lose vision in that eye permanently. Doctors use a laser to punch a tiny hole in your iris or give you strong drops and pills to pull the iris back and reopen the drain, dropping the pressure and saving your sight.

What you might feel

- Sudden, severe eye pain
- Blurry vision or sudden vision loss
- Seeing halos or rainbow rings around lights
- Red eye
- Headache (often on the same side as the affected eye)
- Nausea and vomiting
- Hard, firm eyeball when gently touched
- Pupil that is mid-sized and does not respond to light

- Cloudy or steamy-looking cornea

Call the doctor right away if...

- Sudden severe eye pain with vision loss (permanent blindness can happen within hours if pressure is not brought down)
- Headache with nausea and vomiting along with eye redness (not just a stomach bug—this triad means possible angle closure)
- Eye feels rock-hard to gentle touch through the eyelid (sign of dangerously high pressure)
- Pupil is mid-sized, oval, and does not shrink in bright light (shows the iris sphincter muscle is damaged by pressure)
- Symptoms in someone over 60, far-sighted, or of East Asian or Inuit descent (these groups have narrower drainage angles and higher risk)

What the care team will do

- Get the patient to an eye doctor (ophthalmologist) immediately, or call for emergency help if one is not available right away.
- Keep the patient calm, in a comfortable position (sitting up is often easier), and dim the lights in the room.
- Do not give the patient anything to eat or drink until the doctor says it is okay.
- Give prescribed eye drops or medicine exactly as the doctor orders, and watch for the patient to urinate after certain medicines.
- Check and write down the patient's pain level, vision changes, and any nausea every 15 to 30 minutes.
- Teach the patient that the other eye is also at risk and needs to be checked and possibly treated to prevent the same emergency.

Medicines you may be given — and why

Timolol (eye drops)

Timolol slows down the cells inside your eye that make the clear fluid (aqueous humor, the watery liquid filling the front of your eye). When those cells slow down, they make less fluid. With less new fluid being made every minute, the pressure inside your eye drops.

Brimonidine (eye drops)

Brimonidine works two ways at once: it tells the ciliary body to make less fluid, and it helps the fluid that is already there drain out through a back route called the uveoscleral pathway (think

of it as a side door for fluid to leave the eye, seeping out through the wall). Both actions lower the pressure.

Dorzolamide or Brinzolamide (eye drops)

These drops block an enzyme called carbonic anhydrase that the ciliary body needs to make fluid efficiently. This enzyme helps the cells pump water and salts into the fluid. When the enzyme is blocked, the cells make much less aqueous humor, so pressure drops.

Acetazolamide (pill or IV)

Acetazolamide is a pill (or IV) version of the enzyme blocker. It travels through your bloodstream to the ciliary body and shuts down carbonic anhydrase all over your body. This dramatically slows fluid production in your eye and quickly lowers pressure — it is the fastest medical way to bring down dangerously high eye pressure during an acute angle-closure attack.

Pilocarpine (eye drops)

Pilocarpine makes your pupil shrink and pulls the iris away from the drain in the angle. In angle-closure, the iris was blocking the drain like a curtain over a window; pilocarpine yanks the curtain back, reopening the drain and letting fluid flow out. Pressure drops because fluid can escape again through the trabecular meshwork (the spongy drain tissue).

Mannitol (IV infusion)

Mannitol is a sugar solution given through an IV. It stays in your bloodstream and acts like a sponge, pulling water out of your eye (and your brain) into your blood by osmosis (water always moves toward the side with more dissolved particles). Your kidneys then pee out that extra water. Your eye shrinks slightly, and pressure drops fast — often within 30 minutes. Mannitol is saved for severe, urgent cases when pressure is dangerously high (often above 50 mmHg) and other drugs are not enough.

Apraclonidine (eye drops)

Apraclonidine lowers eye pressure by cutting down how much fluid the ciliary body makes and by helping drainage through the uveoscleral (side) pathway. It works very much like brimonidine. Doctors often use it for short-term jobs, such as stopping pressure spikes right after laser procedures (like laser iridotomy) or during the acute attack as an extra tool.

Glycerin (oral liquid)

Glycerin is a thick, sweet, syrupy liquid you drink. It is absorbed into your bloodstream from your stomach and stays there. Just like mannitol, it pulls water out of your eye by osmosis (water moves toward the glycerin in your blood). Your eye shrinks, and pressure drops. Glycerin is sometimes used in the emergency room when IV access is hard to get or mannitol is

not available, but it is not used as much anymore because mannitol IV works faster and more reliably.

Latanoprost (or other prostaglandin analogs: travoprost, bimatoprost, tafluprost)

Latanoprost copies a natural signal in your body called prostaglandin F2-alpha. It opens up the uveoscleral pathway (the side drain through the wall of your eye, running between muscle bundles in the ciliary body and through the sclera, the white outer coat). With that side drain more open, more fluid flows out, and pressure drops. Latanoprost is NOT used during the acute attack, but doctors often start it after the attack is controlled (after laser iridotomy) to keep pressure low long-term and protect your optic nerve.

Where this information comes from

- American Academy of Ophthalmology Preferred Practice Pattern
- European Glaucoma Society
- National Eye Institute
- UpToDate

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