

Acute Angle Closure Glaucoma

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- Acute angle closure glaucoma is a true ocular emergency in which pressure inside of the eye becomes acutely elevated due to the iris blocking the drainage system.
- Ocular anatomy review:
 - The sclera is the white part of the eye and the cornea is the clear portion that can be seen when looking in the mirror. Sitting flat behind the cornea is the iris which is the colored portion, and in the center of the iris is the pupil.
 - Where the cornea and the iris meet is where the drainage system of the eye is located. This is the trabecular meshwork and can become blocked, leading to increased pressure in the eye.
 - The canal of Schlemm is covered by the trabecular meshwork.
- The clinical presentation for acute angle closure glaucoma includes pain, blurred vision, colored halos around lights, frontal headache, and sometimes nausea and vomiting.
- The classic scenario (which is often seen on examinations) involves a patient who walks into a darkened room (like a movie theater) and then develops an acute onset of eye pain. They present to the ED with a mid-range, dilated, and non-reactive pupil.
 - When a person enters a dark room, the pupil dilates resulting in obstruction of the drainage system by the iris.
- Another suspicious clinical scenario involves a patient who has their pupil dilated during a routine eye examination that presents later that day or at night with acute eye pain.
- History
 - It is important to review the patient's medications for predisposing medications such as anticholinergics and sympathomimetics which may also dilate the pupil.
 - A history of far-sightedness (thick "coke-bottle" glasses) also predisposes to this condition.
 - Ask about recent surgeries or laser treatments.
 - Patients who are older with cataracts can also be at risk for developing this condition.

PITFALLS ◆

- Some patients have little pain despite a high intraocular pressure; therefore, evaluation for acute angle closure glaucoma should be considered in any patient presenting with a monocular change in vision.

- Physical exam:
 - Look for a red eye that is dilated, or sluggishly reactive pupil. The cornea may look cloudy or hazy.
 - **Visual acuity will be markedly reduced in the affected eye.**
 - Slit lamp exam – Perform the **Van Herrick** test
 - Move a very narrow beam of light slowly across the eye starting at about a 60 degree angle from the sclera through the limbus (where the sclera meets the cornea) and onto the cornea.
 - Exam the iris, which is behind the cornea. There should be space between the cornea and the iris. This indicates whether the “angle” is open, closed, or at risk of closure.
 - Other things to look for would include: a hazy, cloudy cornea indicating edema, an injected eye, or a mid-dilated pupil that is sluggish and poorly reactive.

- Diagnostic tests:
 - Use the tonopen to measure intraocular pressure.
 - Start by anesthetizing the eye with proparacaine.
 - Make sure there is no additional pressure placed on the eye as this will falsely elevate the pressure.
 - Retract the eyelids up to the orbital rim with a finger or thumb.
 - Make sure the tip of the tonopen is flat and flush with the eye.
 - Obtain 2-3 pressure readings to make sure it is consistent. It is okay if they are about 5 points within one another.
 - Typically the pressure will be over 40 mmHg if there is acute angle closure glaucoma.
 - If the pressure is less than 25 mmHg, the diagnosis is less likely. However, if the pressure is between 25-30 mmHg, it is still worth consulting an ophthalmologist.

- Treatment:
 - **Immediately start topical medications using maximum medical therapy.**
 - Medications to be used include: timolol (beta-blocker), dorzolamide (carbonic anhydrase inhibitor), latanoprost (prostaglandin analogue) and brimonidine/alphagan (alpha agonist).

- Administer all of the drops, wait 5 minutes and repeat the drug administration three times.
- Wait 30 minutes following administration and recheck the pressure. This is considered maximum medical therapy.
- **Measure the IOP every 60 minutes to determine the response to treatment.**
- If there is no response, transition to intravenous medications like acetazolamide or mannitol.
- Ensure that an ophthalmologist is involved.
- Disposition:
 - Transfer of patients for ongoing care is appropriate because “*time is optic nerve.*” Elevated pressures cause ischemia and can cause permanent visual damage.
- Definitive treatment is laser peripheral iridotomy which will allow the iris to fall back and drainage to resume. Cataract surgery (if indicated) may also be indicated.

PEARLS

- If there is an insufficient response to medical treatment for acute glaucoma, the patient will need emergency iridotomy or surgery, as determined by the consulting ophthalmologist.

References:

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