



Anterior Segment Case Lecture: A Case of Intermittent Angle Closure

Melissa A. Vitek, OD, FAAO



LECTURE OBJECTIVES

- Define angle closure
- Differentiate between pupillary and non-pupillary block mechanisms and management approaches
- Discuss acute, intermittent and chronic manifestations of angle closure
- Discuss management protocols and clinical pearls for angle closure

Patient

- 76 year-old African American female
- CC: Gradual decrease in vision at distance and near OU
- VA: 20/40 Dist and Near OU
- Pinhole: NI OU
- Pupils: PERRLA –APD
- Confrontation fields: Full OU
- EOM's full and unrestricted OU

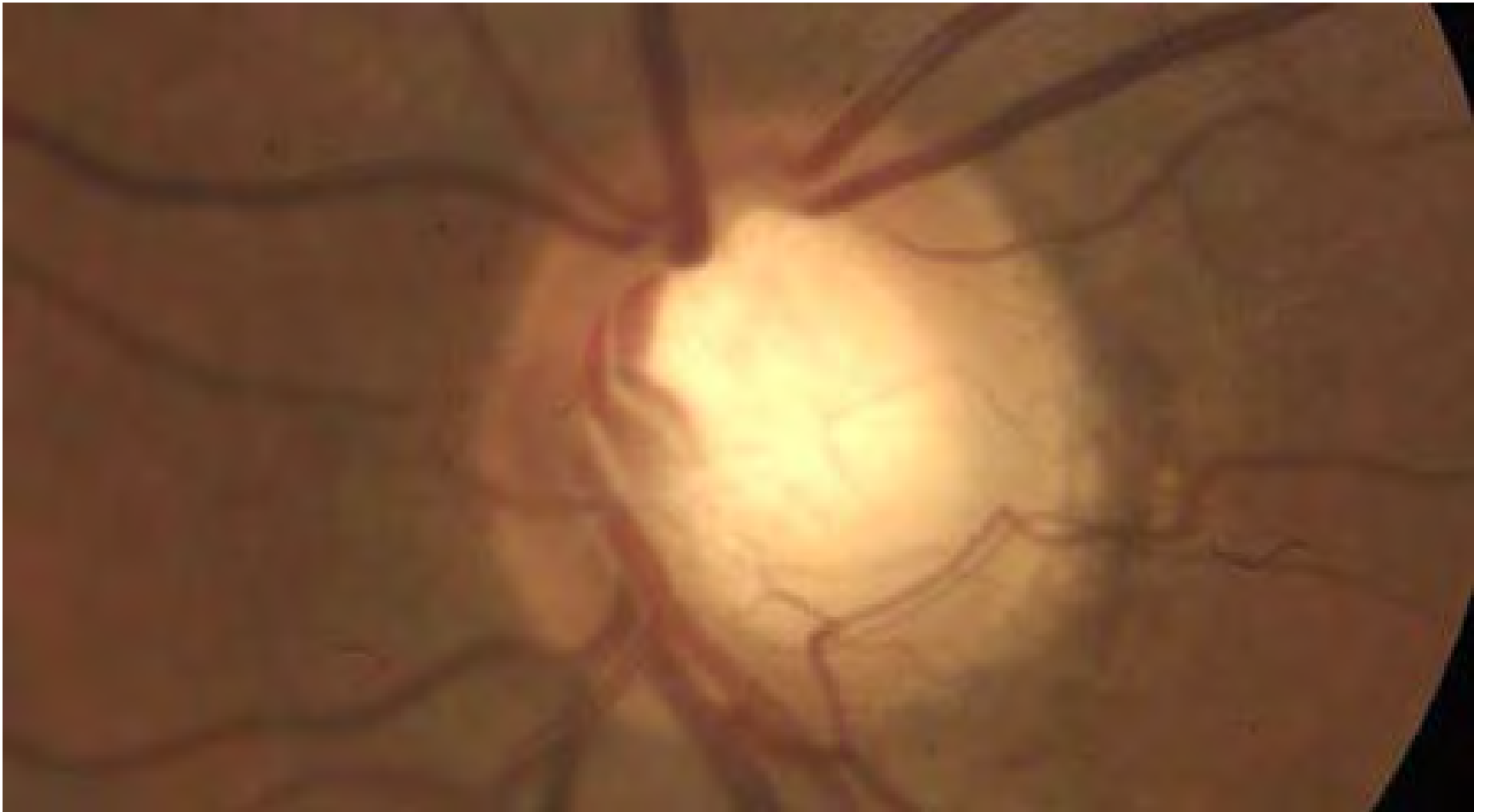
Patient (cont'd)

- DM for 5 years
- Metformin
- No history of eye disease/surgery/trauma
- Recently prescribed medication for nausea-not sure of medication and not sure why nausea is occurring

Any Ideas on What is Causing Patient's Symptoms?

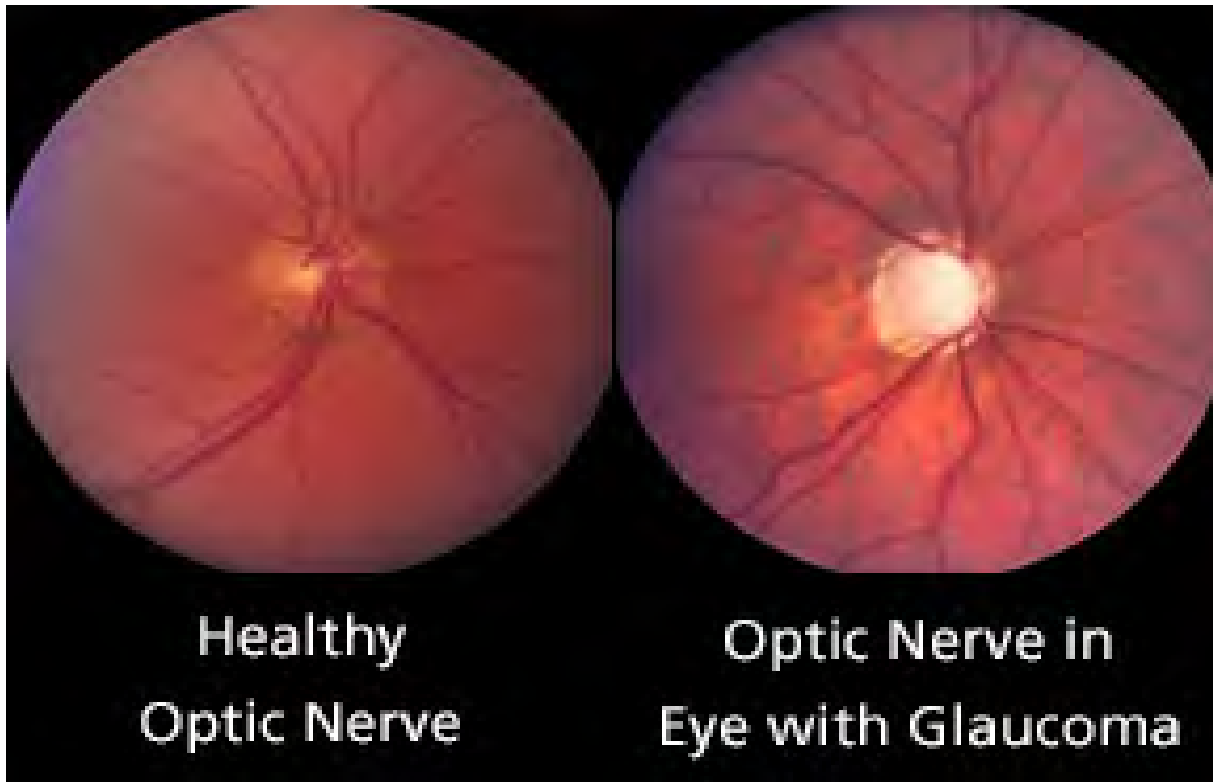


Optic Nerve (not our patient but representative of appearance) OU



Glaucoma

- **Glaucoma is a group of eye disorders leading to progressive damage to the optic nerve**
- **Characterized by loss of nerve tissue resulting in loss of vision**



Glaucoma (Cont'd)

- The most common form of glaucoma, primary open-angle glaucoma, develops slowly and usually without any symptoms
- It initially affects peripheral vision, but can advance to central vision loss; no symptoms
- If left untreated, glaucoma can lead to significant loss of vision in both eyes, including blindness
- In normal-tension glaucoma, eye pressure remains within what is considered to be the “normal” range, but the optic nerve still undergoes damage

Acute Angle Closure

A medical emergency that can cause vision loss within a day of its onset

Many people who develop this acute rise in IOP have a narrow angle

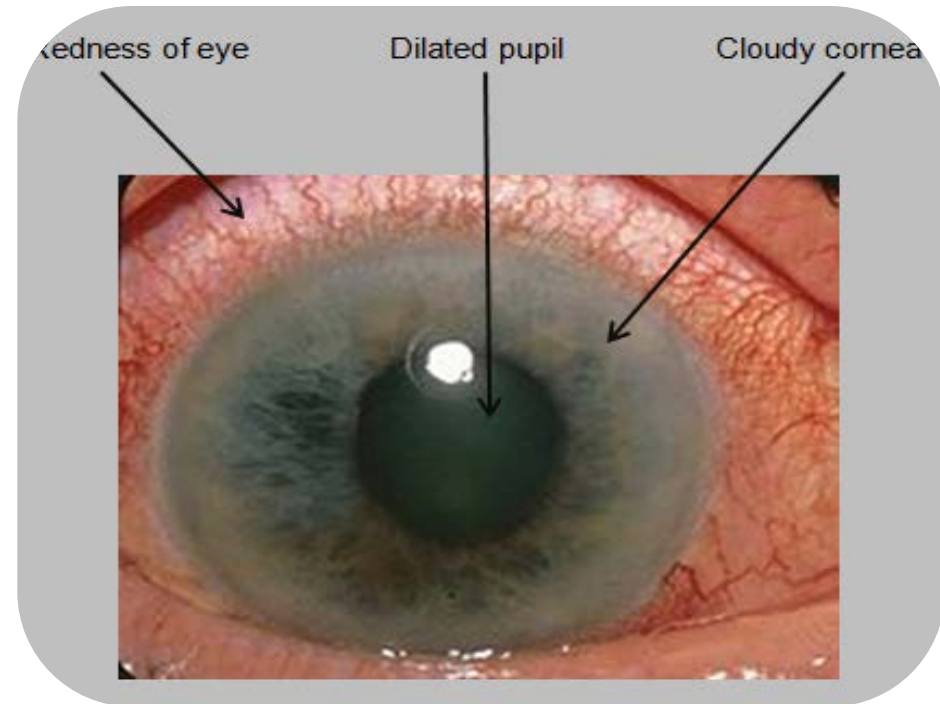
Needs to be classified as pupillary or non-pupillary block

Can be primary or secondary



Clinical findings

- Red eye
- Corneal edema
- Mid-dilated pupil
- Aqueous cell and flare
- Shallow anterior chamber
- IOP > 45 mmHg
- Haloes around lights
- Blurred vision /
Photophobia
- Eye pain
- Nausea and vomiting
- Headache



- **Headache: may receive medications for migraines or an evaluation for a subarachnoid hemorrhage**
- **Vomiting and abdominal pain that can be misdiagnosed**
- **Precipitating factor include sympathomimetics, anticholinergics, antidepressants, anticonvulsants, sulfonamides, cocaine, botulinum toxin, dim light, and rapid correction of hyperglycemia**
- **Has been associated with carotid-cavernous sinus fistula, trauma, prone surgical positioning, and giant cell arteritis**

Epidemiology

Family history of angle closure

Advancing age

Female gender

Asian or inuit descent

Shallow anterior chamber depth

Shorter axial length

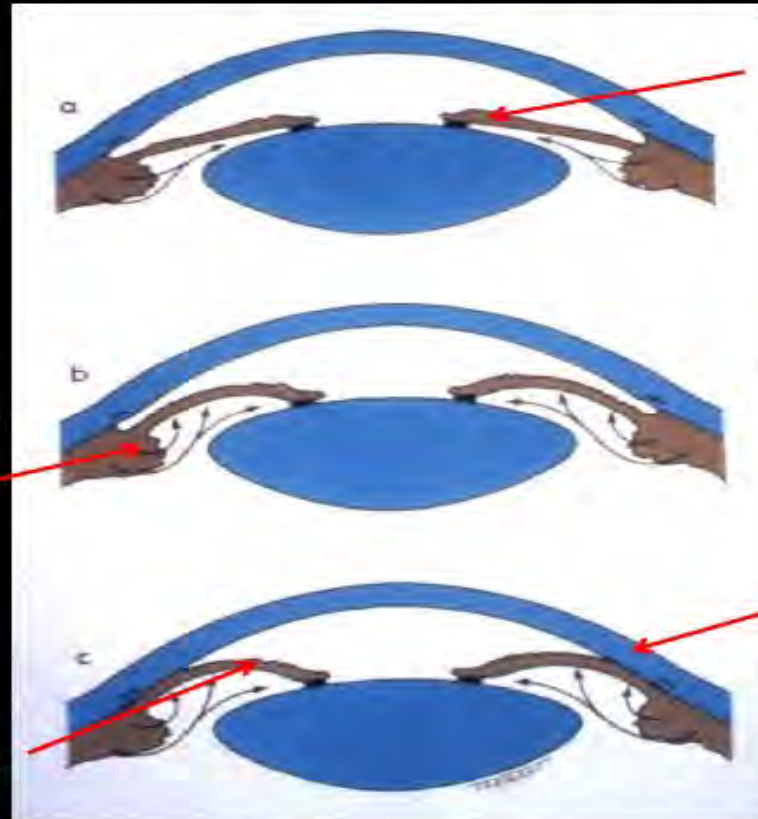
Thicker lens

Hyperopia

Angle Closure: Pupillary Block

CAN BE ACUTE, CHRONIC OR INTERMITTENT

PHYSIOLOGICAL PUPILLARY BLOCK



1. Iris has large arc of contact with anterior surface of lens

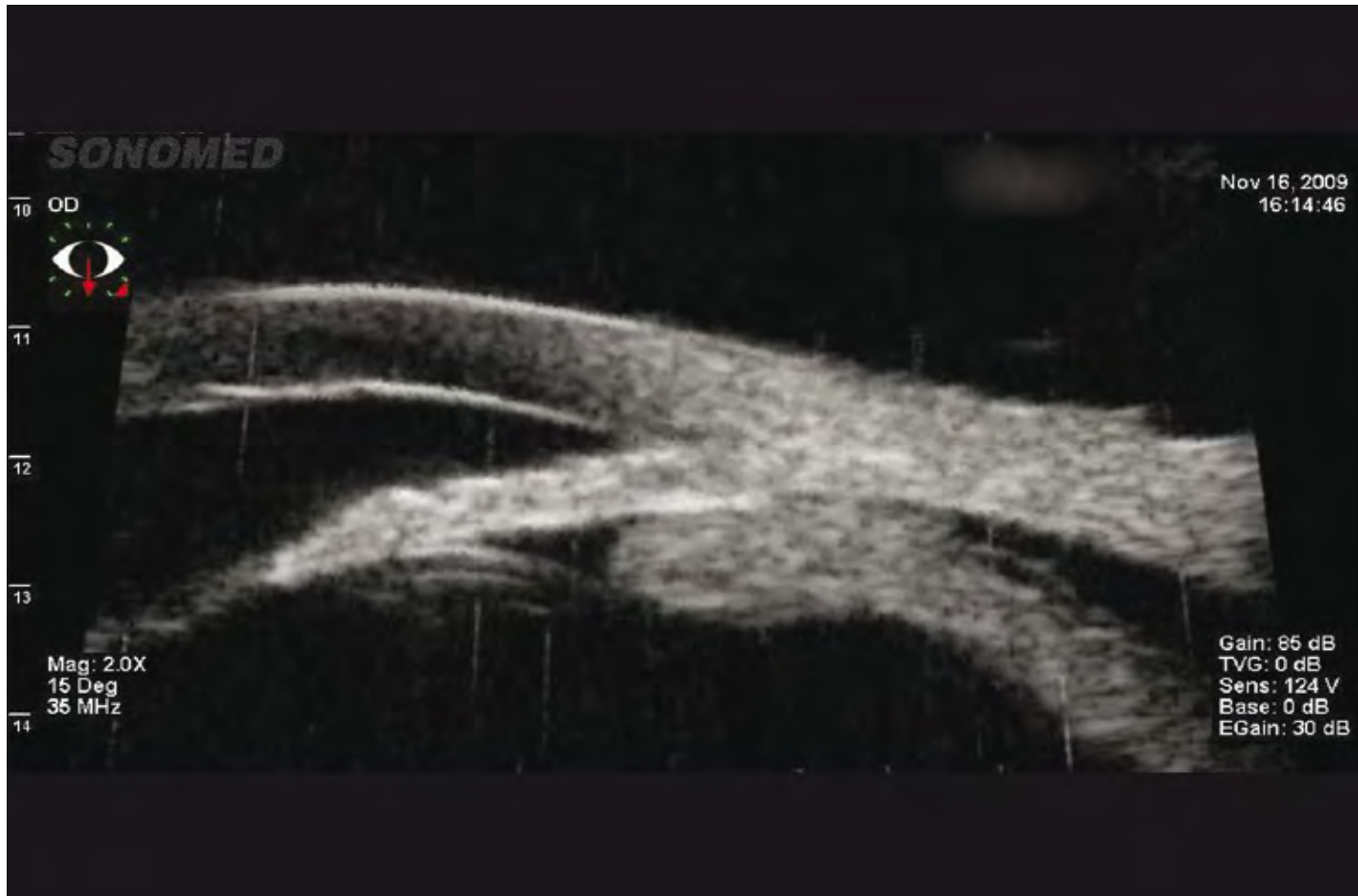
2. Resistance to aqueous flow from posterior to anterior chamber (*relative pupil block*)

3. Pupil dilates, peripheral iris becomes more flaccid and pushed anteriorly

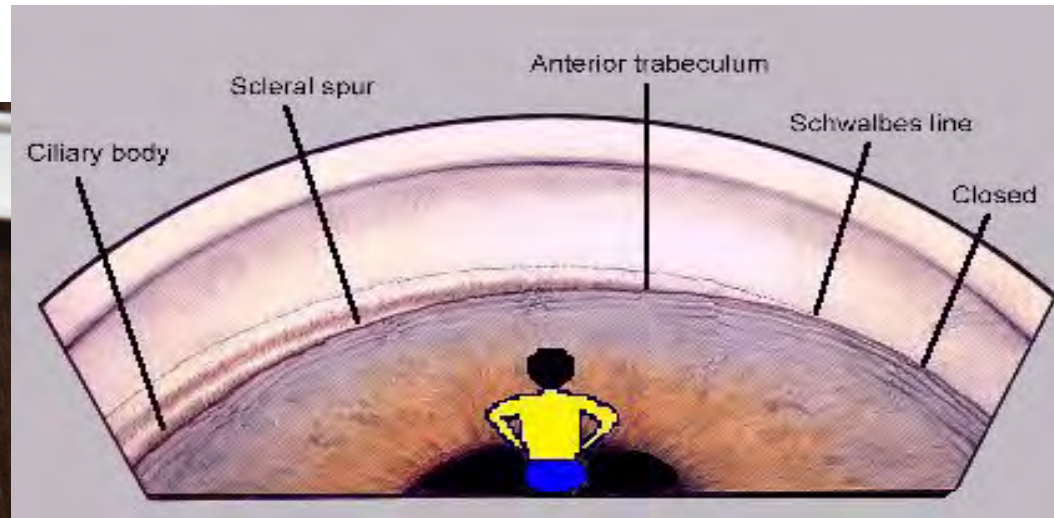
4. Iris lies against trabecular meshwork → impede aqueous humor drainage → ↑ IOP

Non-Pupillary Block Angle Closure

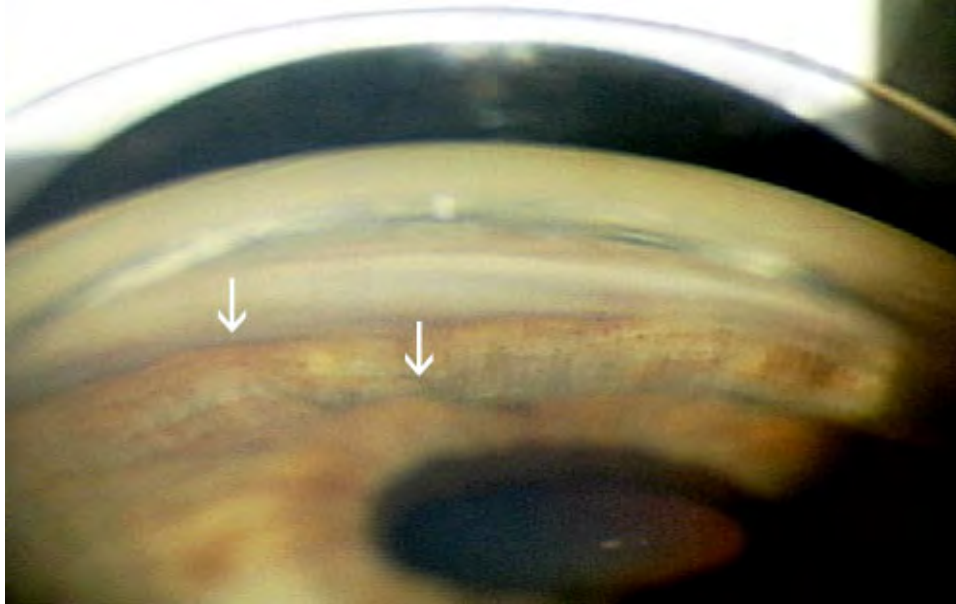
35% of patients have angle closure that is not caused by pupil block



Gonioscopy



Plateau Iris



Secondary Angle Closure Without Pupillary Block

- Anterior pulling mechanism
 - Contraction of fibrovascular membranes on the iris and in the angle in neovascularization
 - Peripheral iris is pulled against the trabecular meshwork
- Posterior pushing mechanism
 - Choroidal detachment
 - Peripheral iris is pushed against the trabecular meshwork

In Office Management

- **History**
 - Eliciting evidence of prior attacks
 - Family history of ACG
 - Hyperopia
- **Penlight shadow test**
 - May appear open centrally in non-pupillary block
 - Iris is mid-dilated secondary to ischemia to the iris sphincter muscle
 - Check other eye
- **Tonometry**
 - Tonopen
 - Fingertensions

Management

- **500 mg acetazolamide orally (not Sequel)**
- **One drop of 0.5% timolol topically**
- **One drop of 2% pilocarpine topically (no higher than 2%)**
- **One drop of 1% apraclonidine topically**

Check IOP readings every 15-30 minutes

If the attack is not broken 1 hour after institution of treatment, oral hyperosmotics may be administered along with repeating all topical medications

Management (Cont'd)

- **When patient is not nauseated or vomiting, oral hyperosmotics can be administered**
 - **50% glycerin (Osmoglyn): 1.5 mg/kg body weight**
 - **45% isosorbide (Ismotic): equal dose for diabetics (not metabolized)**
 - **best tolerated served over crushed ice in 5 minutes time**
- **Can be fatal in patients with cardiac or kidney disease due to high fluid volumes within the vessels; increased effect if given IV**

Management (cont'd)

- **Diamox is most commonly used oral CAI**
 - **should be avoided in patients with kidney disease: 100 mg of neptazane**
 - **an antiemetic suppository may be used with oral medications**
- **CAI are sulfa meds-should be avoided in those allergic to sulfa meds**
- **When patient is nauseous, 500 mg of diamox can be given IV**

- **When an attack is unbroken after 2 hours, the patient should have argon (or diode) laser gonioplasty**
 - **in-office procedure using relatively large spots of low energy to slightly shrink areas of the iris to pull them away from the angle**
- **If the patient is still in angle closure 4-6 hours after initiation of treatment, emergency LPI or surgical iridectomy should be attempted**
- **When the IOP falls to 20 mm Hg or below, gonioscopy should be performed to confirm that the angle is open**

- **When attack can be broken medically, patient should be maintained on 2% Pilo QID OU and 1% Pred Forte QID in the affected eye**
- **Beta blocker BID OU is also commonly used to decrease aqueous production**
- **Customary to wait 2-7 days for LPI so cornea and AC can clear**
- **LPI that are patent 6 months later typically remain so**

Carbonic Anhydrase Inhibitors

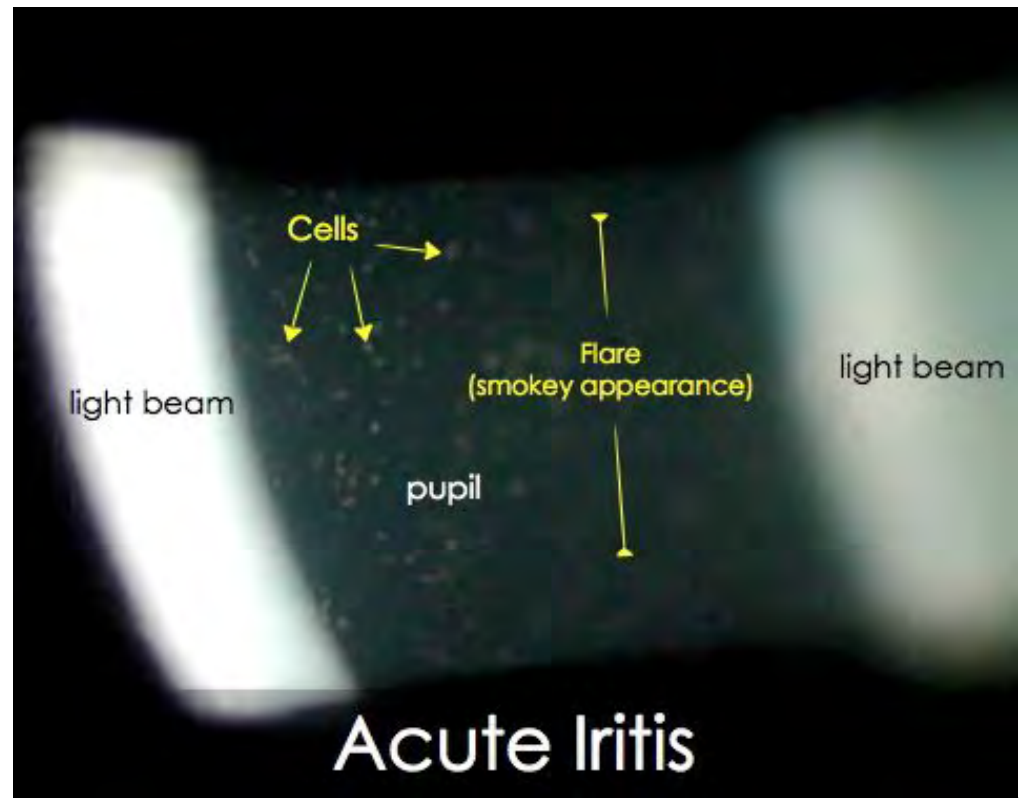
- **Decrease aqueous production**
- **Use in caution in diabetics, those with COPD, Addison's Ds. liver disease and sickle-cell ds./trait**
- **Lower potassium levels**
- **Can give additional 250 mg after one hour**

Pilocarpine

- **Firms the peripheral iris and pulls it away from TM**
- **Should not use concentrations greater than 2%**
- **Normal blood flow does not return to iris sphincter until IOP is reduced to 40 mm Hg**
- **1 gtt every 15-60 minutes up to a total of 2-4 doses**
- **Pre-disposed fellow eye should remain on 2% Pilo until prophylactic LPI is performed in primary pupillary block AC except in conditions associated with weakened zonules, etc.**

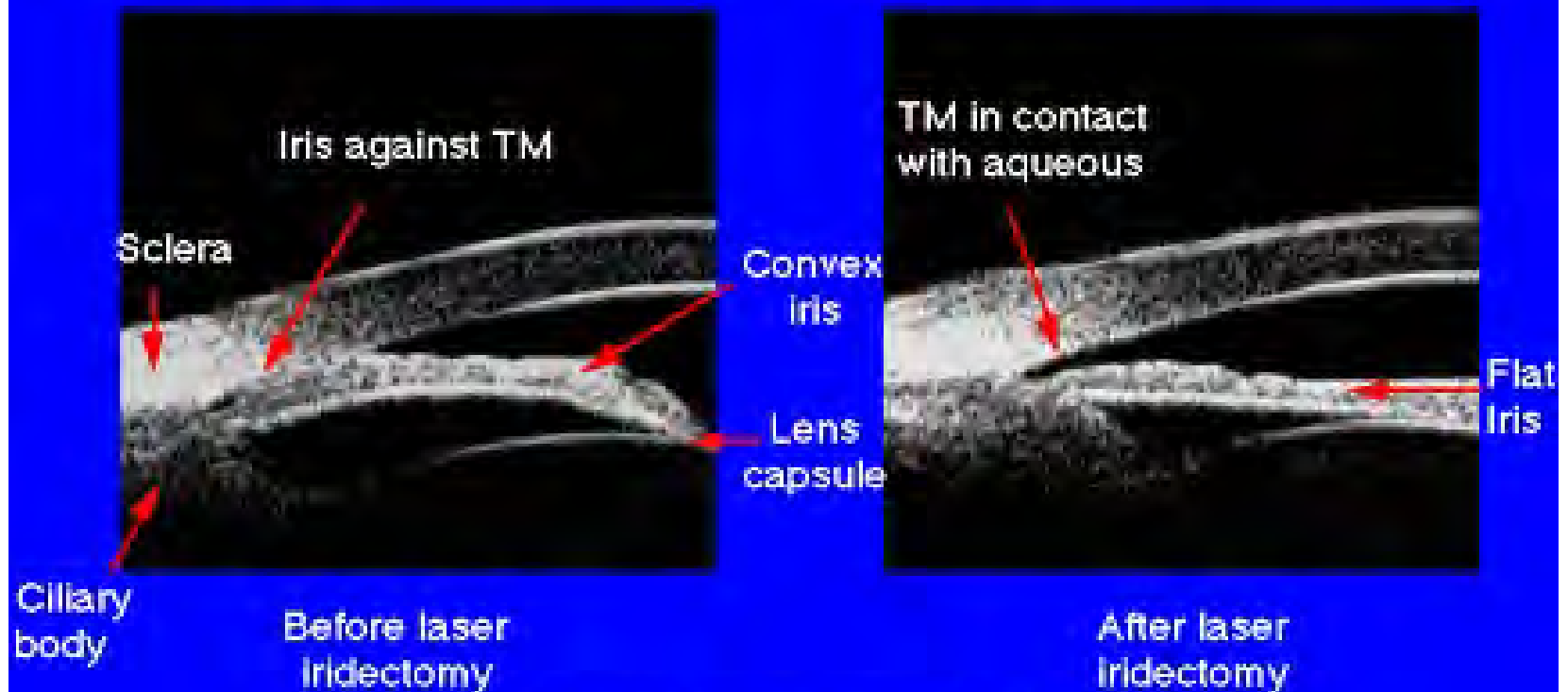
Topical Steroids

- Used once attack is broken medically
- 1 gtt Prednisolone Acetate (Pred Forte) four times a day until the LPI is performed and/or inflammation is under control
- monitor IOP
- Taper



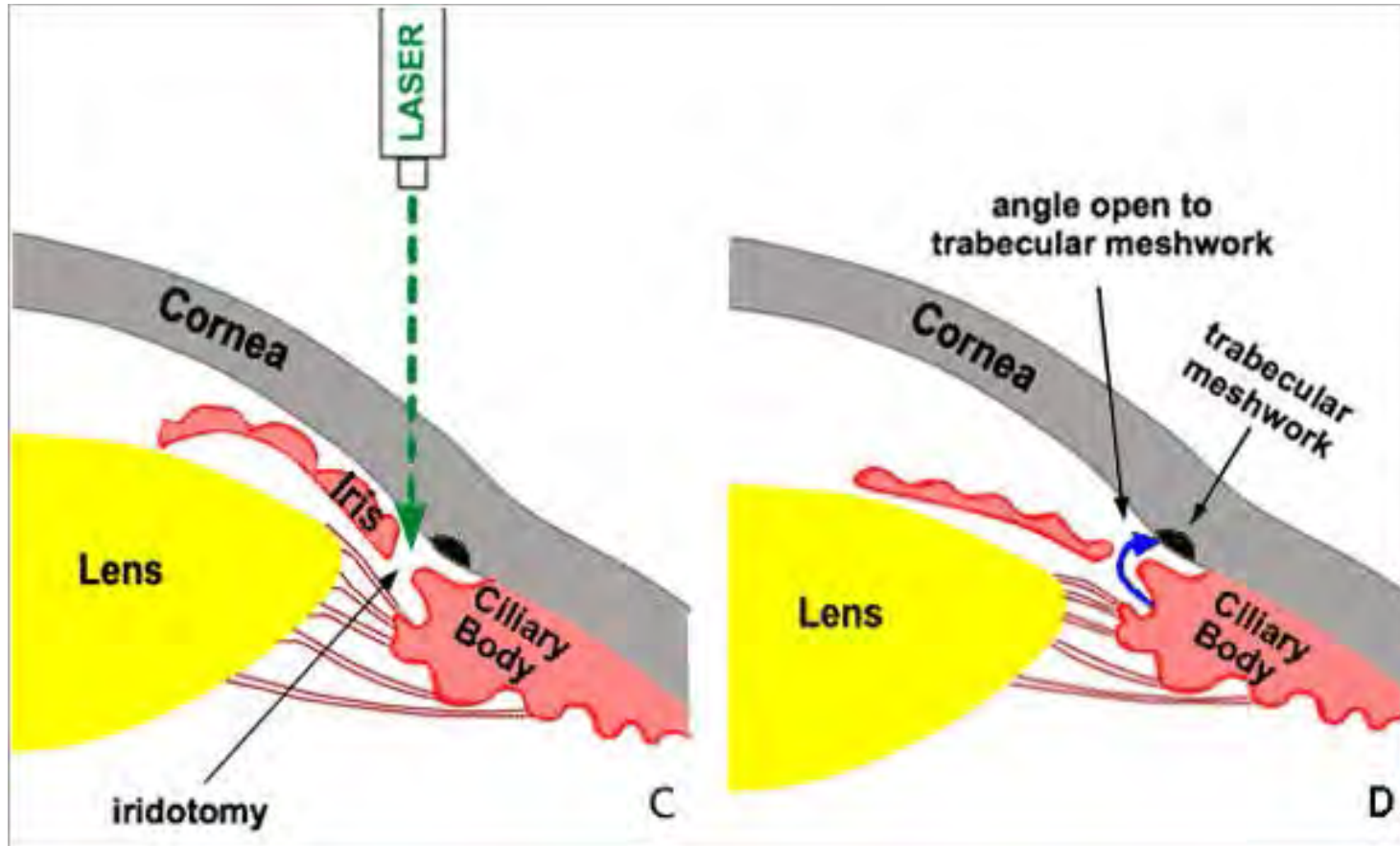
Laser Peripheral Iridotomy

Angle Closure due to Relative Pupillary Block

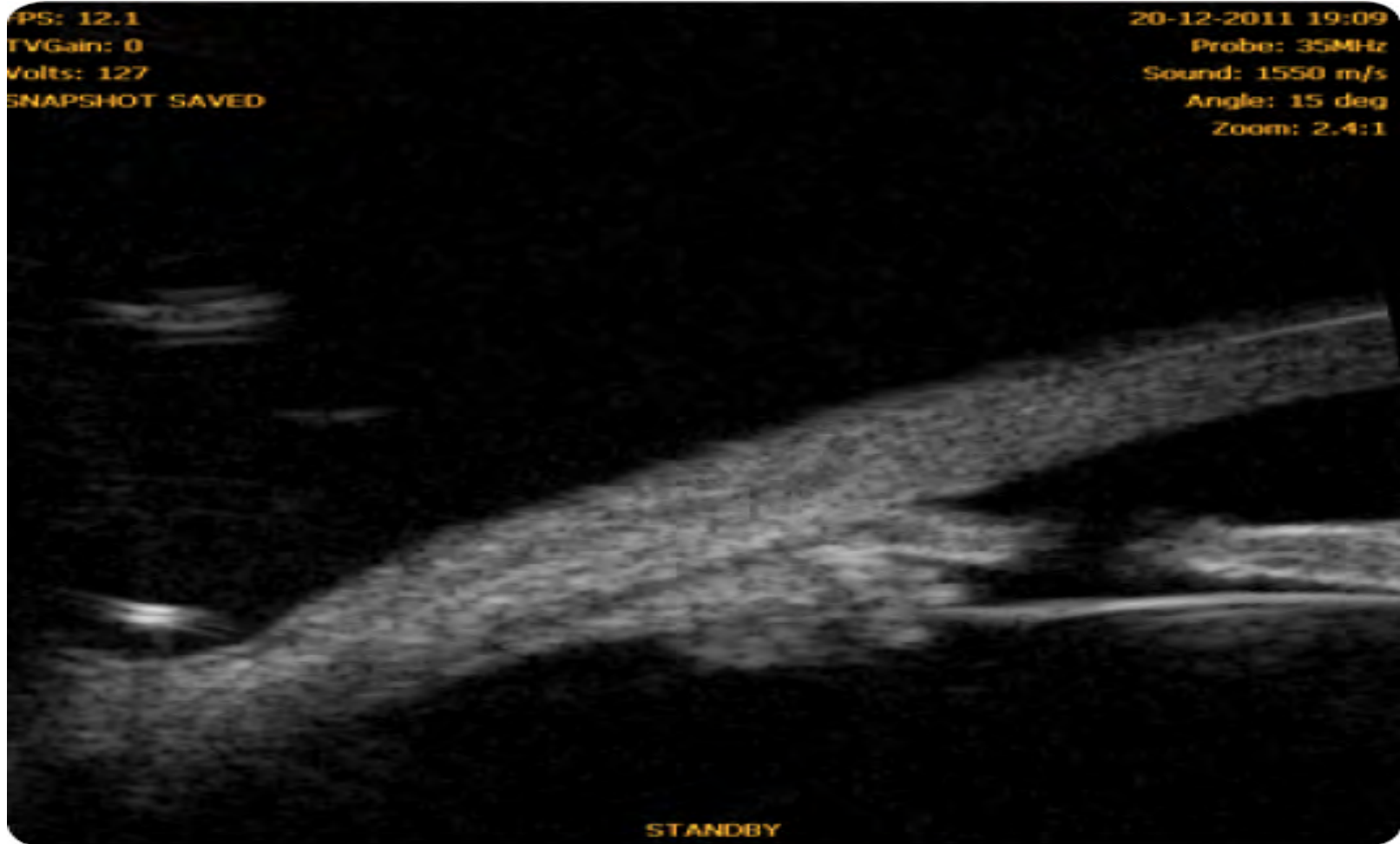


NYEEI, Ocular Imaging Center

Laser Peripheral Iridotomy(cont'd)



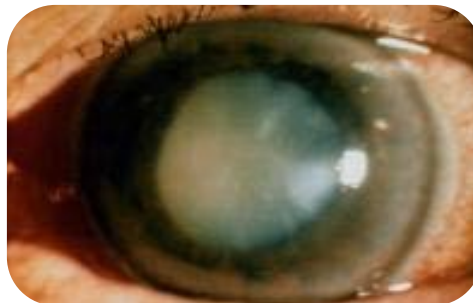
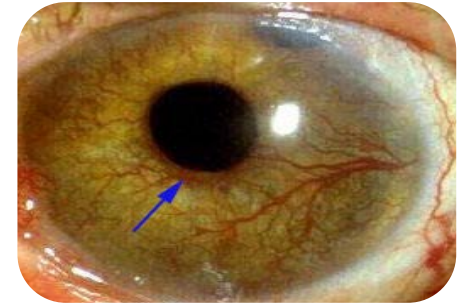
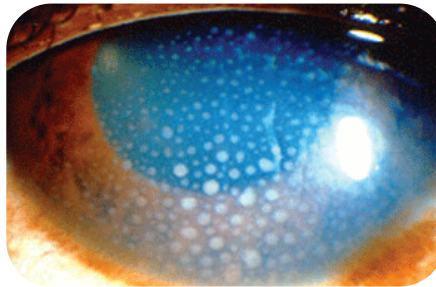
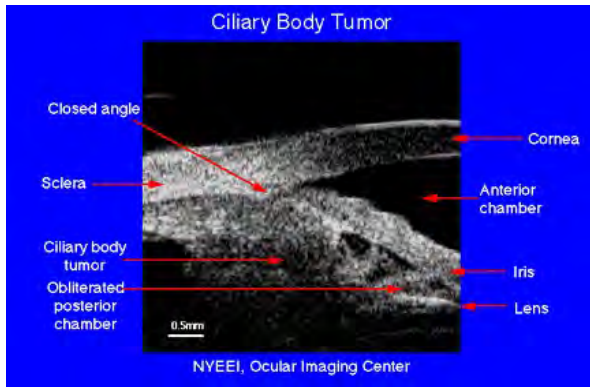
Laser PI In Non-pupillary Block



Secondary Causes

**Tumors of the CB and/or Iris (pupillary or non-pupillary Block
Inflammatory (pupillary or non-pupillary Block) Neovascular Pupillary or
non-pupillary block)**

Lens Induced (pupillary or non-pupillary block)



Clinical Pearls

- **African Americans tend to have fewer symptoms during acute angle closure**
- **Subacute/intermittent attacks tend to increase over time**
- **Level of pain is associated with rapid rise in IOP rather than absolute level of the IOP increase**
- **Betaxolol (Betoptic S) should be used in patients with pulmonary contraindications**

Back to Our Patient

Patient was sent for LPI OU

Patient was taken off ant-nausea medication

Patient considering cataract surgery

QUESTIONS?

mvitek@salus.edu

