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PRIMARY ANGLE CLOSURE GLAUCOMA

D. Dx of Visual Loss

Painful

- Acute Angle Closure Glaucoma
- Neovascular Glaucoma
- Lens Induced Glaucoma
- Endophthalmitis / Panophthalmitis
- Optic Neuritis
- Anterior Uveitis
- Temporal Arteritis
- Trauma

Painless

- Cataract (Except LIG)
- Primary Open Angle Glaucoma / NTG
- Central Retinal Vein Occlusion
- Central Retinal Artery Occlusion
- Retinal Detachment
- Vitreous Hemorrhage
- Macular Degeneration

At the end of this presentation, you must be able to answer these

Learning objectives

- Discuss
  - Stages of PACG
- Discuss
  - Etiology, clinical features, investigation and management of Acute angle closure.

Introduction

- Half of glaucoma related blindness is due to primary angle closure glaucoma (PACG)
- PACG was thought to be acute & symptomatic until majority of cases were found to be chronic & asymptomatic

Quigley HA et al. the number of people with glaucoma worldwide in 2010 and 2020. Br J Ophthalmol. 2006;90:262-7.

- Acute attacks are extremely distressing but transient
- It does not cause permanent loss of vision in many (60-75%) if treated appropriately *

*Aung T et al. the visual field following acute primary angle closure. Acta Ophthalmol Scand 2001;79:298-300.

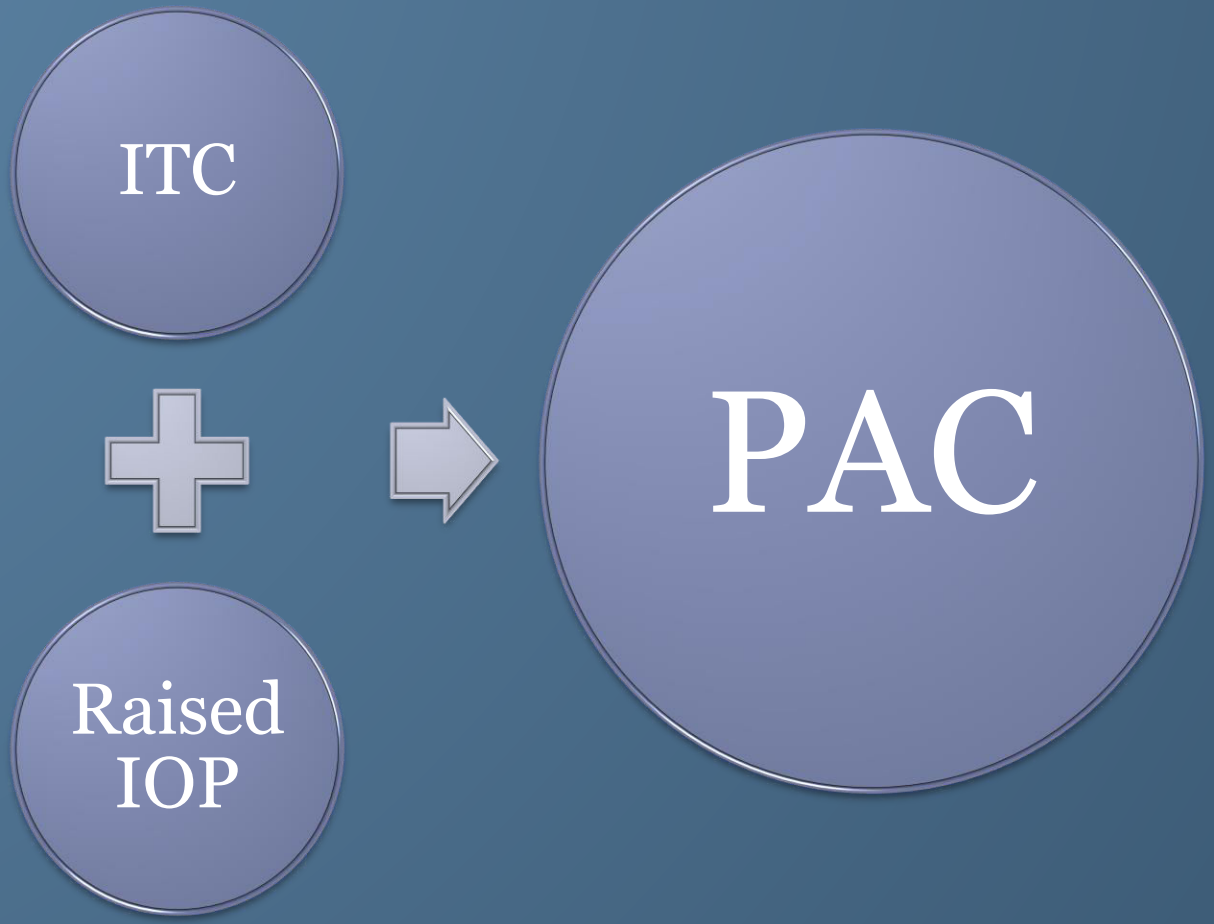
Classification

- Based on natural history of angle closure

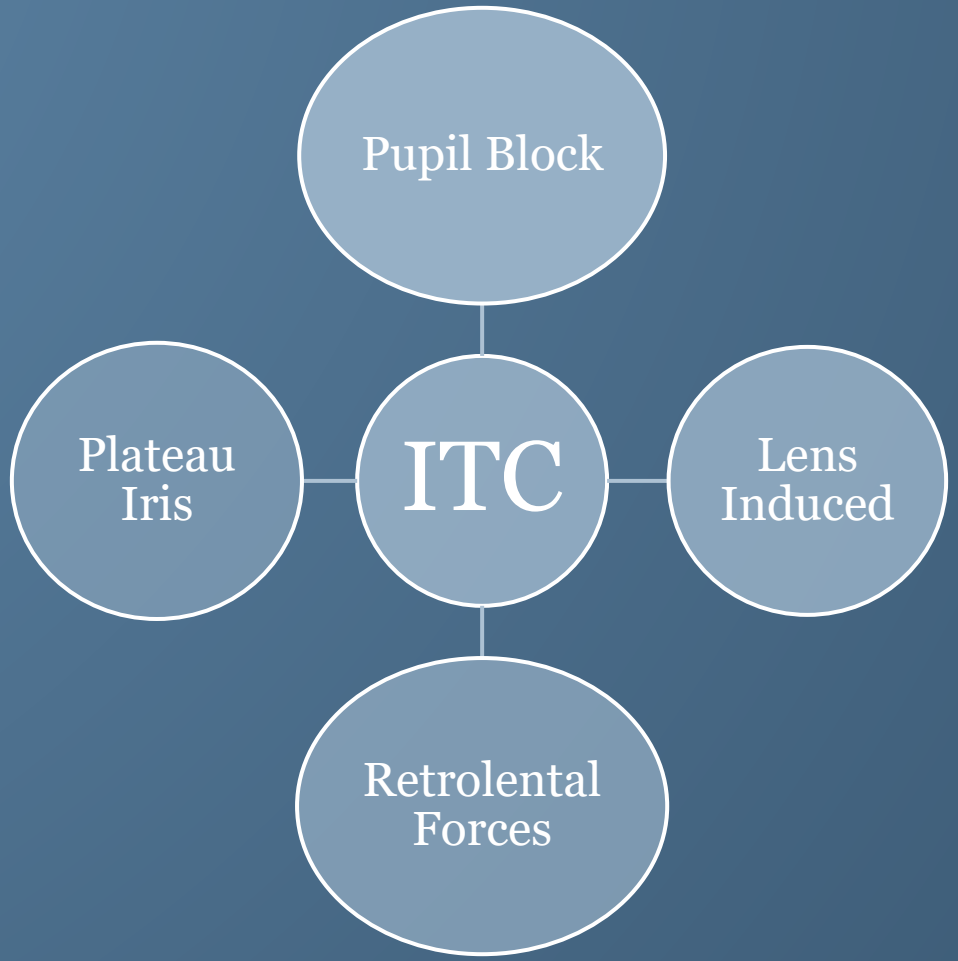
Stage	Definition
Primary angle closure suspect (PACS)/occludable angles	Iridotrabecular contact (ITC) with normal optic disc, IOP & fields. No PAS. Asymptomatic
Primary angle closure (PAC)	ITC + either raised IOP, PAS or typical symptoms
Primary angle closure glaucoma (PACG)	ITC + structural glaucomatous optic disc changes or glaucomatous visual field loss

Primary Angle Closure Suspect

Mechanism



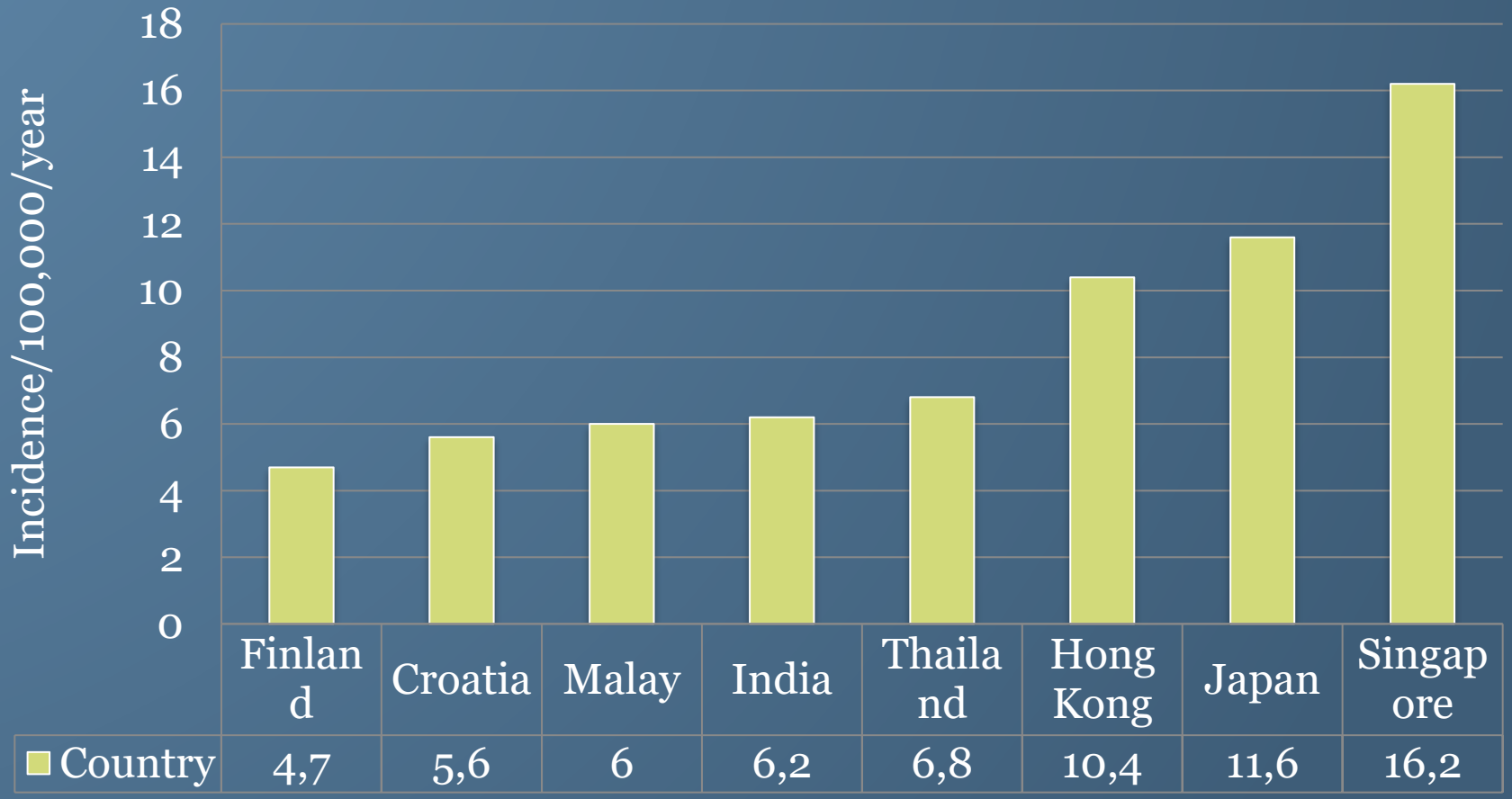
Iridotrabecular contact



Raised IOP

1. Iridotrabecular contact (ITC)…symptomatic angle closure
2. Prolonged appositional ITC leading to PAS
3. Prolonged ITC degrading trabecular meshwork architecture

Incidence (PAC)



Precipitants

- Pharmacological mydriasis…most common recognized event
- Long indoor stay in unpleasant weathers

- Medicines
  - Oral or nebulized ipratropium bromide & salbutamol
  - Tricyclic antidepressants (amitriptyline)
  - SSRI (Paroxetine & Citalopram)
  - Anticholinergic for bladder instability
  - Cold and flu remedies
  - Topiramate

Drug induced angle closure mechanisms

Pupil block	• Anticholinergic (Ipratropium, antihistamine) • Adrenergic • Salbutamol, Naphazoline • TCA, SSRI
Lens-iris diaphragm	• Pilocarpine • Heparin
Choroidal effusion	• Topiramate • Acetazolamide

Risk Factors

- Older age
- Female gender
- Asian parentage
- Singapore Island-wise study*:
  - Female (RR=2.4)
  - Chinese ethnic origin (RR=2.8)
  - Age $\geq$ 60 years (RR=9.1)

*Seath SK et al. Incidence of acute primary angle closure glaucoma in Singapore. An Island-wise survey. Arch Ophthalmol 1997;115:1436-40.

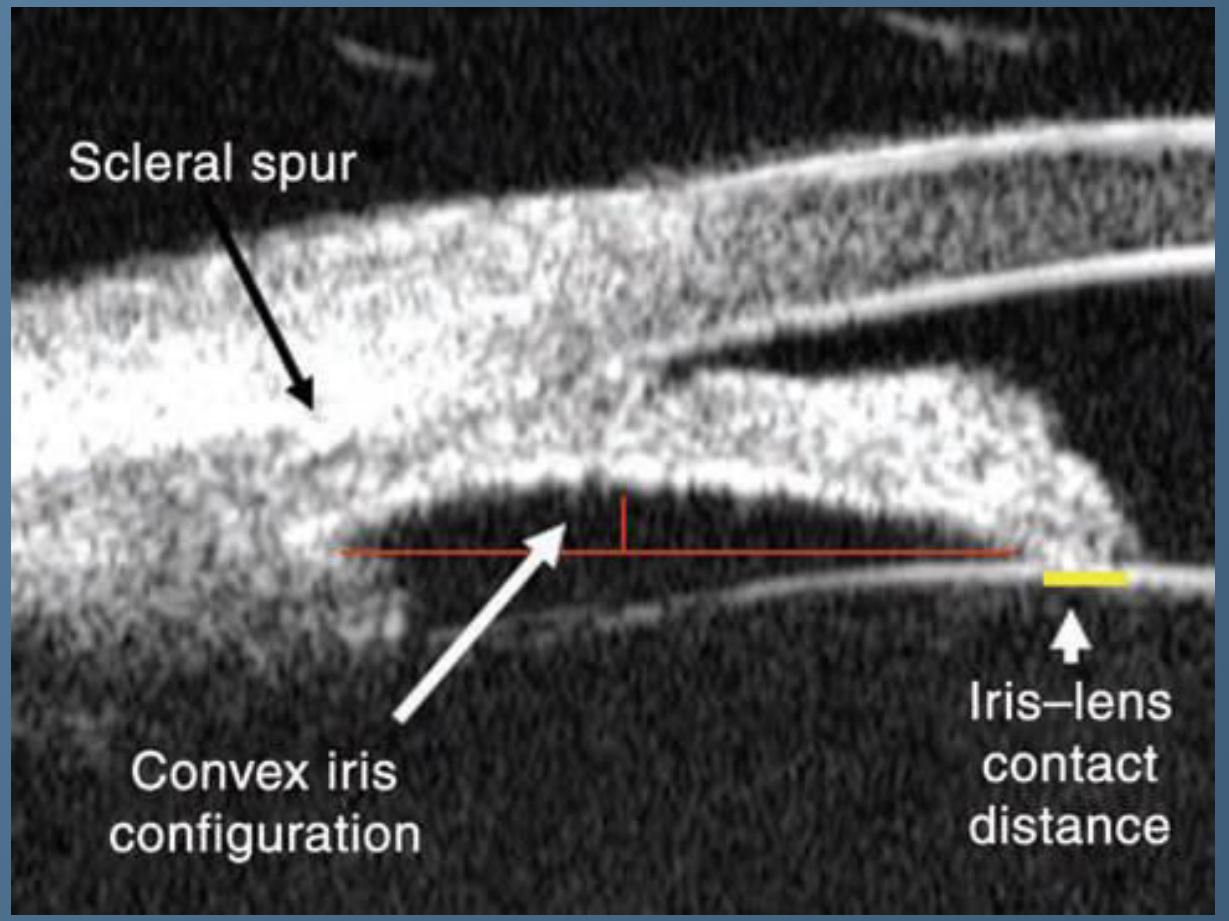
Ocular Risk Factors

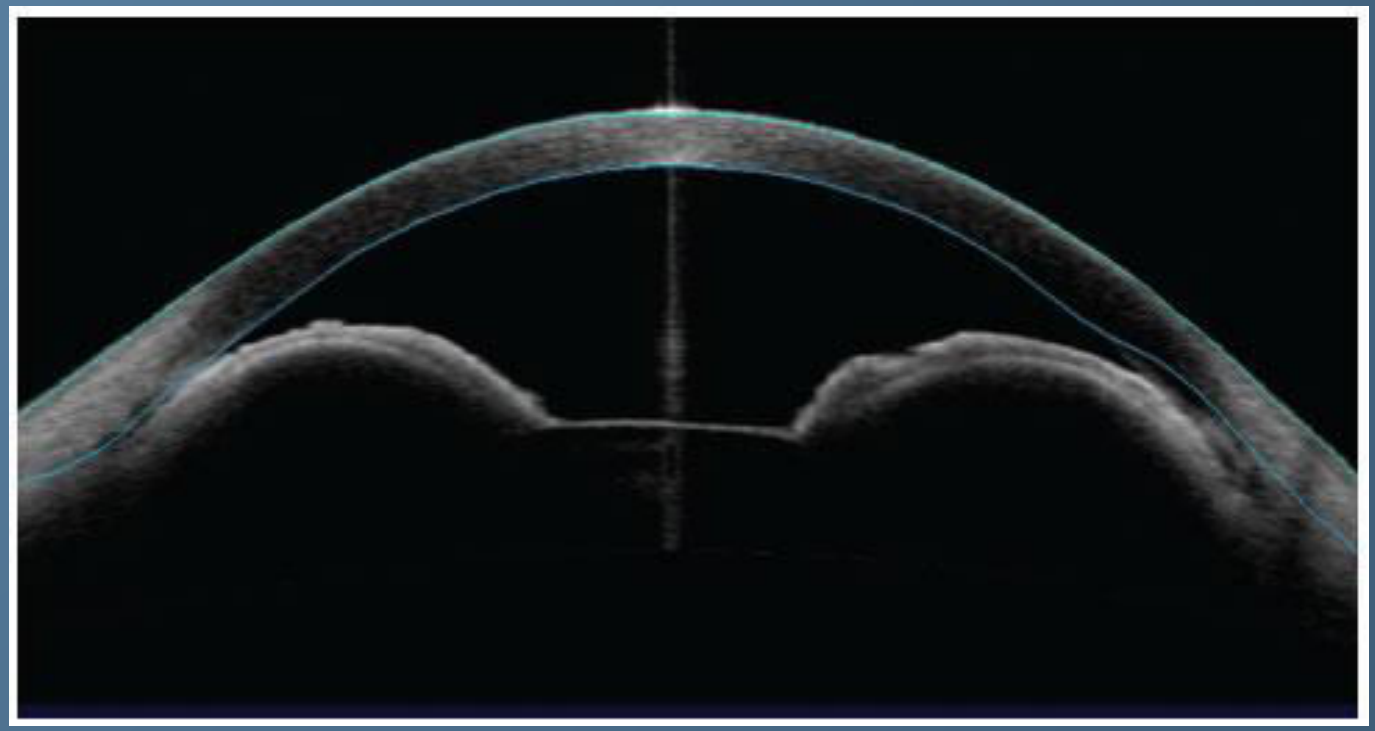
1. Axial length of the globe
   - Shorter axial length
2. Anterior chamber depth
   - Shallow AC
   - Limbal depth of AC is a stronger indicator than axial length
3. Lens position and thickness
   - AC depth is affected by lens

Diagnosing & Testing

- Reference standard… Gonioscopy
- Provocation tests
  - Dark room
  - Pharmacological mydriasis
  - Face-down posture

- Imaging
  - Ultrasound biomicroscopy
  - Anterior segment OCT


Scleral spur
Convex iris configuration
Iris–lens contact distance



Clinical features (Acute attack)

Symptoms

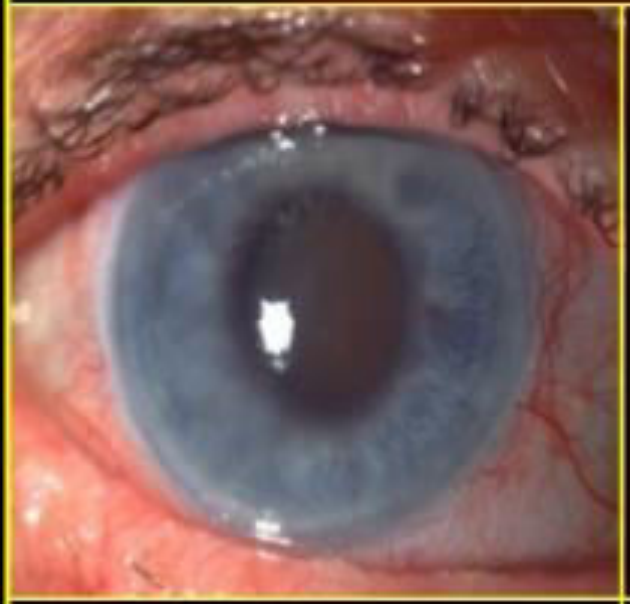
- Ocular pain
- Red eyes
- Headache
- Haloes around light
- Abdominal pain

Signs

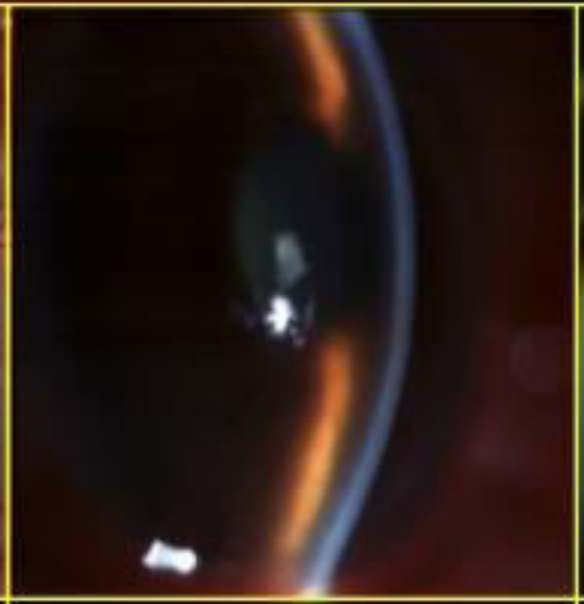
- VA reduced
- Conjunctival hyperemia
- Shallow AC and flare
- Corneal edema
- Mid-dilated pupil
- IOP very high

Acute congestive angle-closure glaucoma

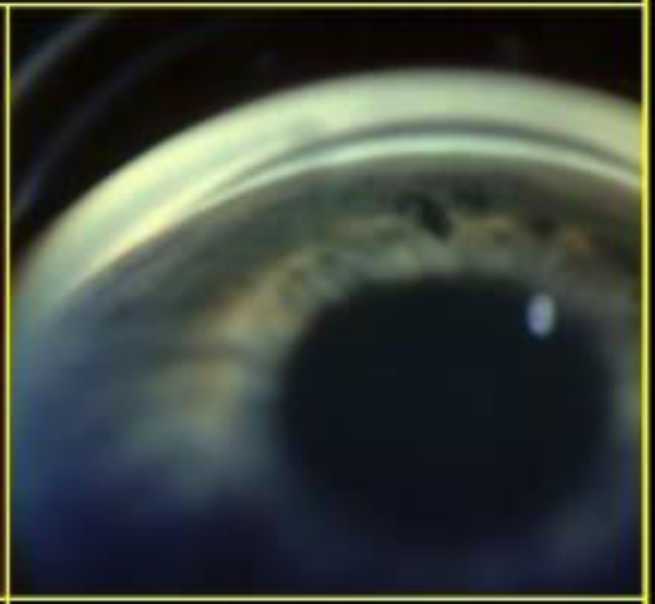
Signs



- Dilated, unreactive, vertically oval pupil



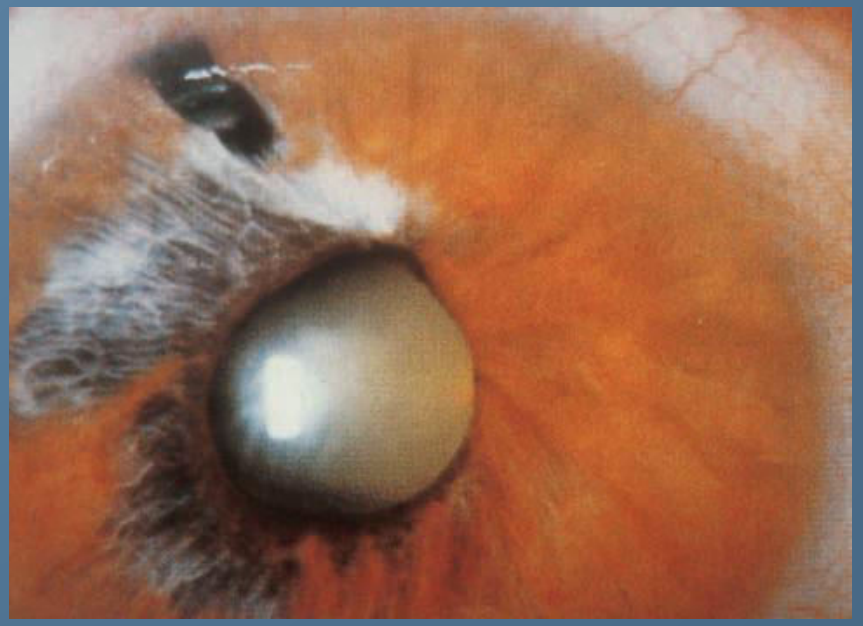
- Shallow anterior chamber

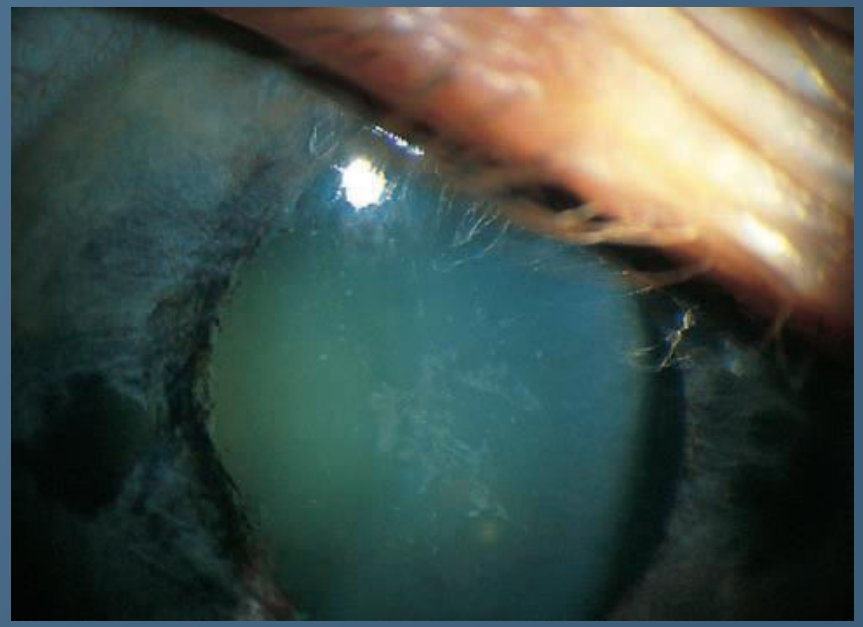


Complete angle closure (Shaffer grade 0)

PACG

- VA normal unless advance damage
- Shallow AC
- Glaukomflecken
- Iris atrophy and PAS
- Peripapillary RNFL loss (4 months)
- Corneal endothelial cell count decreased
  - Raised IOP
  - Toxicity from medicines

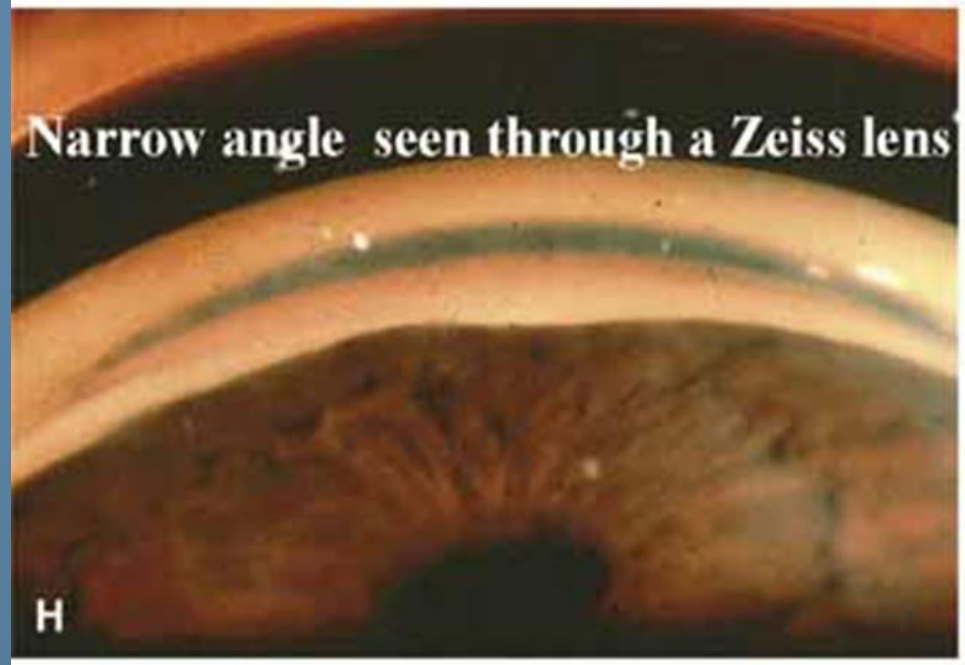


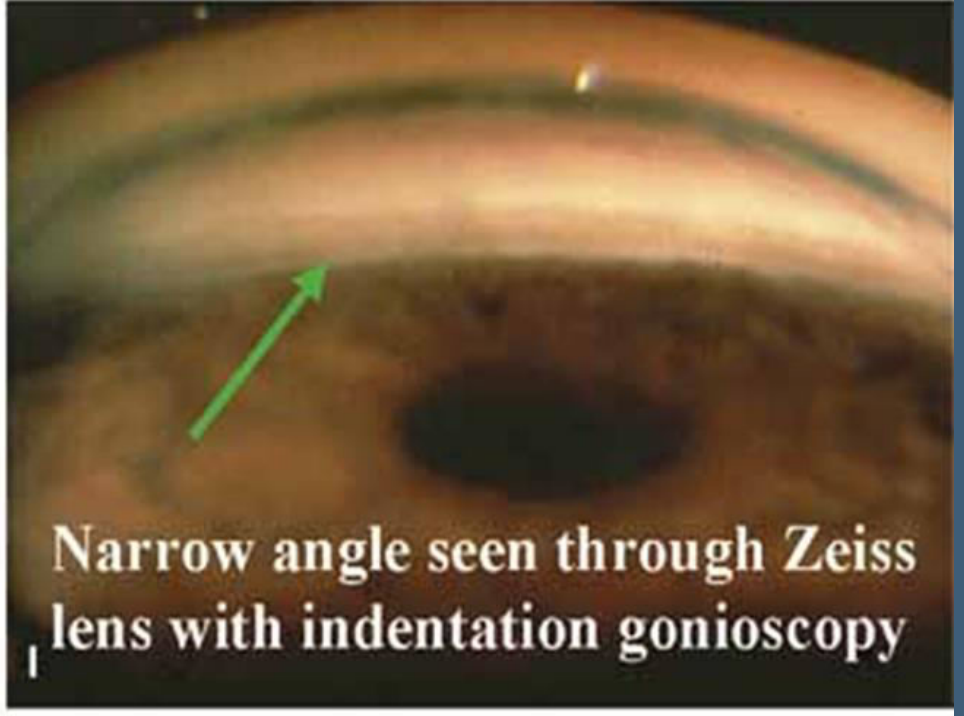


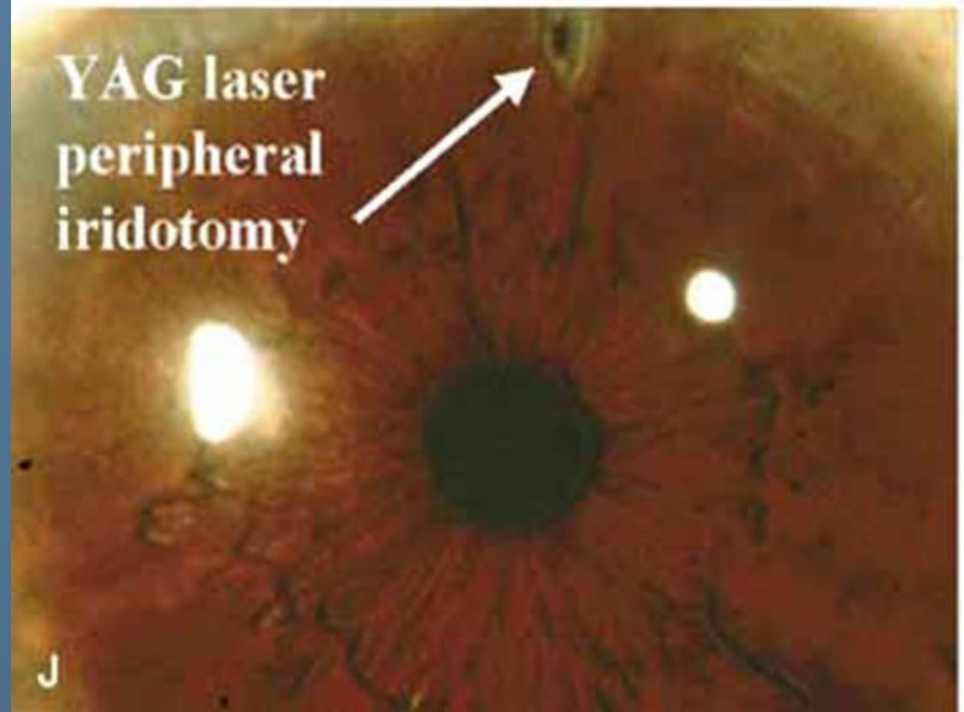
Treatment

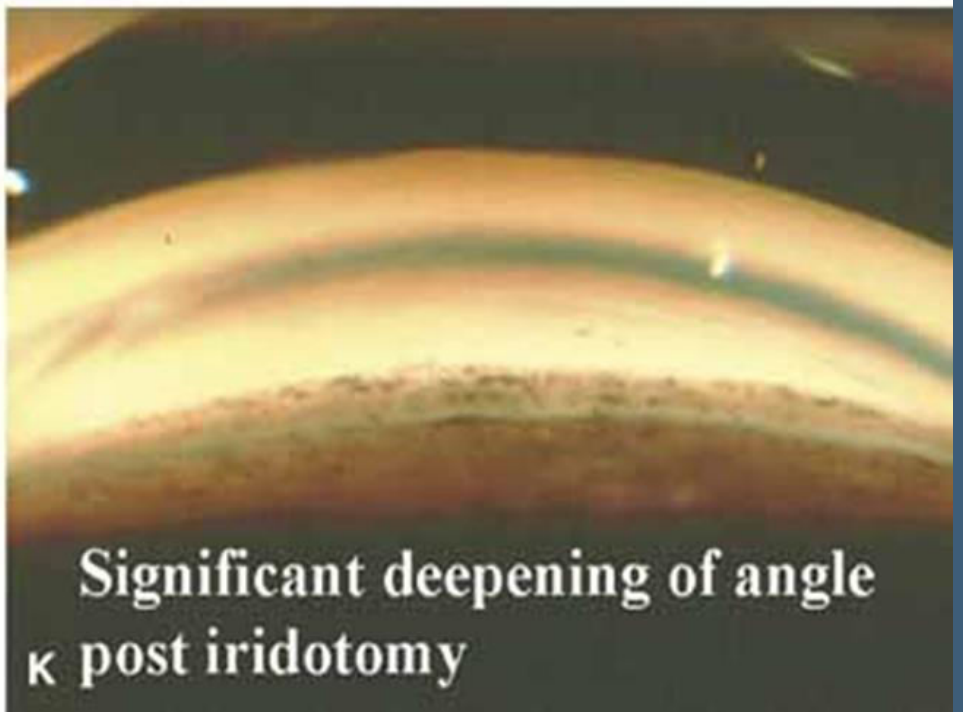
PACS

- Aim
  - To prevent pupillary block
  - Widening of the angles
- Laser iridotomy (the most effective Tx)
- Laser iridoplasty
- Lens extraction if visually significant cataract


Narrow angle seen through a Zeiss lens
H


Narrow angle seen through Zeiss lens with indentation gonioscopy
I


YAG laser peripheral iridotomy
J


Significant deepening of angle post iridotomy
K

Acute Angle Closure

- Emergency
- Intravenous Mannitol / Acetazolamide
- Oral glycerol
- Oral painkillers
- Topical
  - IOP lowering drugs
  - Alpha agonists, beta blockers, CAIs, PGAs, Miotics
  - Glycerol
- Always treat the fellow eye with YLI

Primary angle closure glaucoma

- Low threshold for cataract surgery
- Laser iridotomy for pupillary block
- YLI not effective in synechial angle closure
- Medical agents
  - Same for POAG
  - Prostaglandin analogues outperform b-blockers in PACG*

*Chew PTK et al. Efficacy of latanoprost in reducing intraocular pressure in patients with primary angle closure glaucoma. Surv Ophthalmol 2002;47(Suppl. 1):S125-8

- Surgery:
  - Cataract extraction with synechialysis
  - Trabeculectomy… alone or combined with cataract Sx
  - Glaucoma drainage devices

Prognosis

- Depends on stage of disease
- Untreated:
  - One eye of 33-75% of affected goes blind
  - While 11-27% in Open angle glaucoma
- Earlier stage
  - 75-80% effectively treated with laser iridotomy
  - YLI prevents long-term IOP rise in 90%

Ang LP et al. Acute primary angle closure in an Asian population. Long-term outcome of the fellow eye after prophylactic laser peripheral iridotomy. Ophthalmology 2000;107:2092-6.

Summary

- PACG is rapidly blinding if untreated
- YLI is an effective treatment in early stages

Take home message

- Never forget to treat the fellow eye

Any Questions?

MCQ 1

- A 52 years female presented to emergency with sudden painful visual loss in her right eye. The eye looks congested with hazy cornea and mid dilated pupil. The IOP of that eye is 56 mm of Hg. She denies any systemic illness or trauma.
- What is your most probable diagnosis in this case?

A. Acute angle closure
B. Endophthalmitis
C. Neovascular glaucoma
D. Optic neuritis
E. Panophthalmitis

Ans: A

MCQ 2

- A 52 years female presented to emergency with sudden painful visual loss in her right eye. The eye looks congested with hazy cornea and mid dilated pupil. The IOP of that eye is 56 mm of Hg. She denies any systemic illness or trauma.
- What is best immediate treatment option in this case?

A. Intravenous Mannitol
B. Oral Acetazolamide
C. Topical IOP lowering drugs
D. Topical NSAIDs
E. Topical Steroids

Ans: A

THANK YOU ALL