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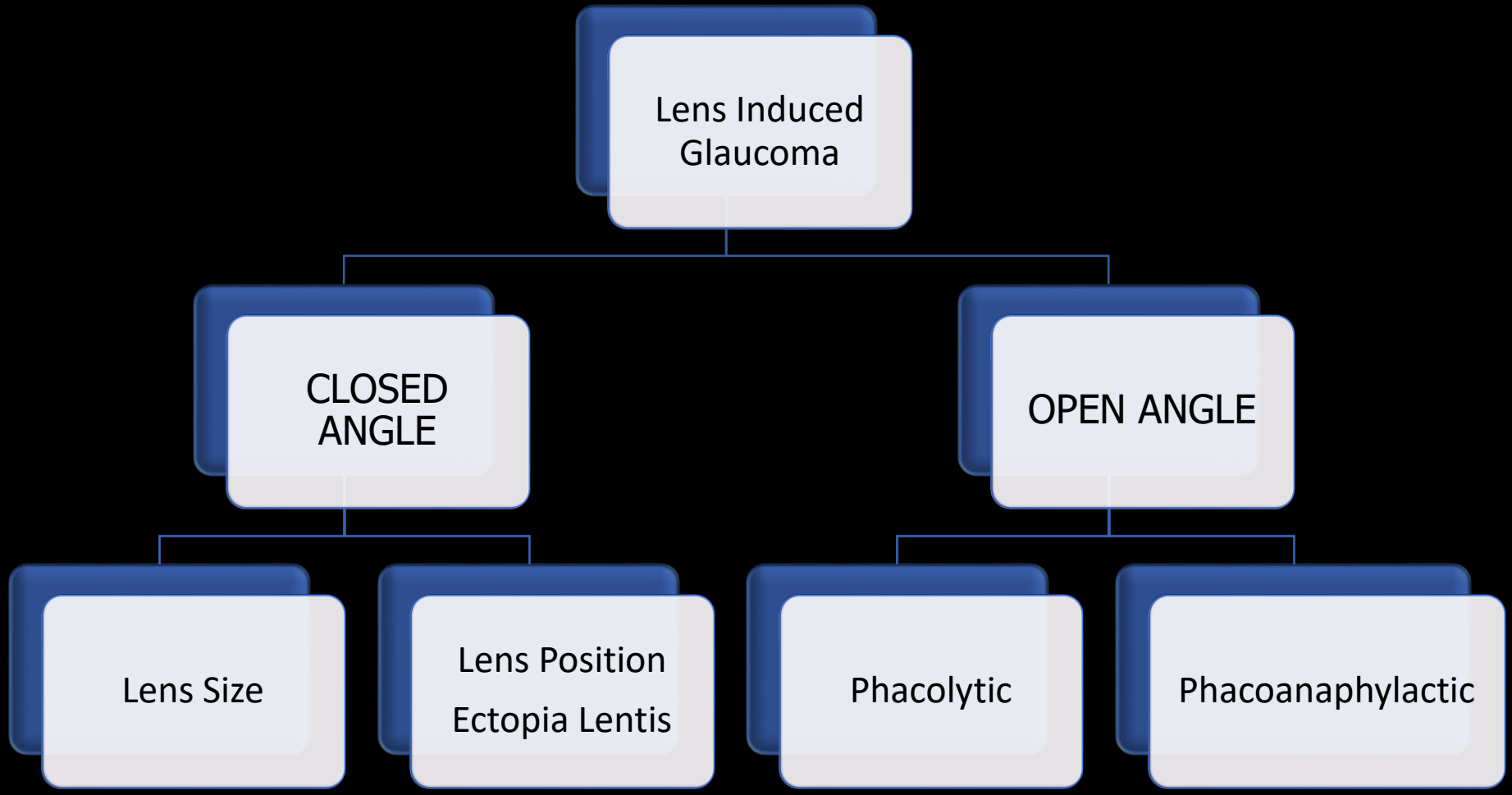
Topics

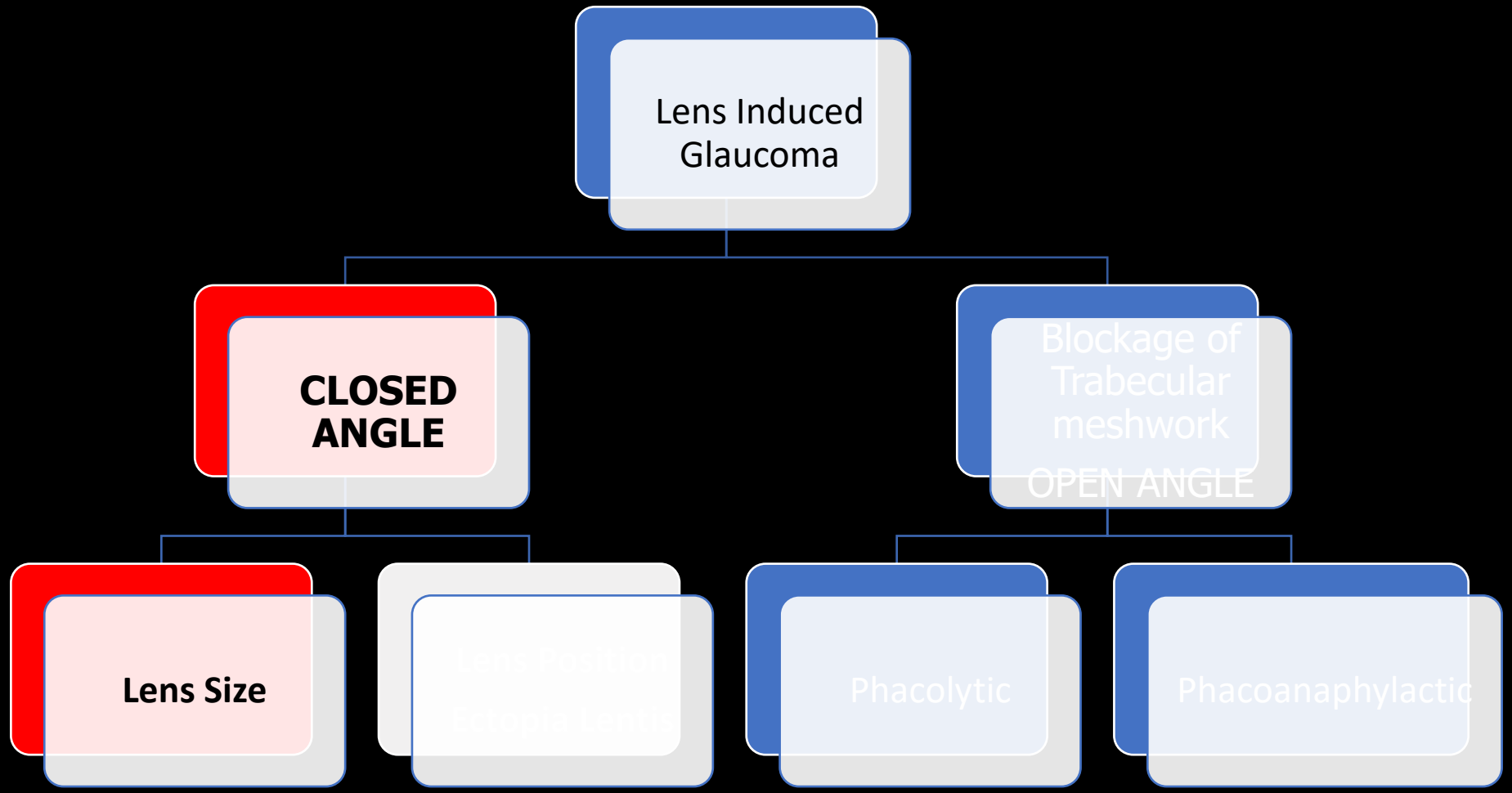
- Lens Induced Glaucoma (LIG)
- Neovascular Glaucoma (NVG)

Learning Objectives

- Discuss
  - Etiology, clinical features, investigation and management of Neovascular glaucoma.
- Discuss
  - Etiology, clinical features, investigation and management of lens induced glaucoma.

Lens Induced Glaucoma


Lens Induced Glaucoma
CLOSED ANGLE
OPEN ANGLE
Lens Size
Lens Position
Ectopia Lentis
Phacolytic
Phacoanaphylactic


Lens Induced Glaucoma
CLOSED ANGLE
Blockage of Trabecular meshwork
OPEN ANGLE
Lens Size
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Closed Angle Lens Induced Glaucoma

1
- Predisposing factors
- Forward movement of lens

2
- Relative Pupil Block iris forward bowing
- Acute angle closure

3
- Mechanical angle closure
- PAS and chronic angle closure

Closed Angle Lens Induced Glaucoma

1

- Predisposing factors
- Forward movement of lens

- Predisposing factors:
  - Shallow AC
  - Short Axial Length
  - Lens dimensions
  - East Asian race

Closed Angle Lens Induced Glaucoma

1

- Predisposing factors
- Forward movement of lens

- Forward movement of lens
  - Aging
    - Lens greater anterior curvature
    - Thicker lens
    - Looser zonues
  - Ectopia Lentis
- Less forward bowing of iris needed to close angle

Closed Angle Lens Induced Glaucoma

1.
   - Predisposing factors
   - Forward movement of lens
2.
   - Relative Pupil Block iris forward bowing
   - Acute angle closure

- What is Pupil Block / Relative Pupil Block?

Closed Angle Lens Induced Glaucoma

1
- Predisposing factors
- Forward movement of lens

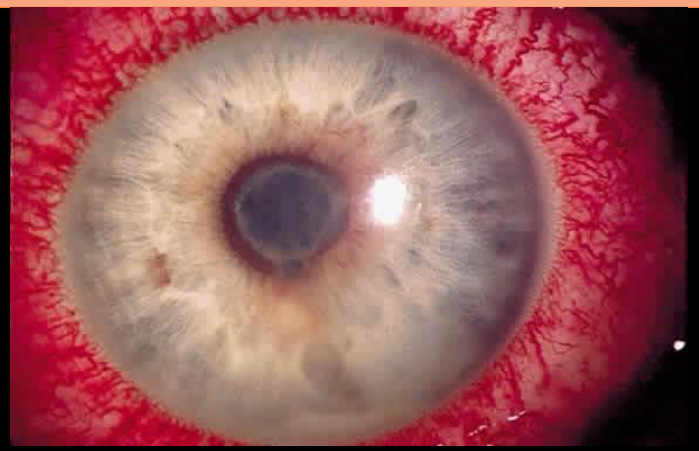
2
- Relative Pupil Block iris forward bowing
- Acute angle closure

- What is Pupil Block?

- “an obstruction to the forward flow of aqueous between the border of the pupil and the anterior capsule of the lens”

Fig. 1. Irido-lenticular pupillary block (iris bombé).

Iridolenticular pupillary block
Iris Bombe
Posterior Synechia binding the pupil margin to the lens capsule. Only “true pupil block”



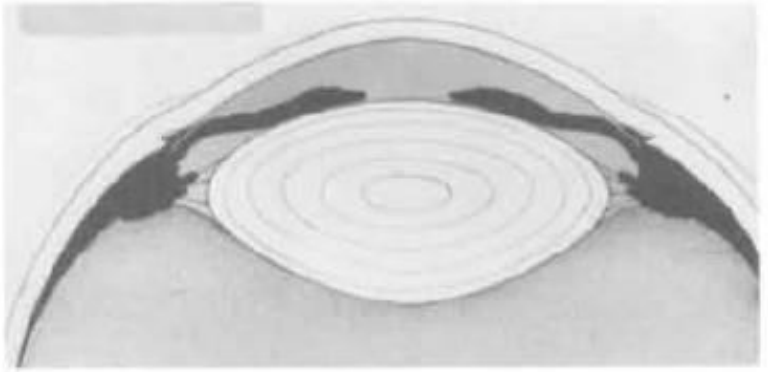
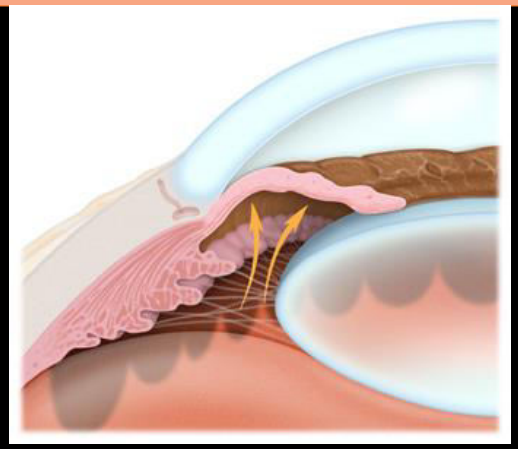


Fig. 2. Irido-lenticular block (relative pupillary block).

Iridolenticular block
Relative Pupil Block
Relative block of aqueous flow in shallow chambered eyes, predisposing to angle closure glaucoma



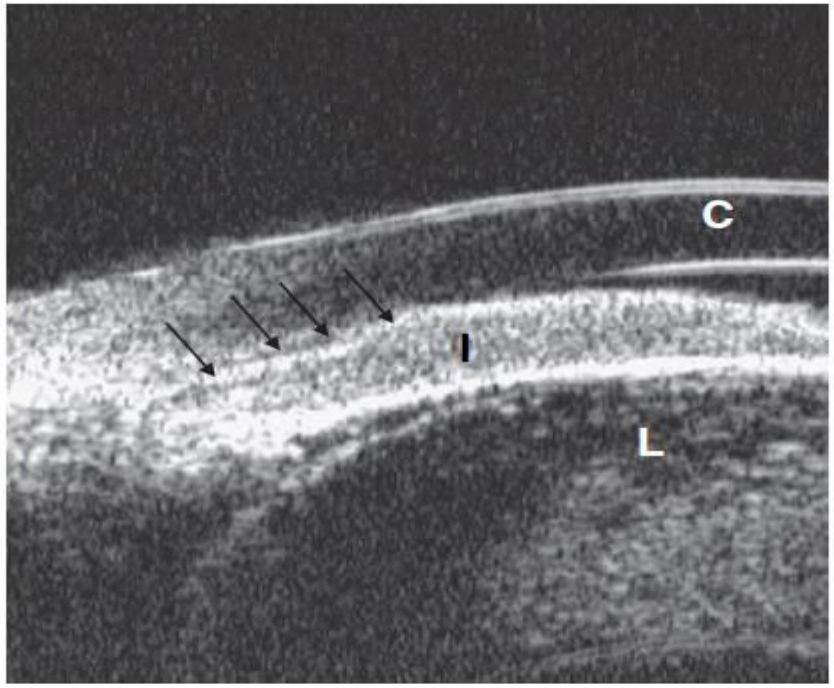
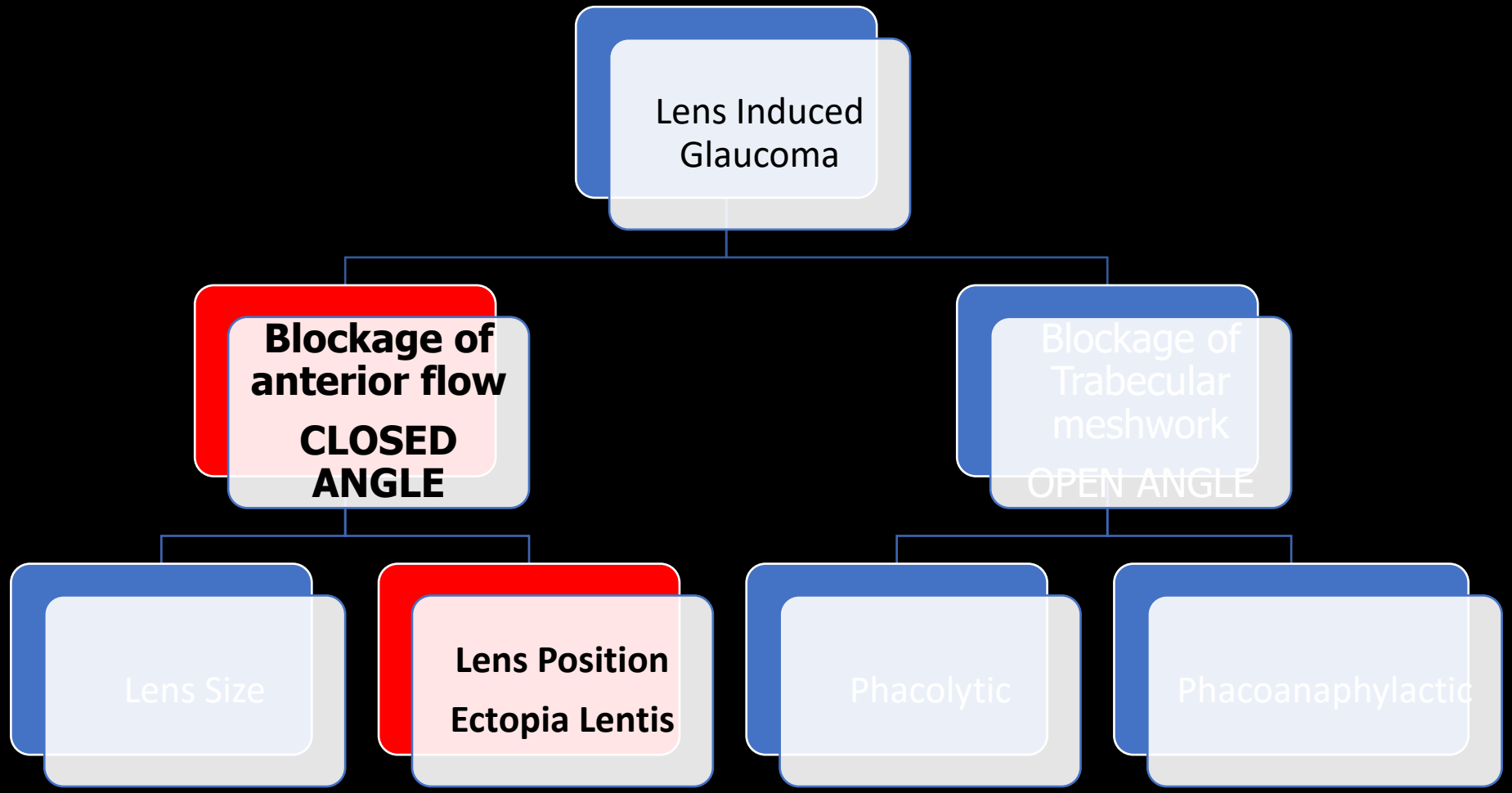


Fig. 5. Phacomorphic angle closure. There is extensive irido-corneal apposition, closed angle, and shallow chamber. Arrows indicate irido-corneal touch. C, cornea; I, iris; L, cataractous lens.

3

- Mechanical angle closure
- PAS and chronic angle closure

- Lens compresses iris and ciliary body against TM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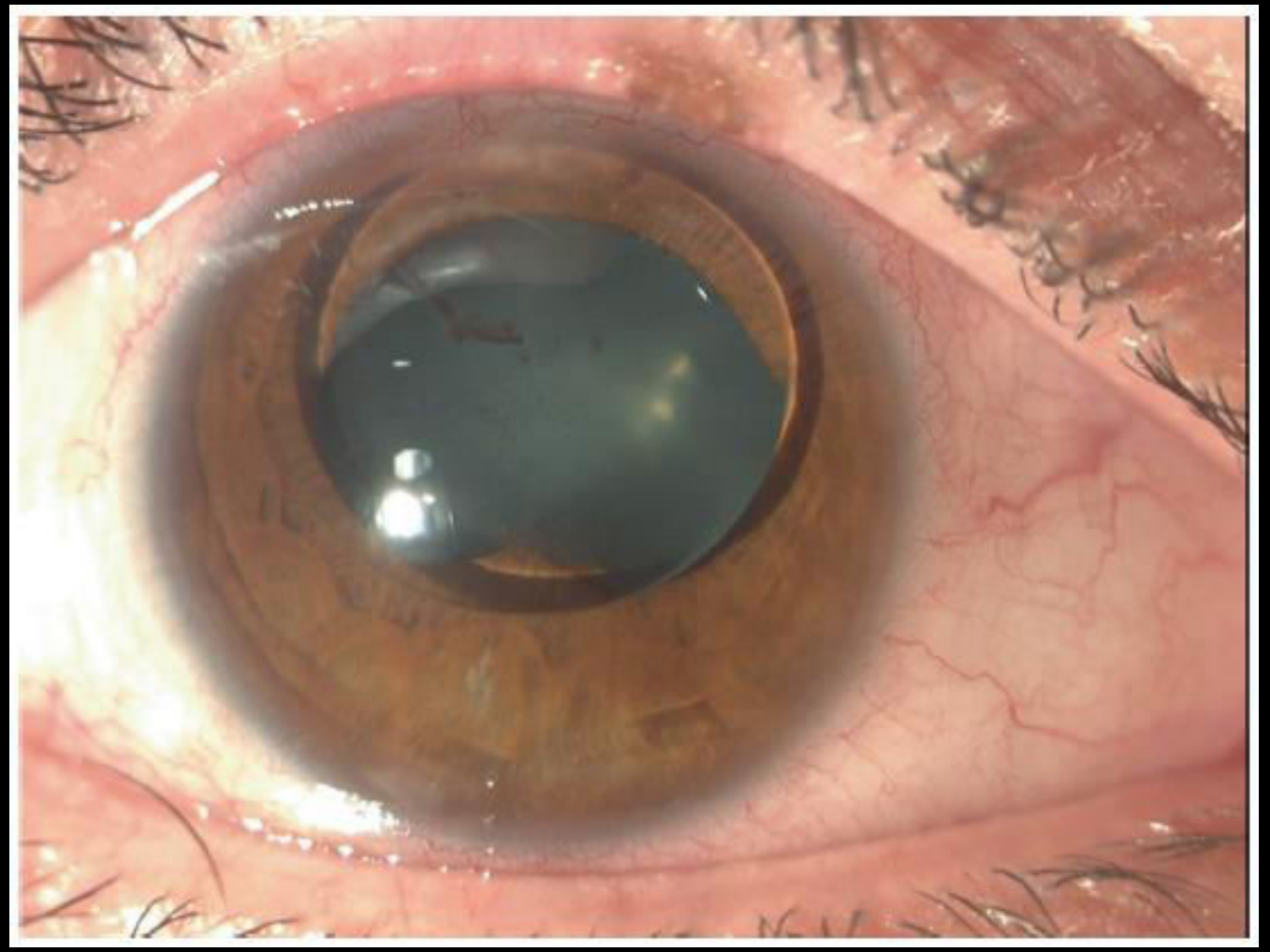
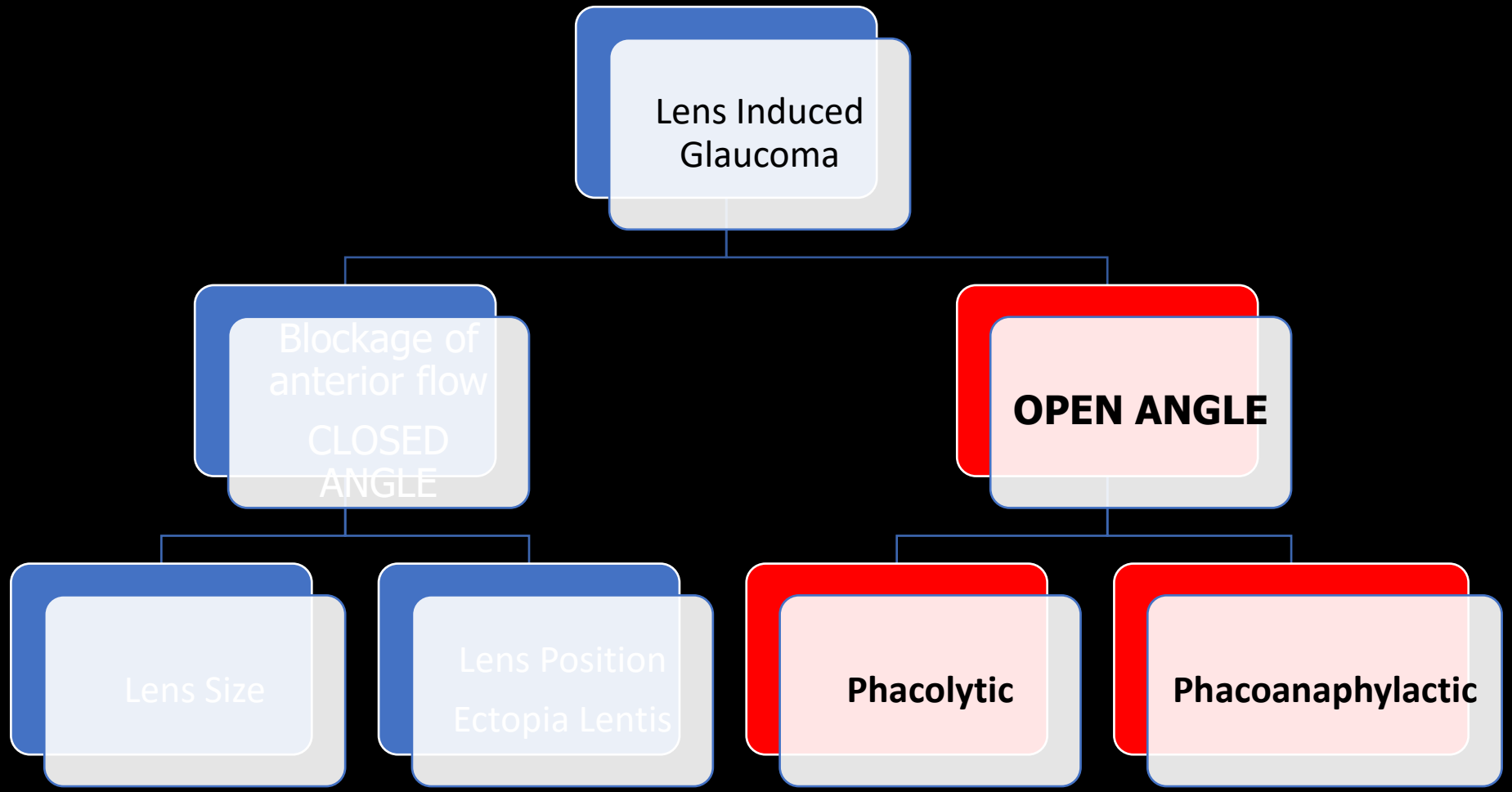
Ectopia Lentis

- is a displacement or malposition of the Eye's crystalline lens from its normal location
- Forward movement of lens weak zonules

- Present as Acute Angle Closure from sudden forward movement of lens
- Relative Pupil Block
- Chronic Angle Closure

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Phacolytic Glaucoma

- Leakage of lens material through intact capsule
- Senile hypermature cataract
- Red, painful eye, gradual visual loss
- High IOP, corneal oedema, open angles
- Heavy flare, larger cells in aqueous
- Macrophages swollen with eosinophilic lens material they have engulfed
- Heavy Molecular Proteins
- – block TM

Phacoanaphylactic glaucoma
Phacoantigenic

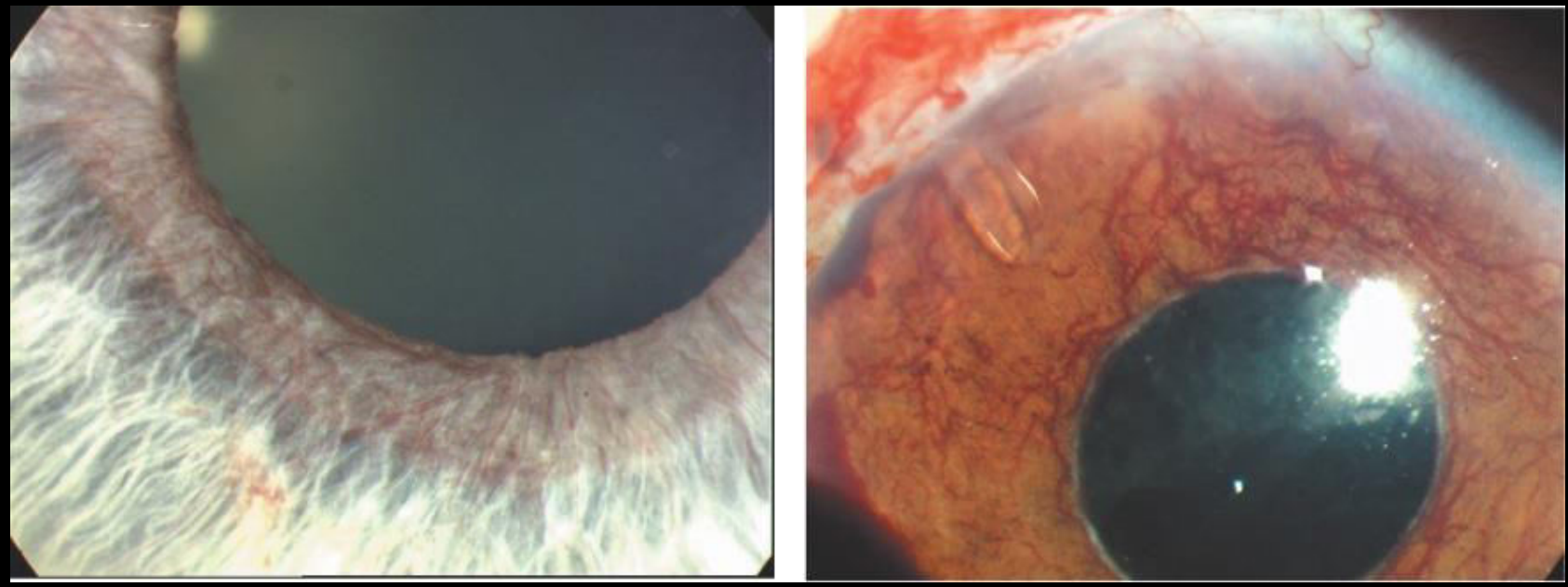
- Inflammation directed against lenticular antigens
- Raised IOP
  - Inflammation of trabecular meshwork
  - Obstruction of TM by inflammatory cells

Treatment

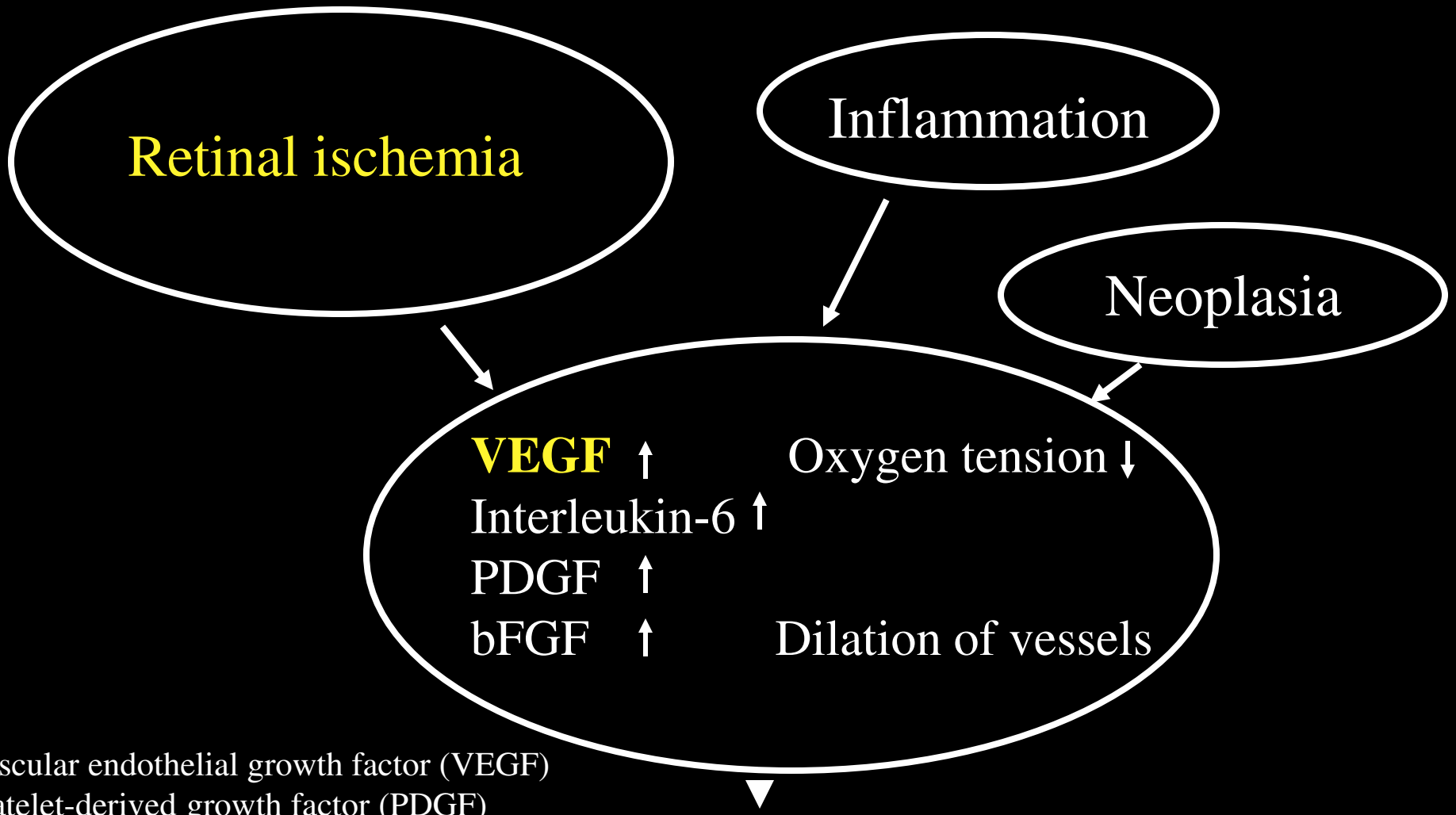
- Control inflammation
- Control IOP
- Remove the cause

Neovascular Glaucoma

Neovascular glaucoma (NVG) occurs when new fibrovascular tissue proliferates onto the chamber angle, obstructs the trabecular meshwork, and produces PAS and progressive angle closure.



Pathogenesis



Vascular endothelial growth factor (VEGF)
Platelet-derived growth factor (PDGF)
Basic fibroblast growth factor (bFGF)

Causes of neovascular glaucoma

- Retinal ischaemic disease
- Inflammatory diseases
- Tumours
- Radiation
- Surgical causes

Retinal Ischaemic disease

1. Diabetic retinopathy

Patients with long-standing diabetes with PDR

Risk ↓ appropriate PRP

↑ cataract extracion

(particularly if the posterior capsule is breached)

2. Central retinal vein occlusion: CRVO

Ischemic CRVO ⟶ 50% of eyes develop NVG

"100 –day glaucoma"

3. Ocular ischemic syndrome

Inflammatory diseases

- Uveitis: chronic iridocyclitis, Behcet disease, Vogt-Koyanagi-Harada syndrome
- Syphlitic retinitis
- Sympathetic ophthalmia
- Endophthalmitis

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Tumors

Iris: melanoma, hemangioma, metastatic lesions

Ciliary Body: ring melanoma

Retina: Retinoblastoma, Large cell lymphoma,

Choroid: melanoma

Conjunctiva: squamous cell carcinoma

Ophthalmology *Volume 108, Number 10, October 2001*

Radiation

- External beam
- Charged particle: proton, helium
- Plaques
- Photoradiation

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Surgical causes

- Carotid endarterectomy
- Cataract Extraction
- Pars plana vitrectomy/lensectomy
- Silicon oil
- Scleral buckle

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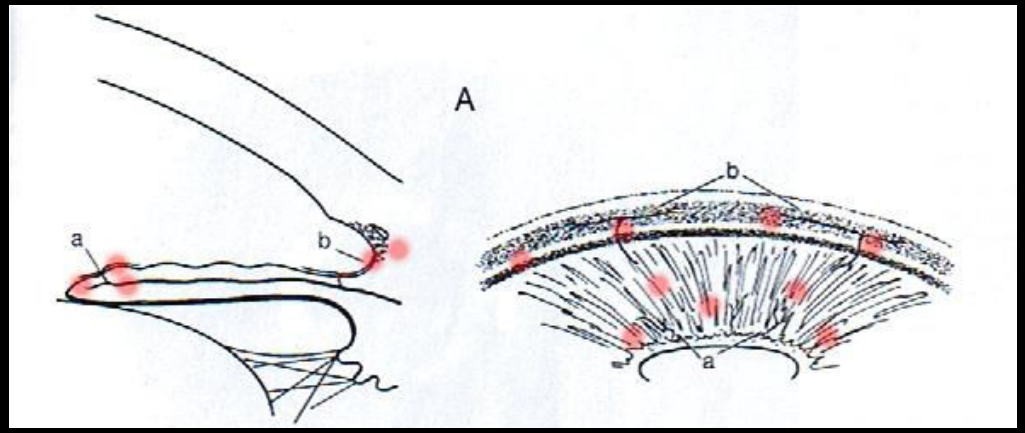
Classification/Staging

1) Rubeosis iridis (Preglaucoma stage)
2) Secondary open-angle glaucoma
3) Secondary synechial angle-closure glaucoma

1) Rubeosis iridis (Preglaucoma stage)

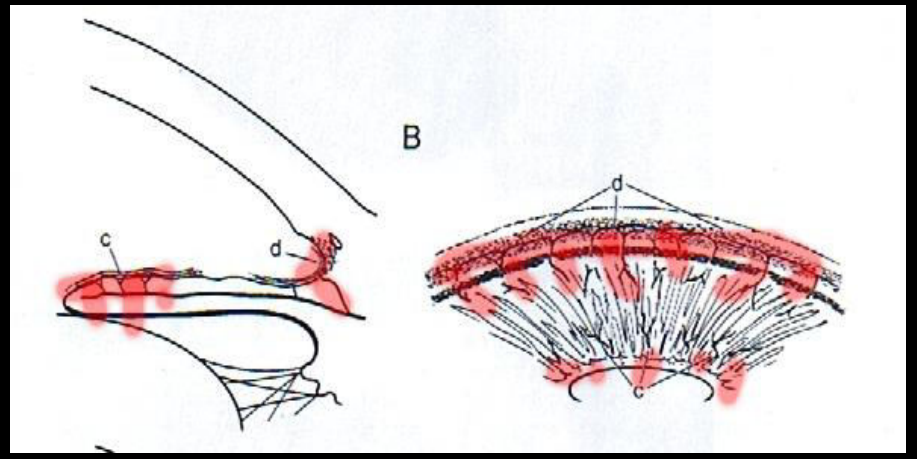
- Tiny dilated capillary tuffs or red spots develop at the pupillary margin.
- The new vessels grow radically over the surface of the iris.
- At this stage the IOP is within normal range.



Rubeosis iridis on the pupillary border

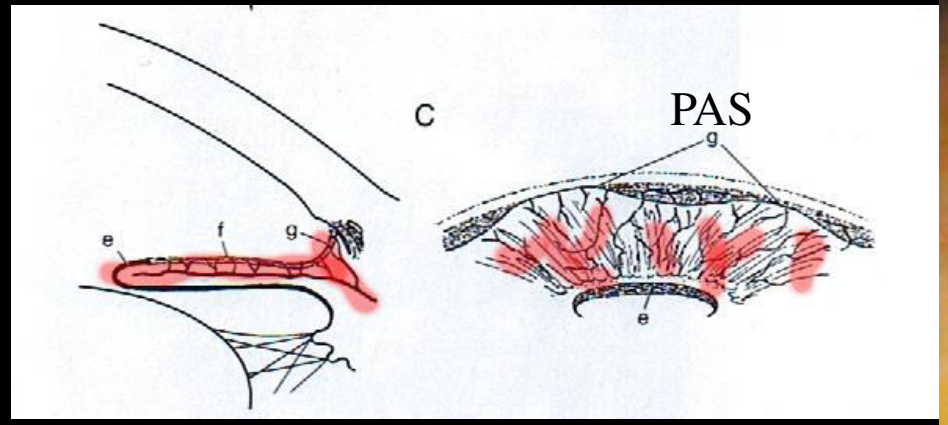
2) Secondary open-angle glaucoma

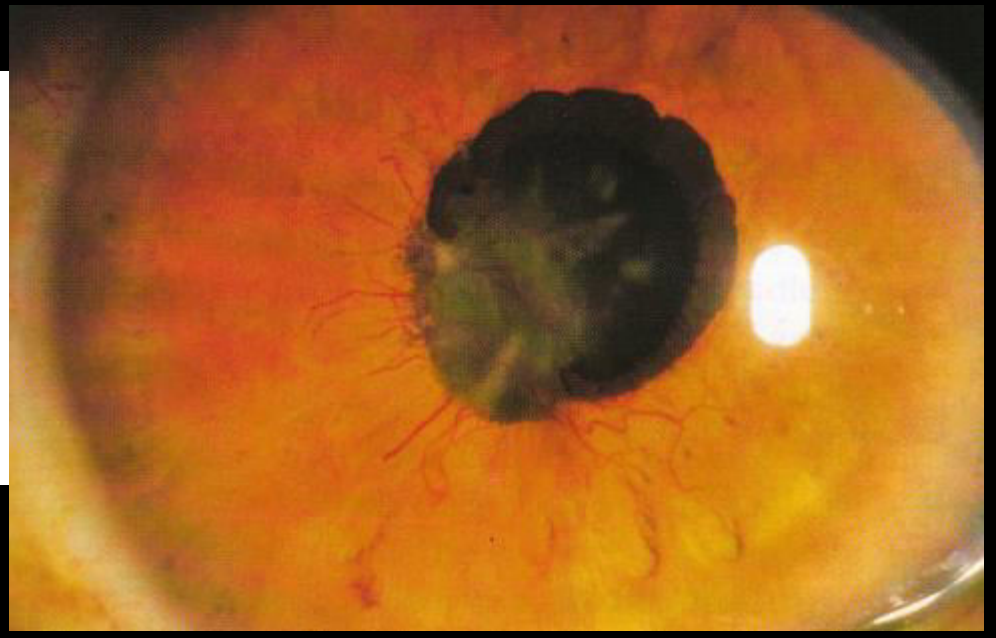
• The new vessels continue to grow across the iris surface towards the iris root.
• The new vessels arborize and form a fibrovasucular membrane, which blocks the trabecular meshwork and gives rise to a secondary open-angle glaucoma.



3) Secondary angle-closure glaucoma

• This is caused by contraction of fibrovascular tissue in the angle with pulling of the peripheral iris over the trabecular meshwork.
• The iris become flattened and ectropion uvea is present.





Distortion of the pupil and ectropion uvea.

Neovascular Glaucoma: Signs

In addition to new vessels:

- Mild anterior chamber reaction
- Conjunctival injection
- Corneal oedema
- Ectropion uveae
- Glaucomatous optic nerve and field defects

Diagnosis

Clinicians should maintain a high level of suspicious about neovascularization of iris or angle

1) Medical History
2) Visual acuity, IOP
3) Pupil
4) GONIOSCOPY

    10% of non ischemic CRVO have NVA without NVI

5) Dilated fundus examination

Differential diagnosis

- Primary congestive angle-close glaucoma
- Uveitic glaucoma
- Postvitrectomy inflammation
- Haemolitic glaucoma / Ghost cell glaucoma

Treatment

1) Treatment of the underlying disease process responsible for rubeosis
   - A) Panretinal photocoaguration (PRP)
   - B) Anti-inflammatory agents

2) Treatment of the high IOP
   - A) Medical management
   - B) Surgical treatment
   - C) Intravitreal Bevacizumab (Avastin)

Summary

- Painful visual loss
  - NVG
  - LIG

Thank you