

# The glaucoma's

## Definitions:

- **Glaucoma's**: are group of disorders characterized by progressive damage to the neural elements of the eye due to IOP changes.
- **Ocular hypertension** : IOP >21mmHg , but no neural damage.
- **Normal tension glaucoma** : IOP<21mmHg but there is neural damage

## Classifications :

### \* Pathological :

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- a- Open angle G.
- b- Closed angleG.

### \* Etiological :

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- a- Primary G.
- b- Secondary G.

### \* Age :

- a-congenital: i-True congenital G.  
ii- Infantile G.  
iii-Juvenile G.
- b-acquired: i-adult onset G.  
ii-senile G.

## Diagnosis :

- 1- Anterior segment examination (slit lamp).
- 2- Tonometry : (methods).
- 3- Gonioscopy ((diagnostic and surgical goniolenses))

- 4- Perimerty (scotoma) : a- absolute scotoma.  
b- relative scotoma.

There are two (main) types of perimetries :

- a- Static perimetry.
- b- Kinetic perimetry.

5-Optic nerve examination :

- normal vertical CD(cup/disc) ratio=0.3
- abnormal = > 0.4

Tonometry:

Measurement of IOP by the following methods :

Goldmann tonometry  $\implies$  Applanation .((very accurate))

The schiøtz t.  $\implies$  Indentation .

The perkins t  $\implies$  hand-help applanation.

For bedbound patients or anaesthetized patients.

The air-puff :

- Easy.
- Non-contact.
- For screening .((results with errors))

The tono-pen :

- portable.((contact tonometer))
- Result with slight errors.

The pulsair2000 (keeler).

- hand-help.
- non contact.
- results are good.

Primary open angle(chronic simple g.)60%-70%

Risk factors

- . Old age
- . Black
- . Myopia
- . Steroid responders [ increase IOP after 6 weeks

coarse f steroid use].

- FH (inheritance)

Pathogenesis:-



- (Resistance to outflow) outflow IOP O.N  
Damage V.F(loss)
- O.N damage caused by i-ischemia  
ii-direct mechanical damage

C.F.

- Symptoms

- Usually no symptoms
- Visual field loss (peripheral vision)
- Occasionally (eye ache or headache)

- Signs

-  IOP
-  CD ratio (( >0.4 Vertically))

- normal A.C. angle (gonioscopy)
- V.F. loss
  - Arcuate scotoma.
  - Paracentral scotoma.
  - Nasal step.
  - Double arcuate scotoma.
  - Late :- only small island of central vision ( tubular vision )

Management

- Aim :- . To control IOP

- . To preserve remaining vision .  
(tubular vision)

- Treatment :-

- . Medical T.

- .Topical B. blocker First line

- . Miotics.

- . Sympathomimetics

- .New drugs :

- .Brimonidine Alpa-2 agonis

- .Dorzolamide.

- .Latanoprost.

- .Brinzolamide.

- A.L.T. Arogon laser trabculo plasty

- .Indicated when : failed medical R.

- .Can be repeated.

- .No surgery.

- .Initial good response!.

- Surgery.

- Trabeculoctomy :

- . Failed medical R.

- . Failed A.L.T.

- . when very low IOP is indicated

Normal tension glaucoma

Eyes with progressive glucomatous changes despite a mean IOP equal to or less than 21 mm Hg.

Unknown etiology

Risk factors

- .Local vascular abnormalities.
- .Vasospastic disorders.
- .Sudden systemic hypotension.
- .D.M. and H.T.

C.F.

- .Usually border line IOP(<21).
- .Increase CD ratio. { Like POAG }
- .V.F. abnormalities (like POAG)

Management

- .Betaxolol!.
- .Systemic Ca. channel blocker(like Nifedipine).
- .Treatment for D.M. and H.T.
- .Surgery (the best).

D.D

- .POAG
- .Cong .O.D. anomaly.
- .O.N. ischemia.
- .Perv .I.O.N. { previous Ischemic optic Neuropathy }

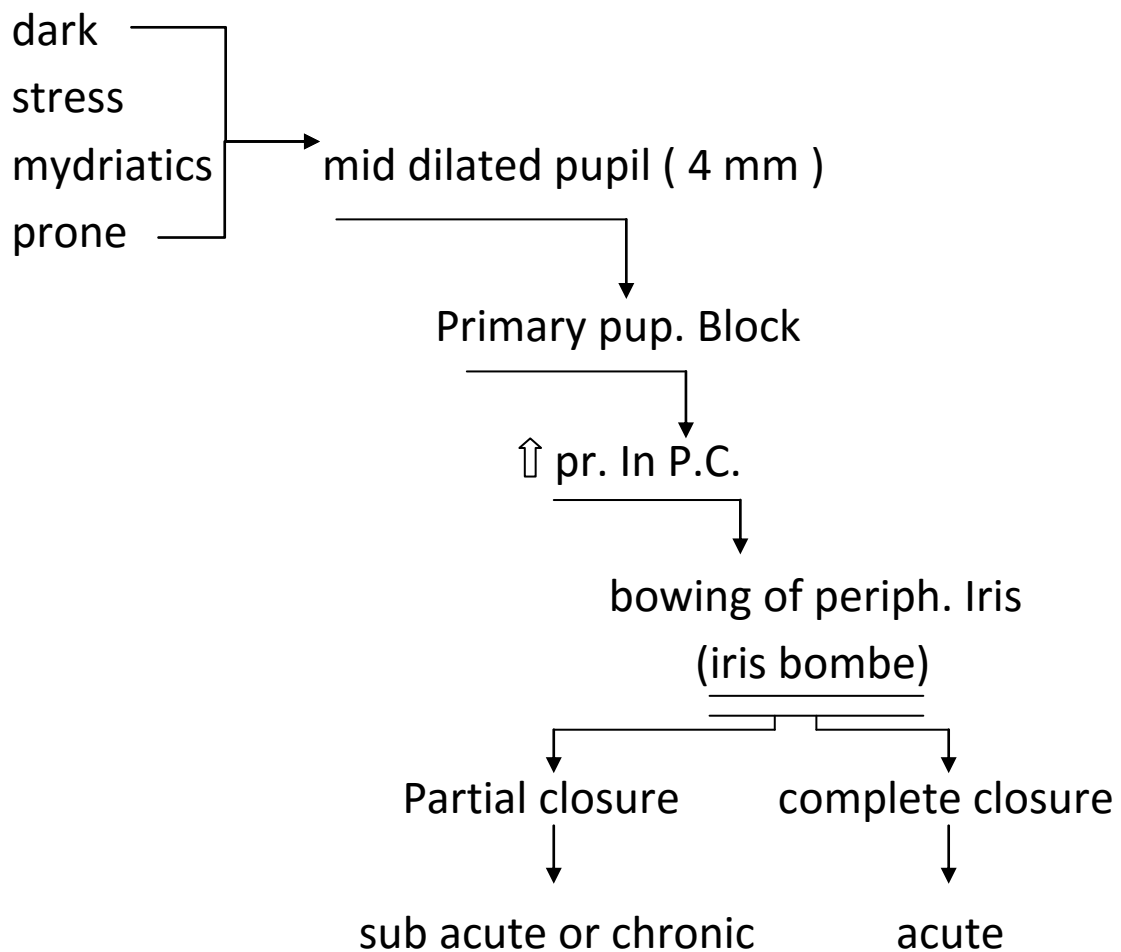
Primary angle closure glaucoma : (10%)

Risk factors



- . old age !
- . white
- . female (F:M 4:1 )
- . F.H.
- . Shallow A.C.
  - Hypermetropia
  - Microcornea
  - Microphthalmia

### Pathogenesis



### Stage

- . Latent((prophylactic treatment))

- . Intermittent((sub acute))attacks.
- . Acute.
- . Chronic
- . Absolute((blind eye)) end stage.

#### Acute congestive(A.C.G):

Sudden total closure of the angle.

#### Symptoms:

- . severe ocular and periocular pain and headache.
- . N .and V.
- . Red congested eye .
- . Lacrimation.
- . Blurring of vision.
- . Colored halos.

#### Signs:

- . Lid edema.
- . Conj. Injection.
- . Corneal haziness ((corneal edema))
- . Fixed mid dilated pupil
- . A.C. reaction ((cells and flare)).
- . shallow A.C. with iridocorneal contact.
- . ↑↑↑ IOP((50-100mm Hg)).
- . fundus : optic disc edema and/or hemorrhage.

#### The other eye :

- . Gonio.((narrow angle)).

- Prophylactic R by miotics or laser peripheral iridotomy.

D.D



- secondary ACG((intumescent or dislocated lens))
- Neovascular gl.

Management :

- Admission((emergency))
- Initial medical R.:-
  - I.V.(CAI) : Acetazolamide((Slow I.V))
  - Hyperosmotic agent :
    - I.V. mannitol .20%  
(1-2gm)/Kg
    - Oral glycerin 50%
  - Topical R.:-
    - Timolol
    - Pilocarpine
    - Steroids
  - Analgesics and antiemetic
- Laser P I.:
  - After 48 hrs. when possible
  - successful if the angle more than 50% Open.
  - For the fellow eye{ prophylactic }



- surgery : Trabeclectomy
  - when medical and laser R. are failed

Secondary glaucomas 30%

secondary open angle glaucomas :-

- pseudoexfoliation gl.
- pigmentary gl.
- Lens- induced gl.
  - Phacolytic gl. (hypermaturing cataract).
  - lens particle gl. (trauma or surgery).
  - Phaco anaphyxis.
- Inflam.gl.  $\implies$  uveitis {Macrophage}
- Trauma(angular recession gl.).
- Hyphema

secondary angle closure gl.

- phacomorphic { lens induced}
  - Intumescent lens.
  - Dislocated lens.
- Uveitis.
  - pupillary block.
  - P.A.S.
- Neovascular gl.
  - CRVO and D.M.(the most common).
  - Carotid disease.

- CRAO (rare)
- I.O. tumours.
- I.O inflammation. (eg:- Behcet's dis.)
- R.D. (long standing).

.I.O tumors.

.Ciliary-block gl. (malignant gl.).

### **Congenital glaucoma:-3%.**

Primary cong. Gl.:-

- Isolated trabecular dysgenesis.

- Bilateral in 75%.

.Classification :- (according to the age).

- True cong. Gl. (intra uterine, since birth)

- Infantile gl. (first 2 years).

- Juvenile gl. (3-16 years).

.C.F.:-

- Lacrimation

- Corneal haize (mild to sever)

- Buphthalmos (large eye)

- Brecks in descemet memberane.

- Optic disc cupping ((reversible in early cases))

• D.D. :-

- Cloudy cornea :-

Birth trauma.

I.U. rubella (keratitis).

Metabolic disorders (mucopolysach.)

- Large cornea :-

Megalo cornea.

High myopia.

- Lacrimatrion :- N.L. obstruction (epiphora)

- Secondary gl. :-

I.O. tumours  $\implies$  Retinoblastoma

I.O. inflammation.

PHPV. { Persistent hyper plastic primary  
vitreous }

Retinopathy of prematurity.

Ectopic lens .

• Management :-

- EUA :-

I.O.P.

Corneal diameters: if more than (12)mm  
is abnormal

Optic disc .((cupping))

Gonio scopy .

- Treatment :- always surgical.
- Regular follow up.

Secondary congenital Gl :-

- .Iridocorneal dysgenesis.
- .phacomatoses e.g:-1-(sturge – weber syndrome)30%.  
2-(Neurofibromatosis I).

### **Glaucoma drugs**

- B-blockers :-
  - .Decrease aq production.
  - .for all types of gl.
  - .S.A.:-bronchospasm & bradycardia.
  - .these include :-
    - .Timolol (0.5%and0.25%).
    - .Betaxolol (0.5%)(cardio-select)??
    - .Levobunolol (0.5%).
    - .Carteolol (1%and 2%).
- Sympathomimetics:-
  - . Decrease I.O.P by increase out flow.
  - . Used in most secondary gl.
  - . C.I. in narrow angles.
  - . Side effects: - irritation.
    - conj. Pigmentation.
    - systemic S.E.

. These include:-

- . Adrenaline 0.5,1,2%.
- . Dipivefrine(0.1%), high cor. penetration.
- . Brimonidine(0.2%)  $\alpha^2$  agonist.
- . Apraclondine (0.2,1%).

• Miotics (parasaymp. Mimetics).

- . Decrease IOP by increase out flow.
- . Good additive effect with B-Blocker
- . S.E. effect :-
  - . Impairment of night vision.
  - . Spasm of accommodation  $\rightleftarrows$  induce myopia.
  - . Retinal detachment. (rare).
  - . Increase ocular inflammation.

.These include :-

- . Pilocarpine(1,2,3,4%).(drops, Gel, sust.release).
- . Carbachol(3%).

• **Prostaglandin derivatives ((latanoprost))**

Increase uvesoscleral out flow.

E.S.:-

- . Increase pigmentation of iris.
- . Increase ocular inflammation.

• **Carbonic anhydrase inhibitors :-**

Decrease aqueous production.

S.E.(feticue , anorexia , depression , paresthesia , renal stones , elect , lmb , blood dysciasias ) .

These include:

- Asetazolamide. (250,500 g ) .
- Mathazolamide (50 mg ) .
- Topical doeoalamide(2%) (trusopt).  
{ Drops :3 times daily}

### **Lasers in glucomas**

ALT :-

- Increases aq. Out flow.
- Used for POAG.
- S.E.:-
  - Peripheral anterior synechea.
  - Hemorrhage.
  - Increases IOP.(transient)
  - Ant. uveitis. .(transient)

Laser iridotomy:-

- ACG and prophylactic to the other eye .
- Pupil . black angel closure gl.
- S.E.:-(diplopia , iritis , bleeding , increase IOP,  
corneal burn.)

### **Trabeculectomy**

is a fistula between anterior chamber and subconjunctival space.

Indicated when medical and laser treatments are failed.

Post . op. complications:-

. Early :-

- Shallow anterior chamber.
- Wound leak .
- Hemorrhage ((hyphema)).

. Late :-

- Bact. Infection.
- Failure.

### **Adjunctive antimetabolites**

Used in conjunction with trabeculectomy.

5.FU (decreases fibroblastic activity).

Mitomycin (decreases lymphocyte activity).

**Artificial drainage shunts** (plastic devices).

e.g {Ahmed"s Malteno-tube}

### **Cyclodestructive procedures**

Usually used for end stage cases of glaucoma to reliefs pain  
and to reduce IOP.

Cyclocryotherapy.

Yag laser cycloablation.

Diode laser.

Pathway of aqueous :-

