





MANAGEMENT OF CHRONIC ANGLE CLOSURE GLAUCOMA

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- Clinically, Chronic angle-closure can occur with or without symptoms, and thus it can be described as '**silent**' closed-angle glaucoma.
- Because this condition mainly consists of irido-trabecular contact leading to synechiae formation and subsequent angle closure, it has also been described as "**creeping**" angle closure



Etiology

- Peripheral anterior synechiae (**PAS**) formation between the peripheral iris and trabecular meshwork of the iridocorneal angle is the **main etiologic factor in chronic angle closure**

DISEASE MECHANISM

NOT MUTUALLY EXCLUSIVE !

IRIS

AQUEOUS

**CILIARY
BODY**

LENS

CHOROID

VITREOUS

P

S

H

**IRIS
ABNORMALITY**

- Intrinsic
- Insertion

STRUCTURE

Narrow angle

FUNCTION

**TM normal
IOP normal**

TIME



**Pupillary
Block**

Lens

**Appositional Irido-
trabecular contact
(reversible)**

**Synechial irido-
trabecular contact
(irreversible)**

**TM dysfunction
IOP Elevated**

**TM blockage
IOP Elevated**

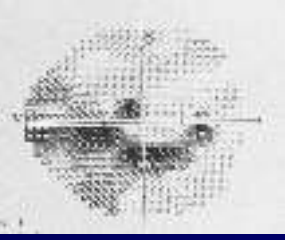
DISEASE STAGING



$\geq 180^\circ$ ITC



$\square$ IOP and/or PAS



Glaucomatous
optic
neuropathy

PACS

Primary Angle Closure
Suspect

*TM at
risk*

PAC

Primary Angle Closure

TM

dysfunction

PACG

Primary Angle Closure
Glaucoma

Optic nerve



Prognosis

- The prognosis of chronic angle-closure glaucoma is **variable** and likely depends on many factors such as the stage of disease at detection.
- A prophylactic peripheral iridotomy does not guarantee prevention of angle-closure glaucoma as **over 50% of the fellow eyes may still develop chronic angle-closure glaucoma** over time despite receiving a peripheral iridotomy at the time of an attack of angle-closure in the contralateral eye

So; PI is done as a temporary prophylactically to prepare the eye for subsequent surgery at ease

RISK OF DISEASE PROGRESSION

PACS

Primary Angle Closure
Suspect

PAC

Primary Angle Closure

PACG

Primary Angle Closure
Glaucoma

TM at risk

22% in 5 years

TM ~~FUNCTION~~

28% in 5 years

Optic nerve



General approach: **ANGLE**

Assign stage: PACS, PAC, PACG

KNow the mechanism

Gonio before & after treatment

Look at the whole patient, not

just the angle **E**vidence-based



Treatment (Medical)/ Management

Medical Treatment

- **Aqueous suppressants**: Carbonic anhydrase inhibitor topical/oral (dorzolamide, brinzolamide acetazolamide, methazolamide), beta-blocker (timolol, levobunolol), alpha-agonist (brimonidine tartrate, apraclonidine).
- **Increase trabecular outflow**: The effectiveness of medications with this mechanism of action (rho kinase inhibitors, pilocarpine) may be reduced as *the trabecular meshwork is obstructed due to peripheral anterior synechiae*.
- **Increase uveo-scleral outflow**: Prostaglandin analogs (latanoprost, bimatoprost, travoprost, tafluprost); however, these may increase inflammation so if there is any chronic inflammatory etiology leading to the chronic closed-angle it may be **avoided**.



Treatment / Management Role of Laser

Laser Treatment

- **Iridotomy**: This can be performed using an Nd-Yag laser with or without argon laser pre-treatment
- **Argon Laser Peripheral Iridoplasty**: This may be **beneficial in reducing appositional angle closure** caused by **non-pupillary block** mechanisms, such as **plateau iris syndrome**.
- **Micropulse trans-scleral cyclophotocoagulation**
- **Continuous transscleral cyclophotocoagulation**. This has traditionally been **reserved for refractory glaucoma** with poor visual potential.
- Endocyclophotocoagulation.



Surgical Treatment / Management

- Phacoemulsification/lens extraction
- Surgical iridectomy
- Combined phacoemulsification and GSL
- Combined phacoemulsification and viscogoniosynechialysis or viscogonioplasty
- Trabeculectomy
- Combined phacoemulsification and trabeculectomy in more than 180 degrees of angle-closure.
(It is suggested that advanced PACG may signify a long duration of angle closure and irreversible structural changes in the trabeculum)
- Phacoemulsification in a patient with less than 180 degrees of angle-closure
- Phacoemulsification with trabeculotomy
- Phacoemulsification with endocyclophotocoagulation
- Phacoemulsification with viscogoniosynechiolysis with endocyclophotocoagulation
- Glaucoma drainage device



When should I perform lens extraction alone?

The **E**ffectiveness in **A**ngle-closure **G**laucoma of **L**ens **E**xtraction (**EAGLE**) Study Group

Prospective multicenter randomized controlled trial
Lens extraction vs. **LPI** in newly diagnosed PAC or
PACG

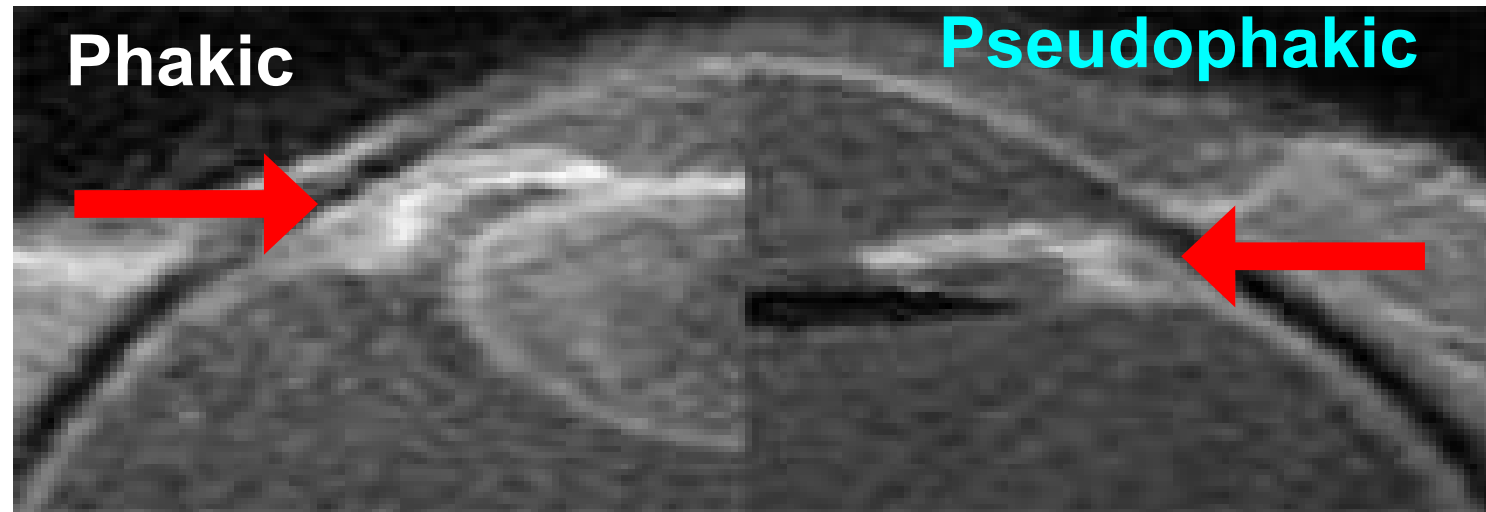
Primary outcomes: IOP, QOL, cost-effectiveness at 3
years



The MESSAGE

- One good quality trial may not be enough to change policy.
- HOWEVER
- **CLE is strongly considered as the first line treatment for PAC suspect and primary angle closure (PAC) with raised IOP, in terms of:**
 1. The superiority of CLE in terms of pt reported and clinical benefits
 2. The absence of serious safety issues
 3. The consistency of the results with relation to previous studies in this regard

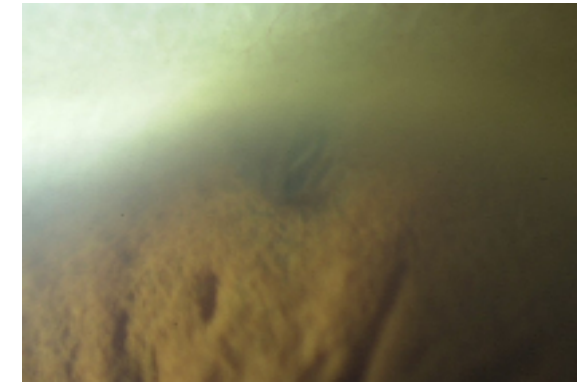
Effect of Lens on CB Position





Laser iridotomy is not without risks.....

- **GLARE (LOCATION-DEPENDENT?)**
- **MORE RAPID CATARACT PROGRESSION**
- **CORNEAL ENDOTHELIAL LOSS**
- **IRITIS**
- **ELEVATED IOP**
- **HYPHEMA**
- **POSTERIOR SYNECHIAE**





Cataract surgery is not without risks.

- **SUPRACHOROIDAL HEMORRHAGE**
- **ENDOPHTHALMITIS**
- **RETINAL DETACHMENT**
- **CYSTOID MACULAR EDEMA**
- **ELEVATED IOP** AQUEOUS MISDIRECTION SYNDROME MAY DEVELOP MORE FREQUENTLY FOLLOWING SURGERY IN EYES WITH CHRONIC ANGLE-CLOSURE GLAUCOMA.
- **CORNEAL ENDOTHELIAL LOSS**
- **DYSPHTOPSIA**
- **INCORRECT IOL POWER**





When can I justify a clear lens extraction after a patent iridotomy?

- Development of **PAC**
- TM dysfunction = **elevated IOP** or PAS
- Special circumstances unique to the patient:
Symptoms suggestive of intermittent angle closure
- Systemic medications that may precipitate angle closure
- Need for repeat dilated exams (diabetes, retinal disease) Unreliable access to eye care

Phacoemulsification versus Combined Phacotrabeculectomy in Medically Uncontrolled Chronic Angle Closure Glaucoma with Cataracts

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Objective: To compare phacoemulsification alone versus combined phacotrabeculectomy in medically uncontrolled chronic angle closure glaucoma (CACG) with coexisting cataract.

Design: Prospective randomized clinical trial.

Participants: Fifty-one medically uncontrolled CACG eyes with coexisting cataract of 51 patients.

Intervention: Recruited patients were randomized into group 1 (phacoemulsification alone) or group 2 (combined phacotrabeculectomy with adjunctive mitomycin C). Postoperatively, patients were reviewed every 3 months for 2 years.

Main Outcome Measures: Intraocular pressure (IOP) and requirement for topical glaucoma drugs.

Results: Twenty-seven CACG eyes were randomized into group 1, and 24 CACG eyes were randomized into group 2. Combined phacotrabeculectomy resulted in lower mean postoperative IOP than phacoemulsification alone at 3 months (14.0 vs. 17.0 mmHg, $P = 0.01$), 15 months (13.2 vs. 15.4 mmHg, $P = 0.02$), and 18 months (13.6 vs. 15.9 mmHg, $P = 0.01$). Combined phacotrabeculectomy resulted in 1.25 fewer topical glaucoma drugs ($P < 0.001$) in the 24-month postoperative period, compared with phacoemulsification alone. Combined surgery was associated with more postoperative complications ($P < 0.001$) and more progression of optic neuropathy ($P = 0.03$), compared with phacoemulsification alone.

Conclusions: Combined phacotrabeculectomy with adjunctive mitomycin C is more effective than phacoemulsification alone in controlling IOP in medically uncontrolled CACG eyes with coexisting cataract. Combined phacotrabeculectomy is associated with more postoperative complications.



Phacoemulsification versus Trabeculectomy in Medically Uncontrolled Chronic Angle-Closure Glaucoma without Cataract

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Objective: To compare phacoemulsification versus trabeculectomy with adjunctive mitomycin C in medically uncontrolled chronic angle-closure glaucoma (CACG) without cataract.

Design: Prospective, randomized clinical trial.

Participants: Fifty medically uncontrolled CACG eyes without cataract of 50 patients.

Intervention: Patients were randomized into undergoing either phacoemulsification or trabeculectomy with adjunctive mitomycin C. After surgery, patients were followed up every 3 months for 2 years.

Main Outcome Measures: Intraocular pressure (IOP) and requirement for glaucoma drugs.

Results: Twenty-six CACG eyes were randomized to receive phacoemulsification, and 24 eyes underwent trabeculectomy with mitomycin C. Phacoemulsification and trabeculectomy resulted in significant and comparable IOP reduction at 24 months after surgery (reduction of 8.4 mmHg or 34% for phacoemulsification vs. 8.9 mmHg or 36% for trabeculectomy; $P = 0.76$). Over first 24 months, trabeculectomy-treated eyes required on average 1.1 fewer drugs than phacoemulsification-treated eyes ($P < 0.001$). However, trabeculectomy was associated with significantly more surgical complications than phacoemulsification (46% vs. 4%; $P = 0.001$). Eight (33%) of 24 trabeculectomy eyes demonstrated cataract during follow-up.

Conclusions: Both phacoemulsification and trabeculectomy are effective in reducing IOP in medically uncontrolled CACG eyes without cataract. Trabeculectomy is more effective than phacoemulsification in reducing dependence on glaucoma drugs, but is associated with more complications.

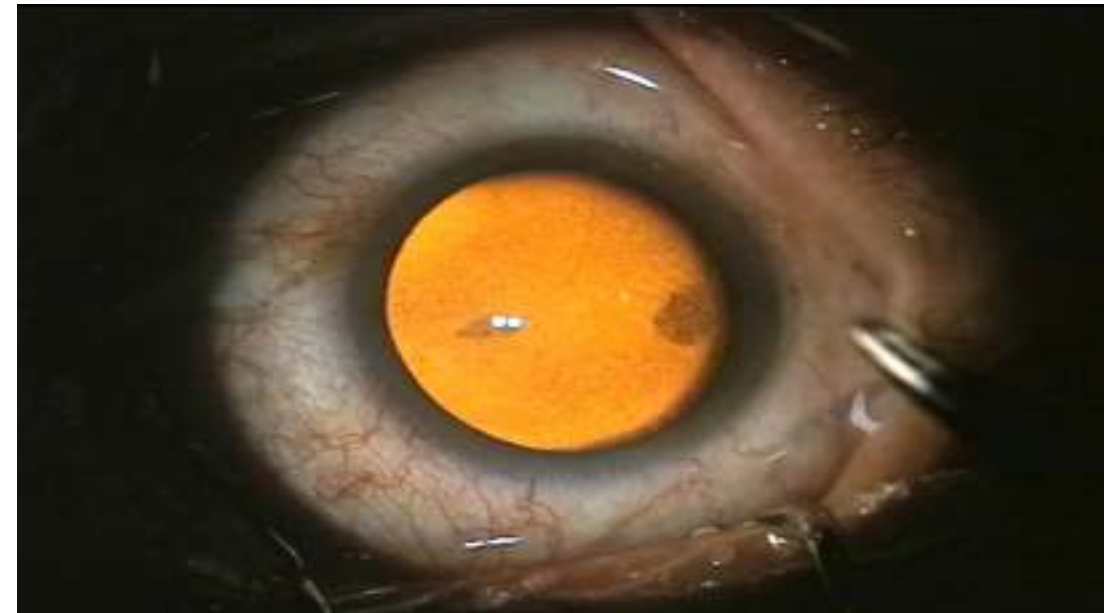
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Combined phacoemulsification and trabeculectomy.

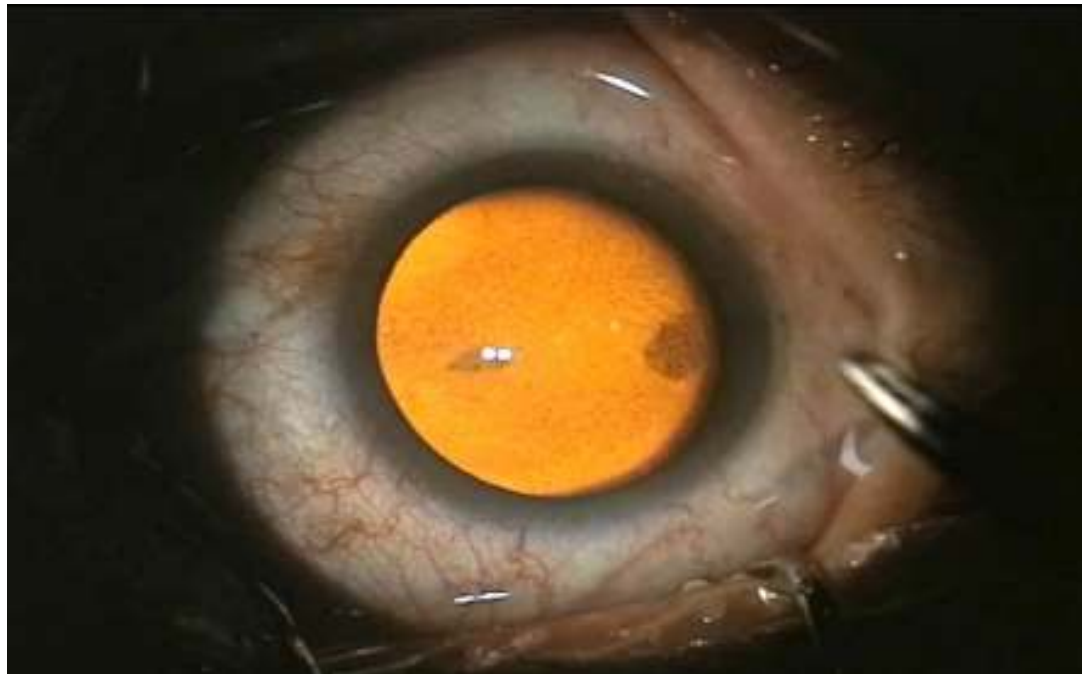
- Combined phacotrabeculectomy may be an option for some patients with PACG.
- It is suggested that advanced PACG may signify a long duration of angle closure and irreversible structural changes in the trabeculum, and patients who require a low target IOP may be candidates for this procedure.
- Combined phacotrabeculectomy may obviate postoperative IOP spikes that can occur after cataract surgery, especially in patients with advanced optic neuropathy.
- Moreover, because combining these surgeries may eliminate many postoperative visits and interventions, phacotrabeculectomy may be more convenient for the patient.

What about Conj & Sclera in such patients





How to lower the pressure Intra-Op?



How to avoid early post-op hypotony?





Phaco-Trab in Narrow Eyes

