

# Phacotrabeculectomy with Releasable Sutures in Primary Angle Closure Glaucoma: a Randomized Controlled Study

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2018



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## Primary Angle Closure Glaucoma (PACG)

One of the **major causes** of blindness worldwide affecting about **15 million** people

Prevalence is higher in **Asian** population

*Tham Y et al. Ophthalmology, 2014.*

## Primary Angle Closure Glaucoma (PACG)

**Lens extraction** represents an **effective method** of reducing the IOP irrespective of the lens clarity.

*Azuara-Blanco A et al. Trials, 2011*

## Primary Angle Closure Glaucoma (PACG)

Prevalence of angle closure glaucoma increases with age, therefore cataract and glaucoma usually coexists.

Moreover, cataract extraction reduces the IOP.

SO many authorities would recommend **Combined Phacotrabeulectomy** to treat both conditions in the same setting.

## Primary Angle Closure Glaucoma (PACG)

**Tham et al. in 2008 and 2009 conducted Two Prospective randomized Clinical Trials Comparing Combined Phacotrabeculectomy to Phacoemulsification alone**

### In both studies:

**Phacoemulsification alone** was effective in reducing the IOP and that **Trabeculectomy** was needed in **only 2.9% (only one case out of 35 cases) of medically controlled and 14.8% of medically uncontrolled CACG cases.**

IOP was **lower (by < 1.5 mmHg)** in the combined surgery group and on the expense of complications namely **hypotony.**

## Primary Angle Closure Glaucoma (PACG)

The use of **releasable sutures** in trabeculectomy aims at closing the scleral flap **tightly, avoiding complications of the overflow and hypotony,** and then titrate IOP post operatively.

***Usha Kaul Raina and Deven Tuli. Arch Ophthalmol, 1998.***

## AIM OF WORK

To compare the effectiveness of the Phacoemulsification alone to the Combined Phacotrabeculectomy with releasable sutures in the management of PACG patients regarding the percentage of IOP reduction and the number of glaucoma medications needed

## Patients and Methods

- A **prospective** randomized controlled study.
- A total of **Sixty-three** eyes of **sixty three** patients.

**Methods** (Continued)**Inclusion Criteria**

- Patients diagnosed with **PACG**; based on **three** criteria:
  1. IOP > 21 mmHg.
  2. Glaucomatous optic neuropathy.
  3. Gonioscopy revealing >180 degrees of irido-trabecular contact.

**Exclusion Criteria**

- Eyes with **retinal pathologies**.
- Eyes with **corneal opacities** impeding visualization during phacoemulsification.
- Previous intraocular surgery **with the exception of laser iridotomy**.
- Patients who **did not complete 3 months of follow up**.

**Methods** (Continued)**All patients underwent:**

A complete preoperative assessment, including:

- History taking.
- Measurement of **BCVA** using Snellen's chart.
- Slit lamp examination.
- **IOP measurement** using **Goldmann applanation tonometry**.
- **Indentation gonioscopic examination** to differentiate between appositional and synechial angle closure.
- A detailed dilated fundus examination including **vertical cup to disc ratio (VCDR)** assessment.
- **Visual field assessment** using **Humphery automated perimetry**.
- **Ultrasonography** was done in eyes with dense cataract.

## Methods (Continued)

Then the Eyes were randomized into two groups

Group 1: **Combined Phacotrabeculectomy** with adjunctive mitomycin C (**MMC**), and watertight closure of the scleral flap using at least **4 releasable sutures**.

Group 2: **Phacoemulsification alone.**

## Methods (Continued)

### Surgical Technique




**Methods** (Continued)**Postoperative Follow**

**up** Postoperative follow-up visits were planned to be at **day 1, 1<sup>st</sup> week, 1<sup>st</sup>, 3<sup>rd</sup>, 6<sup>th</sup>, 9<sup>th</sup> and 12<sup>th</sup> month**


In the **Phacotrabeculectomy group**, if the pressure was **higher than desired in the first two**

**weeks**  **bleb massage** was done

 If the IOP remained unsatisfactory

**One or more of the central releasable sutures** were removed. The two releasable sutures **at the corners of the scleral flap** were not removed in **the first two weeks** postoperatively, to guard against **hypotony**

**Methods** (Continued)

 When the pressure remained high despite **removal of all scleral flap sutures**

**Needling with subconjunctival injection of 5- Fluorouracil (5-FU)** was performed. A **maximum of 3 needlings** were performed

 Then if the IOP was still high

**Topical antiglaucoma medications** were restarted

In the **Phacoemulsification group**, antiglaucoma medications were started when **the IOP was >21 mmHg**

# RESULTS

## AND

# DISCUSSION

	Combined Phacotrabeculectomy	Phacoemulsification	<i>P-value</i>
<b>Eyes</b>	<b>31</b>	<b>32</b>	
<b>Right (%)</b>	18 (41.9%)	14 (43.75%)	0.25
<b>Laterality</b>	Unilateral: 6 (19.35%) Bilateral: 25 (80.65%)	-Unilateral: 6 (18.75%) -Bilateral:26 (81.25%)	
<b>Gender</b>			
<b>Male (%)</b>	20 (64.5%)	16 (50%)	0.24
<b>Age at presentation (years)</b>			
<b>Range</b>	42-71	42-73	0.47
<b>Mean <math>\pm</math>SD</b>	57.3 $\pm$ 8.3	58.8 $\pm$ 8.4	
<b>Diabetes</b>	5 (16.1%)	7 (21.8%)	0.33
<b>Crystalline lens status</b>	- <b>Cataractous: 24 (77.4%)</b> - Clear: 7 (22.5%)	- <b>Cataractous:24 (75%)</b> - Clear: 8 (25%)	0.82
<b>Cup-to disc ratio</b>			
<b>Range</b>	0.4-1	0.4-0.9	0.13
<b>Mean <math>\pm</math>SD</b>	0.7 $\pm$ 0.14	0.7 $\pm$ 0.14	
<b>Preoperative VA</b>	0.008-1 0.28 $\pm$ 0.24	0.008-1 0.3 $\pm$ 0.27	0.55



		Combined Phacotrabeculectomy	Phacoemulsification	P-value
<b>Preoperative</b>				
	IOP (mmHg)	25.6 ± 11.14 (13-56)	21.6 ± 9.2 (10-45)	0.143
	Medications (no)	2.8 ± 1 (0-5)	2.3 ± 0.9 (1-4)	0.113
<b>Postoperatively</b>				
<b>One Month</b>				
	IOP (mmHg)	13.9 ± 6 (2-30)	14.4 ± 3.6 (7-22)	0.692
	<b>IOP Percentage Reduction (%)</b>	<b>38.3 ± 31 (-29.4%, 92.3%)</b>	<b>24.1 ± 32 (-66.6%, 70%)</b>	0.084
	Medications (no)	0.06 ± 0.2 (0-1)	0.4 ± 0.8 (0-3)	0.033
<b>Three months</b>				
	IOP (mmHg)	13 ± 4.1 (6-22)	13 ± 5.4 (8-38)	0.958
	<b>IOP Percentage Reduction (%)</b>	<b>43.5 ± 20.7 (0%-82.6%)</b>	<b>33.4 ± 27 (-31%, 80%)</b>	0.108
	Medications (no)	0.12 ± 0.42 (0-2)	0.53 ± 0.87 (0-3)	0.03

		Combined Phacotrabeculectomy	Phacoemulsification	P-value
<b>Sixth months</b>				
	IOP (mmHg)	12.7 ± 3.8 (6-22)	12.4 ± 2.5 (8-18)	0.143
	<b>IOP Percentage Reduction (%)</b>	<b>42 ± 32 (-53%, 80%)</b>	<b>34 ± 28 (-80%, 72.5%)</b>	0.306
	Medications (no)	0.32 ± 0.59 (0-2)	0.51 ± 0.85 (0-3)	0.304
<b>12 months</b>				
	IOP (mmHg)	13.2 ± 3 (7-20)	12.6 ± 2.6 (8-17)	0.434
	<b>IOP Percentage Reduction (%)</b>	<b>38 ± 29 (-50%, 80%)</b>	<b>32 ± 28 (-60%, 76%)</b>	0.434
	Medications (no)	0.46 ± 0.9 (0-4)	0.46 ± 0.81 (0-3)	1
<b>Last Follow-up</b>				
	IOP (mmHg)	13 ± 2.7 (6-20)	12.4 ± 2.7 (7-17)	0.425
	<b>IOP Percentage Reduction (%)</b>	<b>41 ± 24 (-60%, 68%)</b>	<b>39 ± 27 (-50%, 76%)</b>	0.425
	Medications (no)	0.63 ± 1 (0-4)	0.58 ± 0.85 (0-3)	0.72

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## Results & Discussion (Continued)

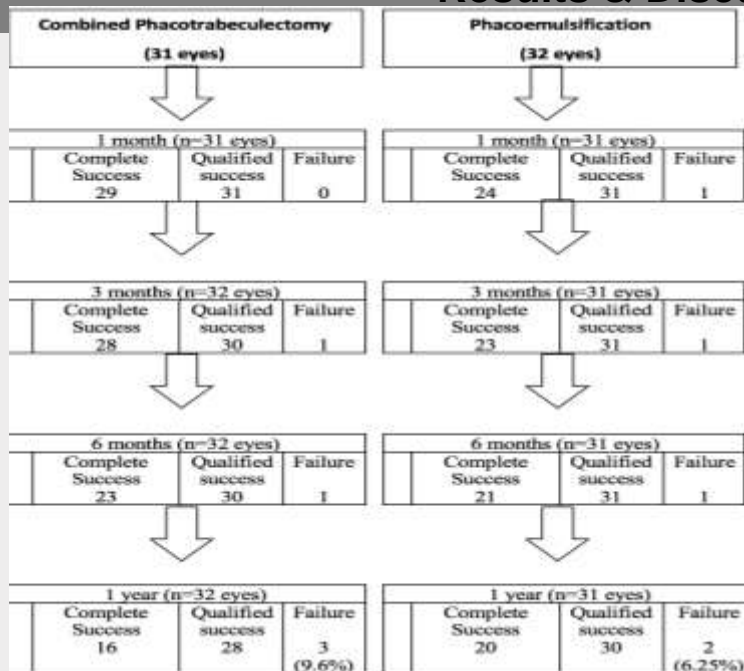
### III- Success and Failure Rate:

**Complete success** was defined as IOP of 5 to 21 mmHg at the last follow-up visit with no other signs of glaucoma progression

The use of glaucoma medications to achieve such a pressure was considered as **qualified success**.

**Failure** was considered if no such pressure could be achieved despite maximum tolerated medical treatment, or if a subsequent glaucoma procedure was needed to control the IOP or if a vision-threatening complication occurred (e.g. chronic hypotony, endophthalmitis).

## Results & Discussion (Continued)



**Results & Discussion** (Continued)

<b>I</b>	Combined Phacotrabeculectomy	Phacoemulsification	P-value
<b>Complications</b>			
Choroidal detachment	1 (3%)	1 (3%)	0.98
Shallow AC	4 (12.9%)	0 (0%)	
Conjunctival retraction	1	0	
Hyphema	1	0	
Posterior capsular rupture and vitreous loss	0	1	
Corneal edema	<b>6 (19%)</b>	<b>9 (28%)</b>	0.66
Corneal ulcer	1	0	
Pupillary membrane	3 (9.6%)	1 (3.1%)	1.00
Hypotony	<b>4 (25.8%)</b>	0	

**Results & Discussion** (Continued)**V-Interventions done during the follow up period:**

	Combined Phacotrabeculectomy	Phacoemulsification	P-value
<b>Interventions</b>			
Reformation of AC	4 (12.9%)	0 (0%)	
Needling and injection of 5 FU	<b>11 (35.4%)</b>	0 (0%)	
<b>Subsequent Procedures</b>			
Trabeculectomy	0 (0%)	<b>2 (6.25%)</b>	
Cyclophotocoagulation	<b>1 (3.22%)</b>	0	

# CONCLUSION

## CONCLUSION

- **Phacoemulsification alone** seems to be as effective as **Combined Phacotrabeculectomy with releasable sutures** in **controlling the IOP** in patients with **PACG**.
- Only **two eyes** (6.25%) who underwent **Phacoemulsification alone** eventually required **Trabeculectomy** with adjunctive mitomycin C to control the IOP.
- **Phacoemulsification alone reduces the risks** of the filtering surgery such as hypotony, shallow AC and bleb encapsulation which in turn require further postoperative interventions.
- **The use of releasable sutures** helped to **titrate the pressure** postoperatively but over **the long term the difference in IOP reduction** between both groups is **negligible**.

