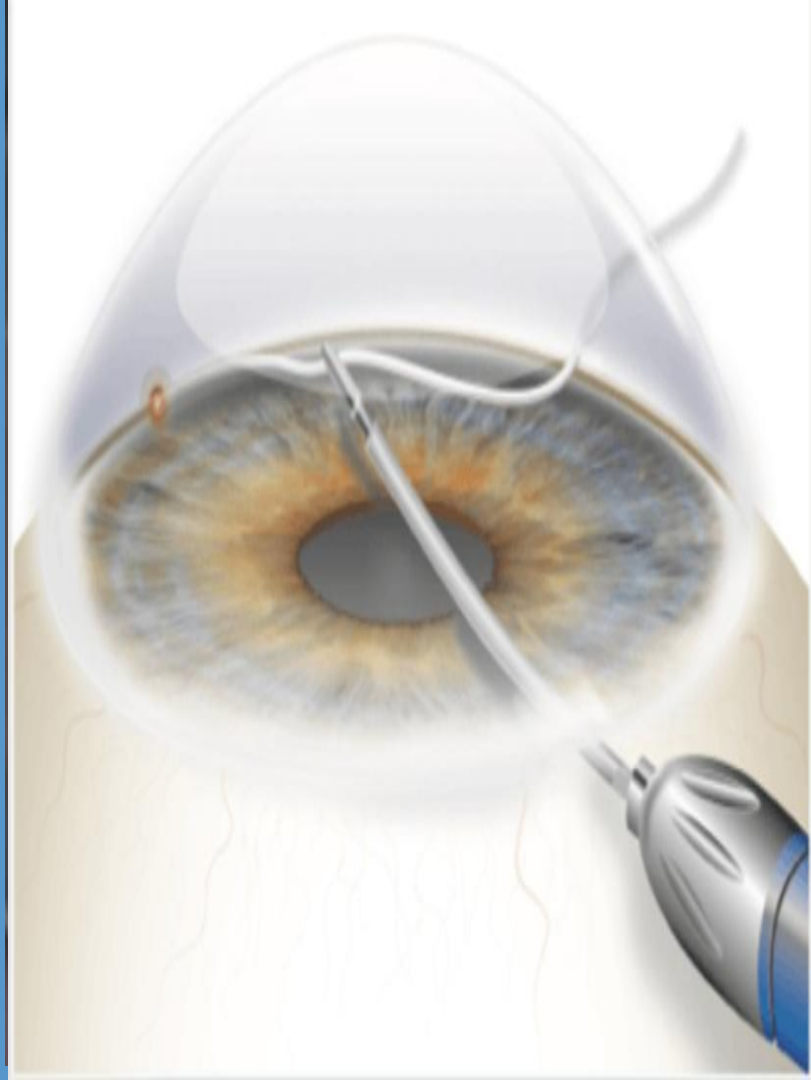


Incidence of Descemet Membrane Detachment Post Gonioscopy-Assisted Transluminal Trabeculotomy

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Participants :

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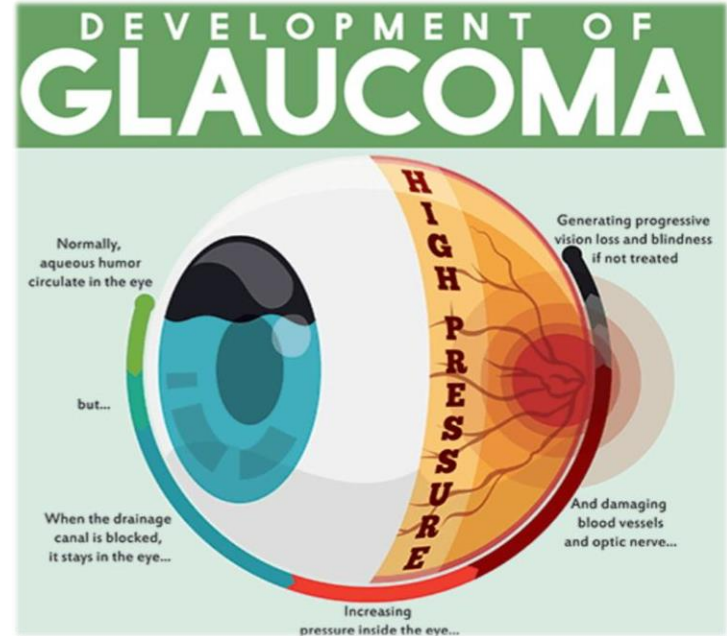
Background and Rationale

Glaucoma:

Glaucoma is the most common cause of **irreversible blindness** worldwide.

The major site of **resistance** to aqueous humour outflow lies in the TM specially juxtacanalicular part.

Conventional **surgical procedures** to treat glaucoma rely on bypassing this resistance using filtering procedures like trabeculectomy or aqueous shunts.

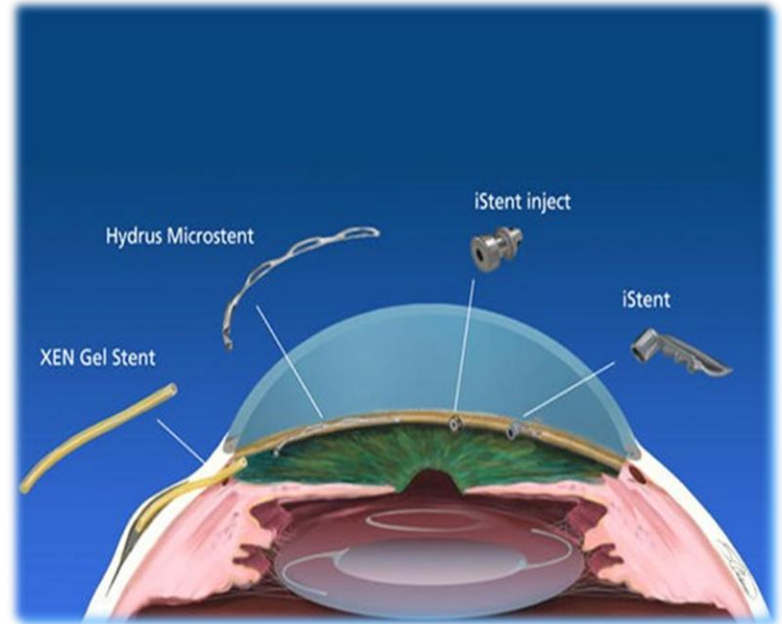


Background and Rationale

Glaucoma:

Angle based procedures (goniotomy and trabeculotomy) are the standard procedures in management of **childhood** glaucoma and recently they are found to be effective in **adult** primary and secondary Glaucoma .

Minimally invasive glaucoma surgeries target the more physiological outflow pathway through TM and inner wall of SC.



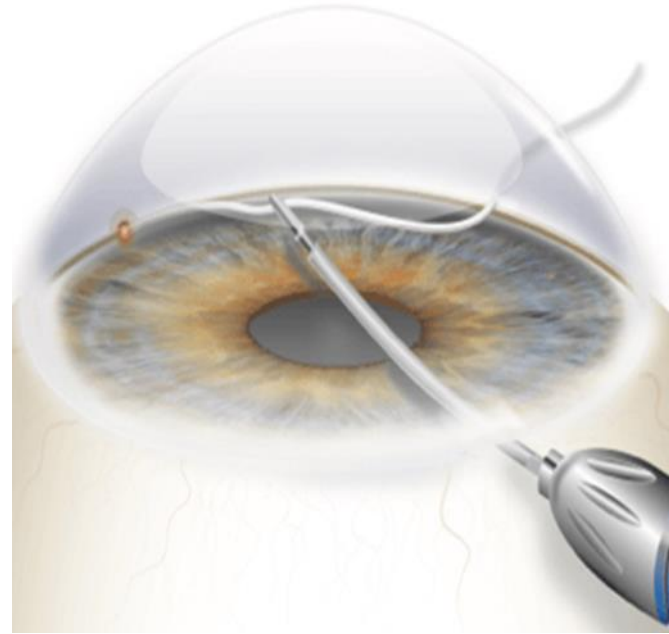
Background and Rationale

GATT:

Grover et al. Described gonioscopy-assisted transluminal trabeculotomy (**GATT**) procedure in 2014 which seeks to create a 360° trabeculotomy from an ab interno approach.

And they found that the GATT is an **effective and safe** intervention

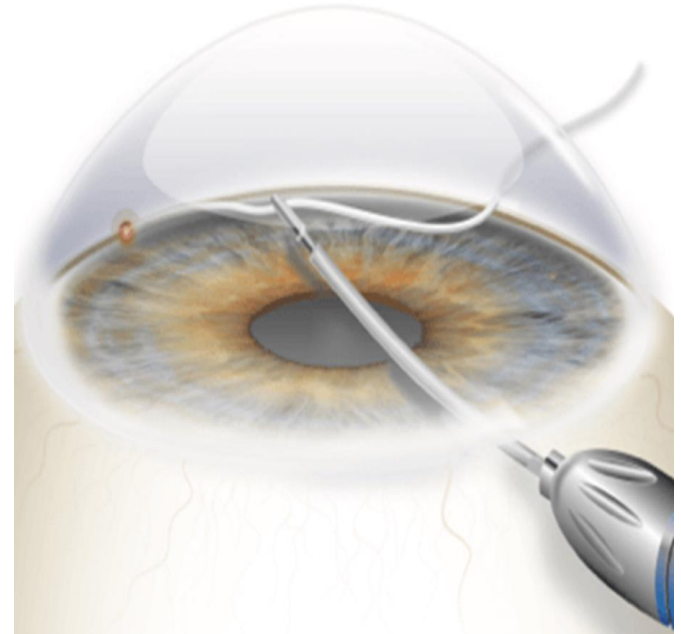
With the **advantage** of low rate of long-term complications compared to filtration surgery and the intervention is feasible even when conjunctival scarring is encountered.



Background and Rationale

Complications of GATT:

- **The most common complication post GATT** was transient hyphema.
- Other reported complications were persistent corneal oedema, iridodialysis, cystoid macular oedema and Descemet membrane detachment.
- In 2018, Grover et al. reported an incidence of 0.5% of Descemet membrane detachment in peripheral cornea post GATT.



Aim of The Work:

Detect the incidence of Descemet membrane detachment post (GATT) Gonioscopy-Assisted Transluminal Trabeculotomy by anterior segment optical coherence tomography in patients with open angle glaucoma.

Patients & Methodology:

Population of study:

Patients with open angle glaucoma presenting to the ophthalmology outpatient clinic of – Kasr Al-Ainy – Cairo University Hospital and underwent GATT surgery.

Study Location

Cairo University Hospital.



Patients & Methodology:

Study Design:

This is a prospective clinical study that was conducted on 30 eyes in the interval between June 2022 and January 2023

Inclusion Criteria:

- Age 18 – 70 years.
- Patients with open angle glaucoma undergoing gonioscopy assisted transluminal trabeculotomy



Patients & Methodology:

Exclusion criteria:

- Patients with with open angle glaucoma and aphakia.
- Patients with congenital glaucoma.
- Patients with open angle glaucoma undergoing phaco –gonioscopy–assisted transluminal trabeculotomy.
- Patients with neovascular glaucoma.
- Patients with pigmentary glaucoma.



Methodology in details:

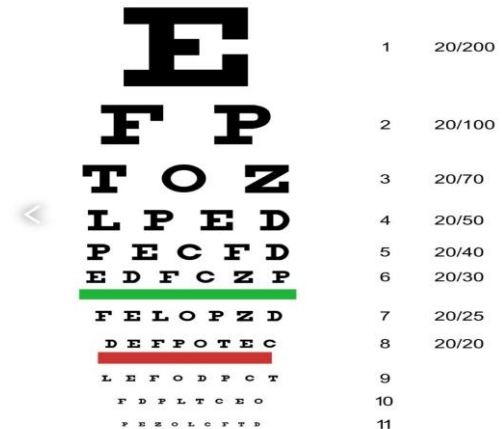
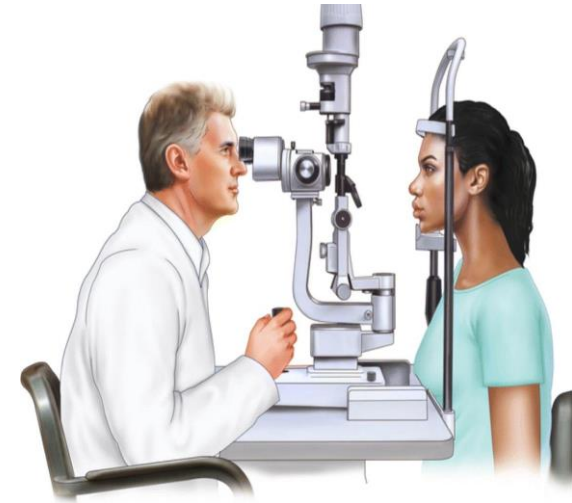
All selected patients received a thorough explanation of the study design and aims, and signed an **informed consent**.

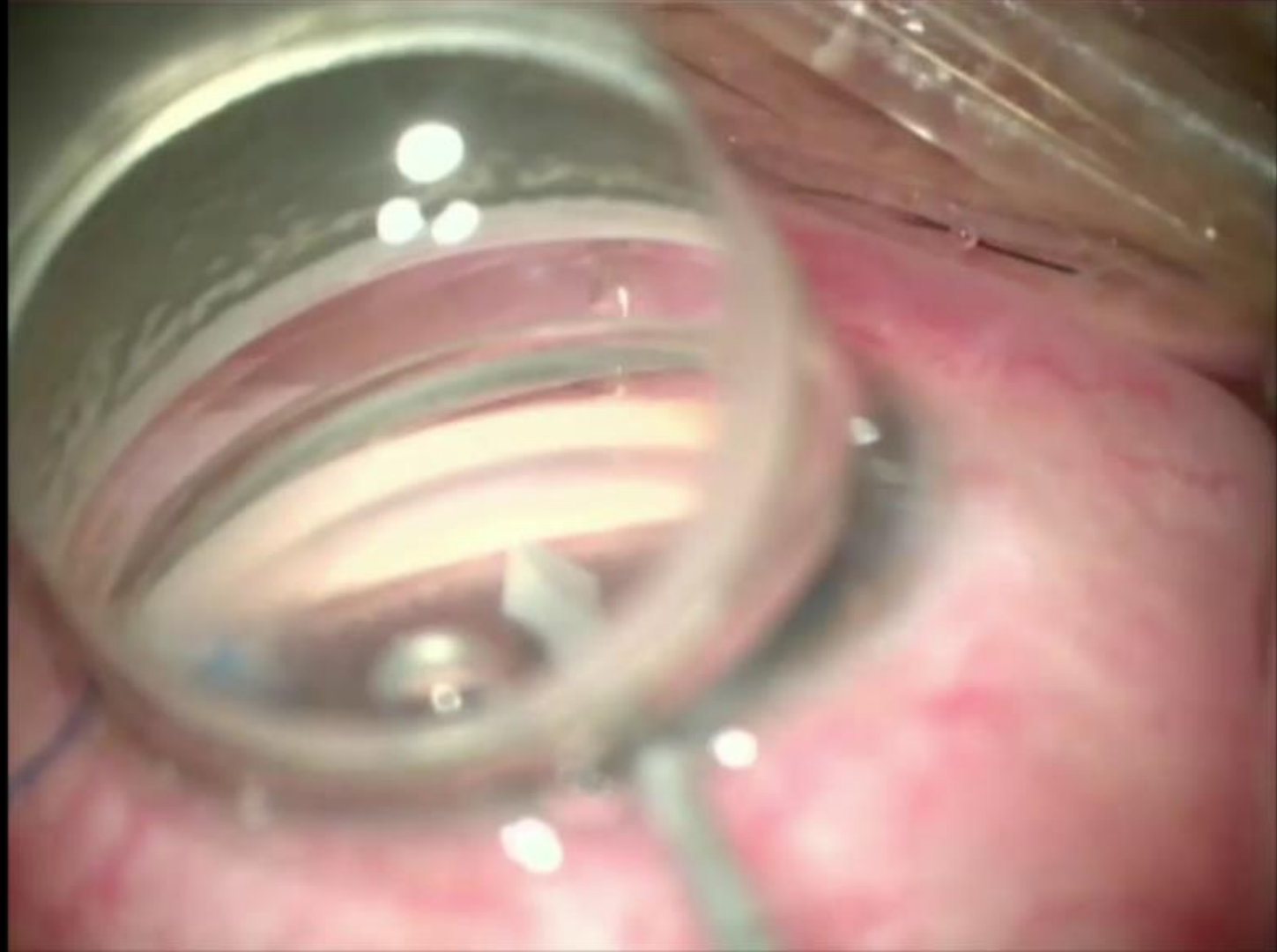


Methodology in details:

Preoperative Assessment: of all participants will include:

- Best corrected visual acuity (**BCVA**) using decimal.
- **Slit lamp examination** of the anterior segment.
- **Gonioscopy** using Goldmann lens.
- **Intraocular pressure measurement** using Goldman applanation tonometry.
- **Dilated fundus examination** by binocular indirect ophthalmoscopy and slit-lamp bio microscopy using +90 D Volk Condensing lens.
- **Visual field** testing if the vision permits.
- **Preoperative anterior segment OCT using SD-OCT:** Optovue RTVue (Optovue Inc., Fremont, CA, USA) to exclude presence of Descemet membrane detachment for the cases who underwent previous anterior segment surgeries.





Methodology in details:

Post-operative Care:

- NSAID eye drops 3 times per day for 2 weeks
- topical broad spectrum antibiotic eye drops for 1 week
- oral tranexamic acid to control hyphema
- semi sitting position after surgery.

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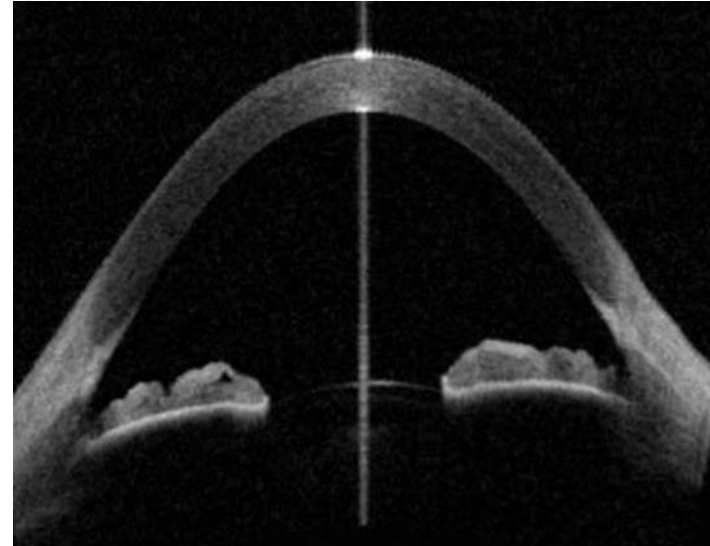
Methodology in details:

On the first post-operative day:

- **Slit lamp examination** of the anterior segment.
- **IOP** measurement using GAT.
- **Screening for Descemet membrane detachment** by anterior segment optical coherence tomography using SD-OCT: Optovue RTVue (Optovue Inc., Fremont, CA, USA) for the angle day 1 post operative for all patients and 1 week post operative in cases with Descemet membrane detachment to check for spontaneous resolution.

One month post-operative the patients underwent

- Best corrected visual **acuity (BCVA)** using decimal.
- **IOP** measurement using GAT.



Results:

Baseline characteristics of the study population:

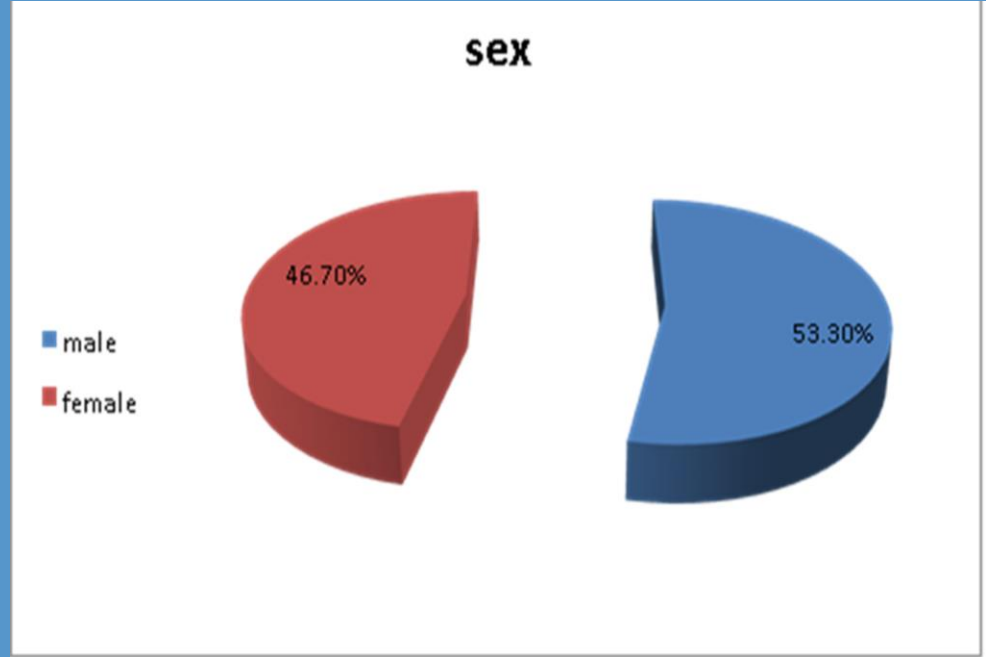
Our study included 30 eyes of 28 patients with age range from 18 – 70 years underwent gonioscopy-assisted transluminal trabeculotomy.

Age (mean, SD)	(48.97, 19.65)
Range	18 – 70 years.
Diagnosis	
• JOAG	7 (23.3%)
• POAG	17 (56.7%)
• Uveitic OAG	2 (6.7%)
• Silicon oil induced glaucoma	2 (6.7%)
• PXG	1 (3.3%)
• Inflammatory glaucoma	1 (3.3%)
Preoperative BCVA (Decimal) Mean (SD)	0.28 (0.21)
Preoperative cup to disc ratio Mean (SD)	0.82 (0.19)

Results:

Gender distribution:

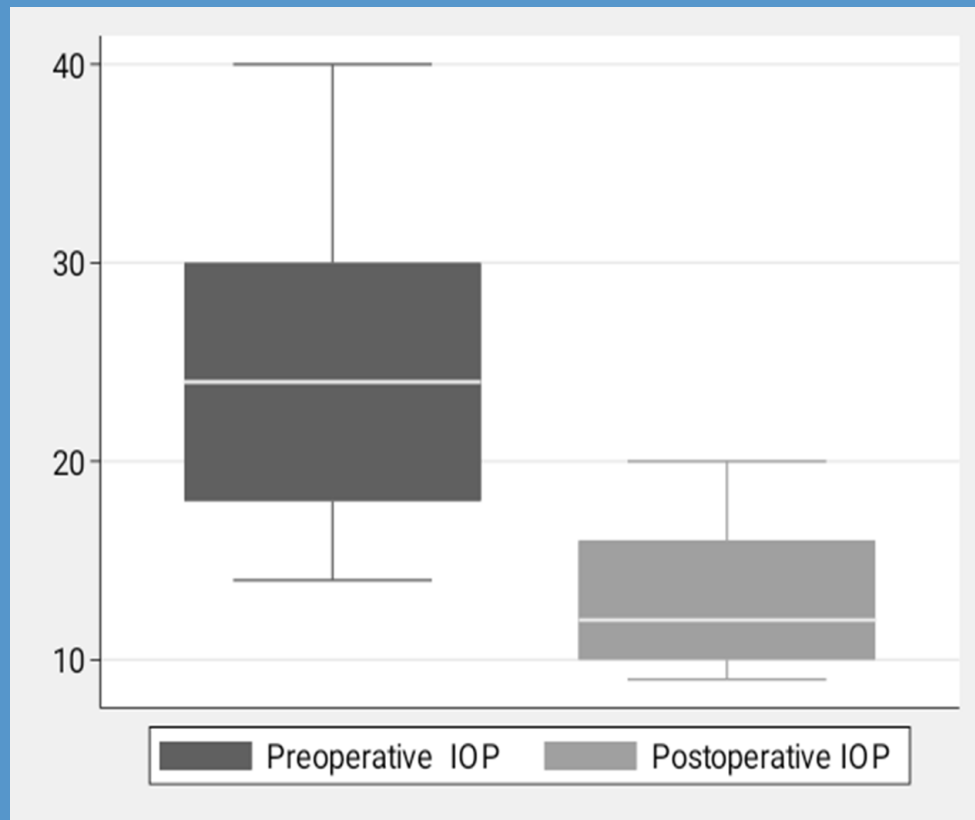
53.3% of them were males and 46.70% of them were females.



Results:

Relationship between preoperative and one month post-operative intraocular pressure measurement by GAT:

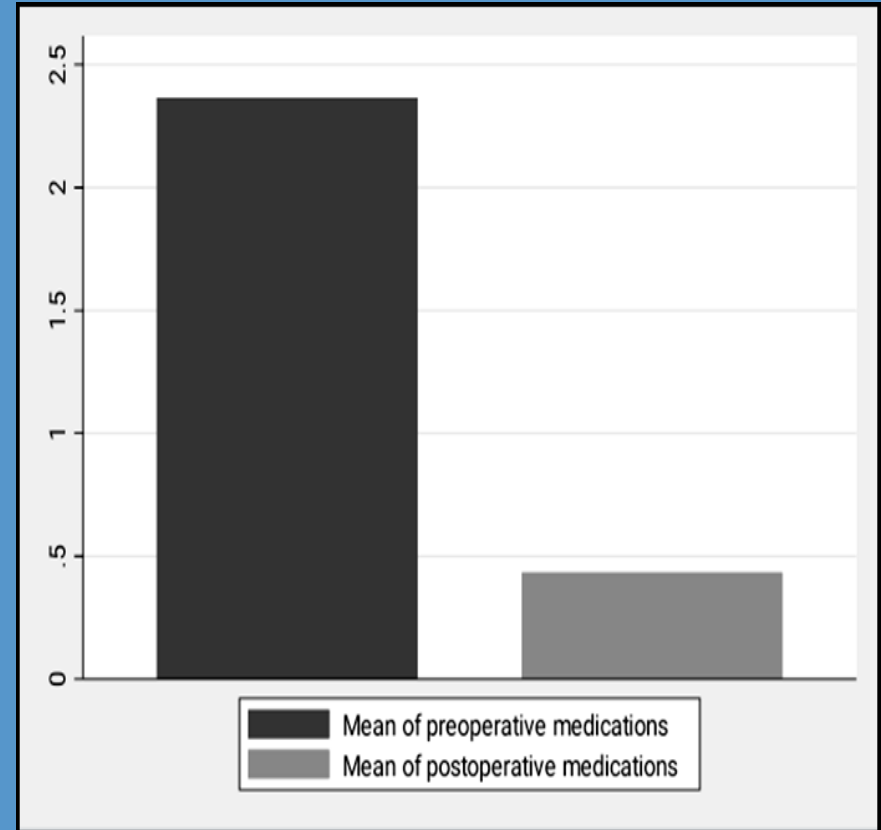
	Pre-operative	Post-operative	P value
IOP mmHg	24.63	13.17	<0.0001
Mean (SD)	(7.26)	(3.27)	



Results:

Relationship between preoperative and one month post-operative NGM (number of Glaucoma medications):

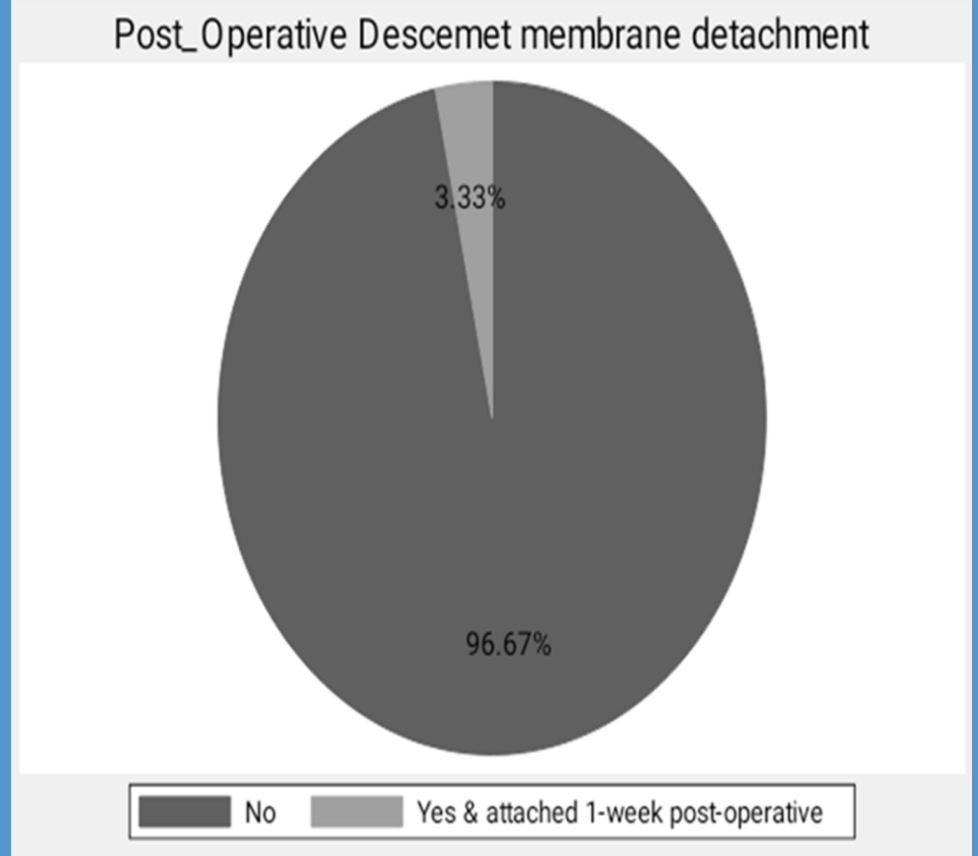
	Pre-operative	Post-operative	P value
Number of Glaucoma Medications Mean (SD)	2.37 (1.33)	0.43 (0.9)	<0.0001



Results:

Incidence of Descemet membrane detachment at the first post-operative day:

Descemet membrane detachment occurred in one case and healed spontaneously after one week (3.3%).



Results:

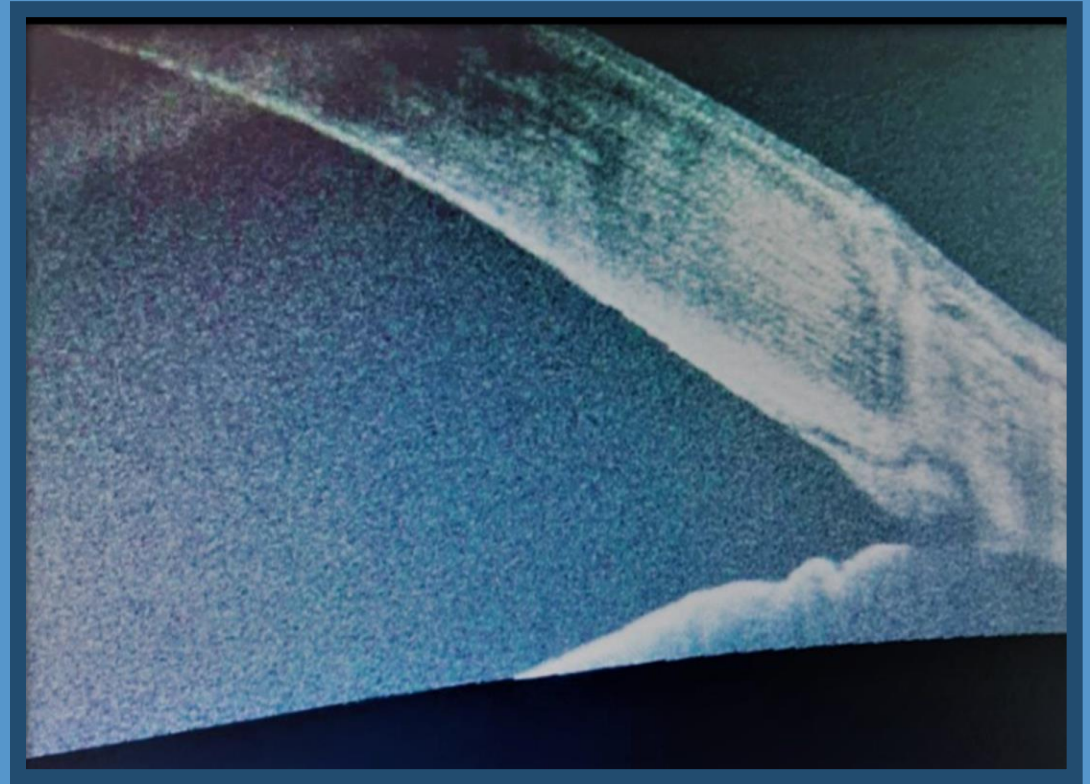
Descemet membrane detachment post gonioscopy assisted transluminal trabeculotomy in the nasal angle:





Results:

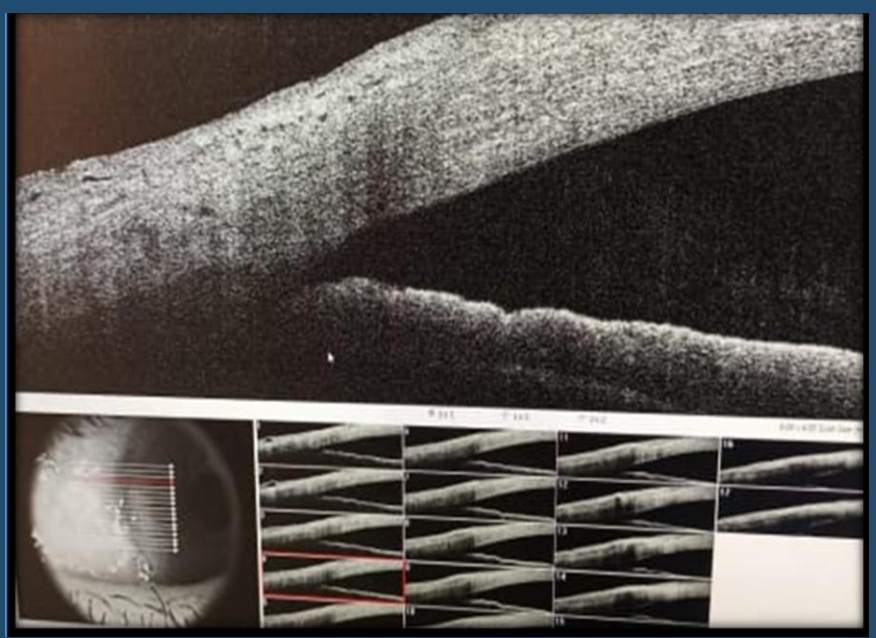
Spontaneous healing of Descemet membrane detachment after one week without surgical intervention.



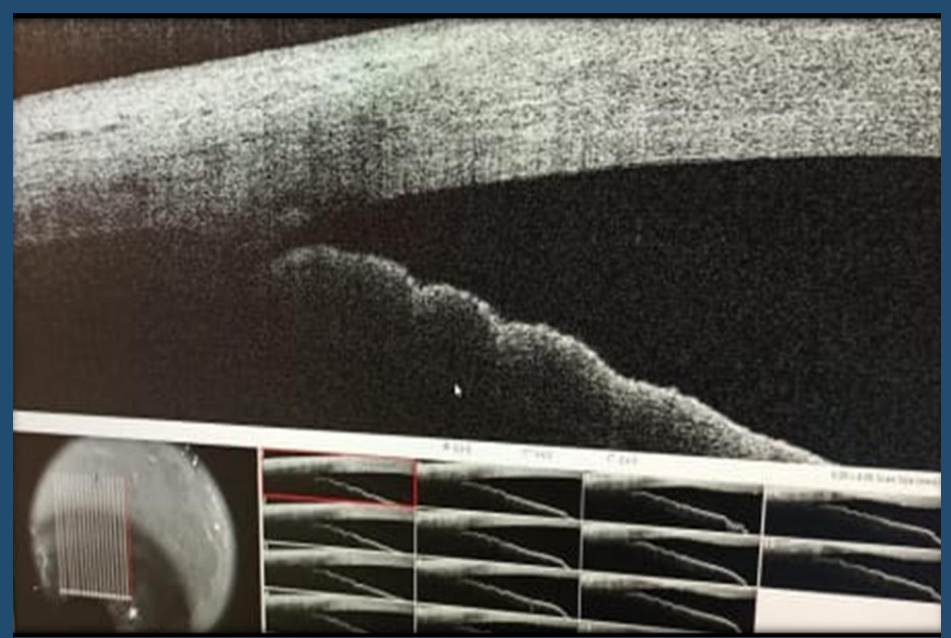


Results:

Normal nasal angle post GATT.

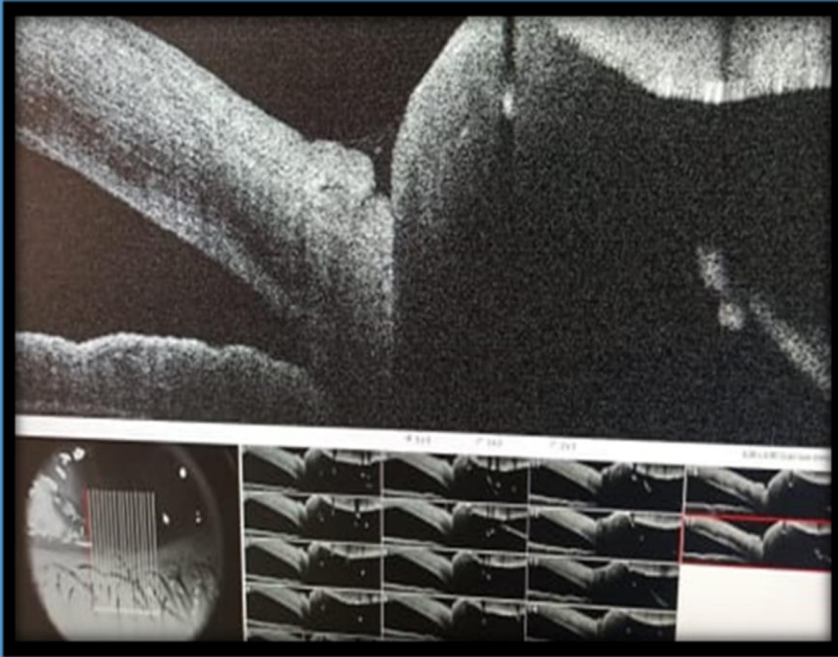


Normal superior angle post GATT.

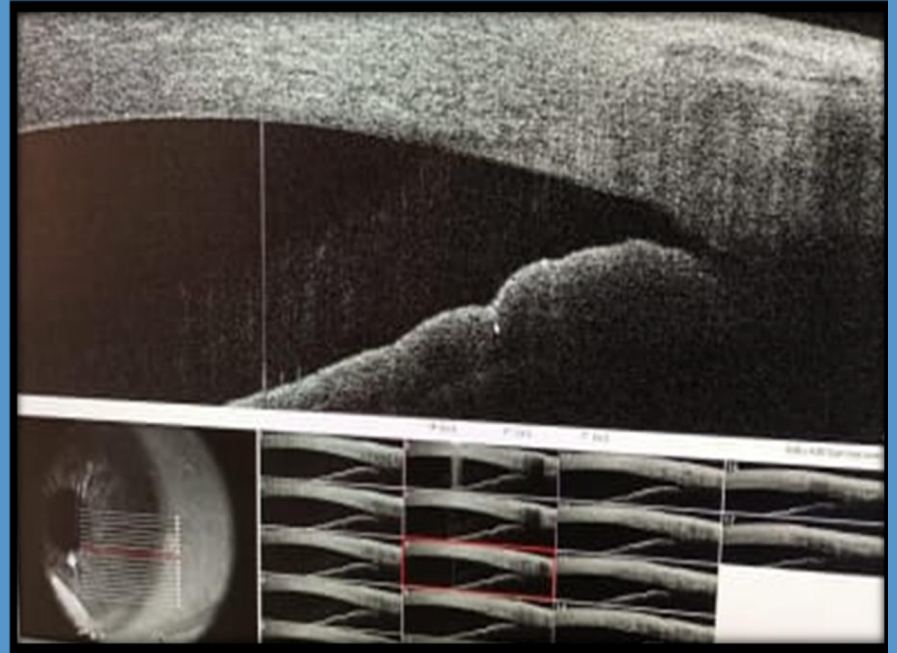


Results:

Normal inferior angle post GATT.



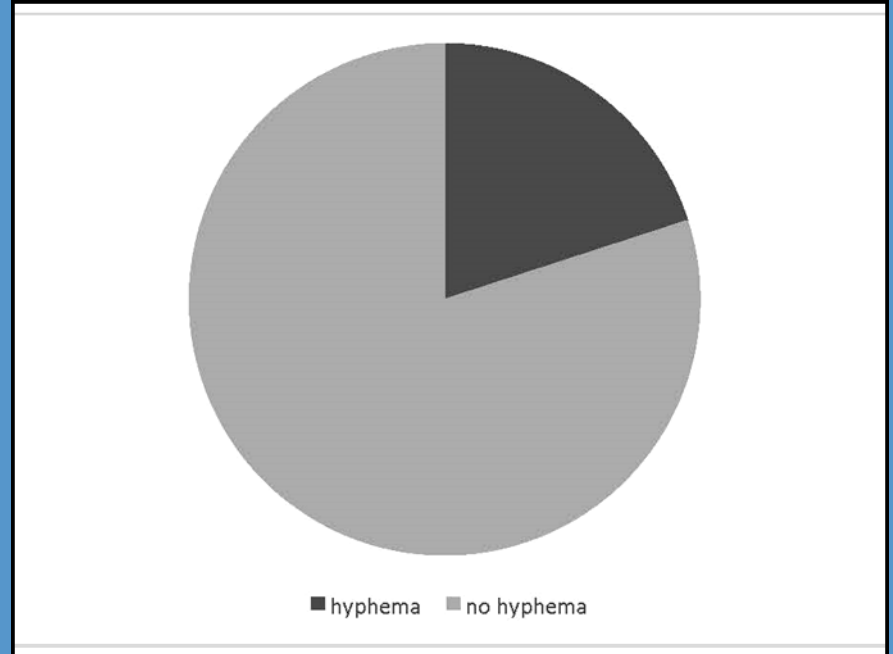
Normal temporal angle post GATT.



Results:

Incidence of hyphema post gonioscopy-assisted transluminal trabeculotomy:

20% (6 cases out of 30 cases with the level ranging from 0.5 mm to 4 mm and resolved conservatively after 1 week).



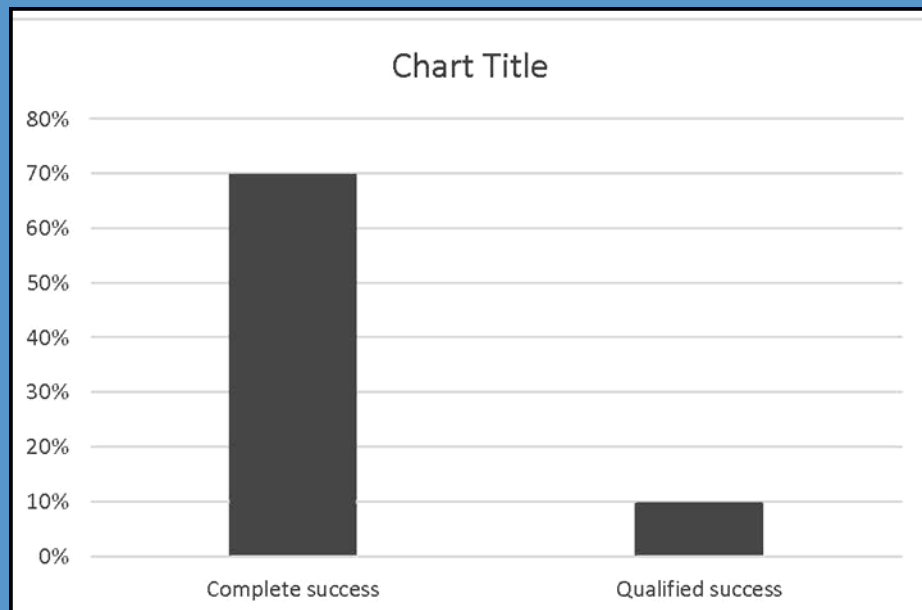
Results:

The complete and qualified success rates:

The complete and qualified success rates were defined as an IOP \leq 18mmHg and a reduction of IOP by \geq 20% from baseline with (qualified success) or without (complete success) glaucoma medications.

The percent change in IOP ranged from 0 to -72.5%, with a median (IQR) change of -44% (-60.7% - -28.6%).

Complete success	21 (70%)
Qualified success	3 (10%)



Results:

**Post-operative BCVA
and cup to disc ratio:**

Post -operative BCVA <u>Decimal</u> Mean (SD)	0.28 (0.20)
Post -operative cup to disc ratio Mean (SD)	0.82 (0.19)

Results:

Post-operative IOP spikes

:

Post-operative IOP spikes was defined as IOP more than 30 mmHg that responded to systemic carbonic anhydrase inhibitors.

Post-operative IOP spikes	3 (10%)
Number of cases (percentage)	2 cases JOAG and one case uveitic glaucoma.

Discussion:

Our study which included **30 eyes of 28 patients** with OAG who underwent 360 GATT.

The average **IOP reduction rate** was **44%** in patients with open angle glaucoma primary and secondary types

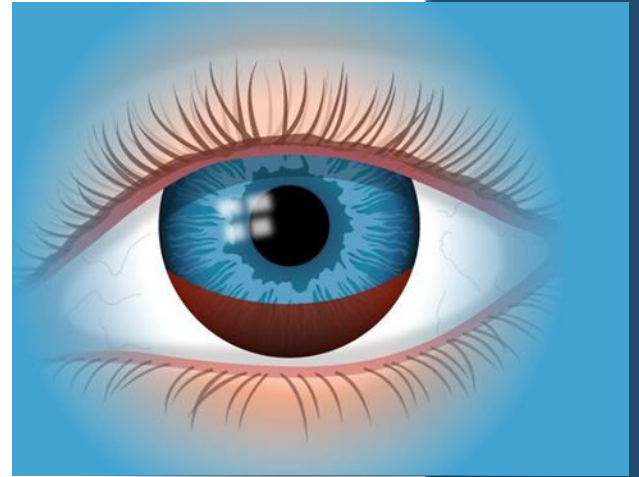
which was **similar** to IOP reduction rate to that of Grover et al. in their 24-month follow-up outcomes, they found that the average IOP reduction rate in POAG was **37.3%** and in SOAG **49.8%**.

Discussion:

One of the major advantages of the GATT procedure is its **safety**.

In our study we had 6 cases with microhyphema (20%) and all resolved after one week without surgical intervention. And that was similar to many authors reported incidence of hyphema from 10 -25%.

Some authors described the hyphema in Schlemm's-canal surgery as an **inevitable event** that happens after tearing the vascularized-angle structures and it is a good predictive sign of surgical success.



Discussion:

Risk factors for DMD

Preoperative patient-related factors:

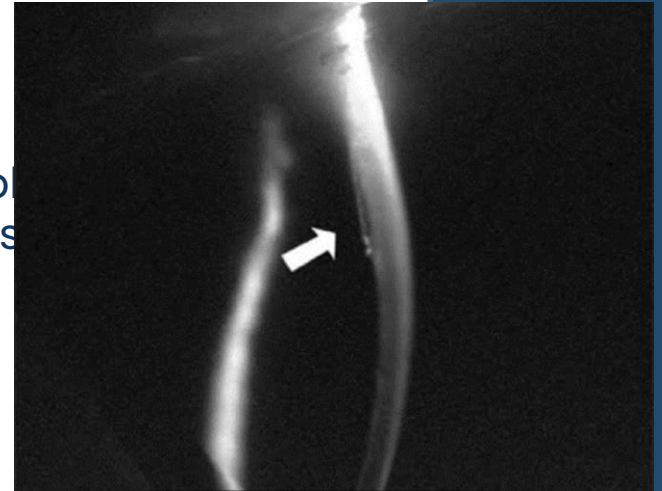
- Age over 65 years.
- Preexisting endothelial diseases like Fuchs dystrophy
- Intrinsic Descemet stromal interface abnormalities

Intraoperative factors:

- Clear corneal incision (small, oblique, ragged).
- Blunt instrumentation.
- Inadvertent damage by instruments.

Post-operative factors:

- Genetic causes of weak adhesion.
- Endothelial disorders like FECD.
- Abnormality in Descemet stromal interface.



Discussion:

To the best of our knowledge this is the first study conducted to document the incidence of Descemet membrane detachment following GATT surgery from the incision or even during cannulation of the angle with 5-0 prolene suture.

We found **one case** who was **70 years** old male pseudophakic patient out of 30 cases (**3.3%**) had Descemet membrane detachment in the nasal angle on day one post-operative which healed spontaneously after one week without the need for air or gas injection, which was **compared to the results of Grover** et al. as they reported 2 cases out of 198 cases (0.5%).

And this will add for the **safety** of GATT surgery.

Conclusion:

Ab interno angle surgery has revolutionized glaucoma surgery with the goal of reducing failure rates and bleb-related complications.

GATT is an effective conjunctival-sparing surgery in lowering the intraocular pressure and number of glaucoma medications for various forms of open-angle glaucoma.

GATT is a safe surgical procedure with low complications rate.

Descemet membrane detachment is a rare complication post GATT and can heal spontaneously without surgical intervention.

*Thank
you*

