LVPEI
So that all may see

**L V Prasad Eye Institute**

# LOW IOP (HYPOTONY), HIGH TENSION!


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# Ocular Hypotony

## Numerical

**IOP <6.5 mmHg, or less than 3 SDs below the mean**

## Clinical

Defined based on three factors:

- duration - acute, transient, chronic and permanent
- functional changes - asymptomatic or symptomatic
- structural changes - reversible or irreversible

Wang Q, et al. 2019
Rabiolo A, et al. 2024

# Hypotony based on duration

- As per WGA guidelines - Early (≤1 month) or late (>1 month)
- Most studies use 3 months as the cut-off between early and late hypotony.
- Acute hypotony - Immediate drop in intraocular pressure (IOP), often reversible.
- Transient hypotony – If IOP ≤5 mmHg in one or more visits disappears without therapy in ≤90 consecutive days and does not result in any consequences associated to hypotony.
- Chronic hypotony - Intraocular pressure (IOP) <5 mmHg in ≥2 consecutive visits lasting >90 days or any IOP ≤ 5 mmHg associated with hypotony-related problems or needing surgical intervention.
- Permanent hypotony - irreversible changes with transition to phthisis.

Abbas A,et al. 2019.

LOW IOP
NO
COMPLICATIONS

NORMAL IOP
BUT
HYOPTONY
COMPLICATIONS ???

- Young patients with more elastic sclera
- Myopes with thinner sclera
- Vitrectomized patients lacking vitreous body support for the sclera

In study by rabiolo et al. most patients with numerical hypotony did not develop any complications. Conversely, approximately 0.3% to 0.4% of patients with no numerical hypotony experienced hypotony

Rabiolo A, Hypotony Failure Criteria in Glaucoma Surgical Studies and Their Influence on Surgery Success. Ophthalmology. 2024

# When should we worry about Hypotony?

Review > Acta Ophthalmol. 2018 May;96(3):e285-e289.
doi: 10.1111/aos.13601. Epub 2017 Nov 29.

**Exploring literature-based definitions of hypotony following glaucoma filtration surgery and the impact on clinical outcomes**

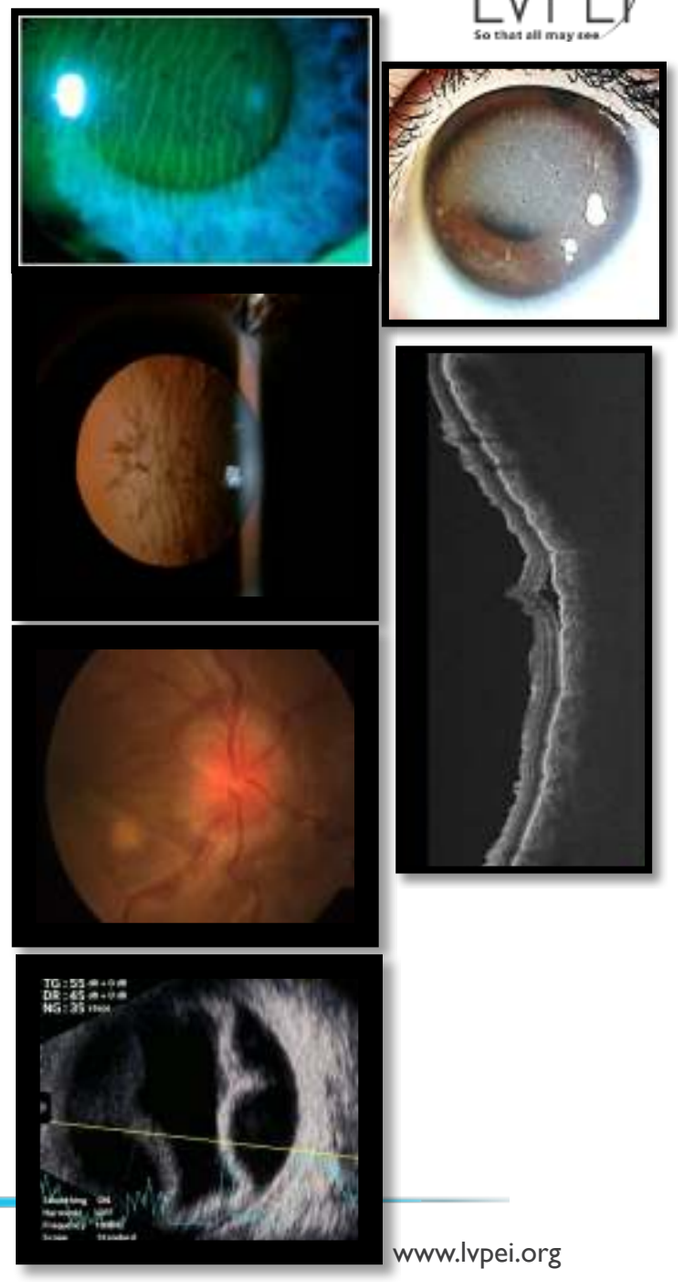
Ali Abbas [1], Pavi Agrawal [2], Anthony J King [2]

IOP ≤7 mmHg with CD or maculopathy, or requiring surgery to address hypotony-related complications at any time post GFS, regardless of IOP

Abbas A, Agrawal P, King AJ. Exploring literature□based definitions of hypotony following glaucoma filtration surgery and the impact on clinical outcomes. Acta Ophthalmologica. 2018 May;96(3):e285-9

# What can happen with low IOP??

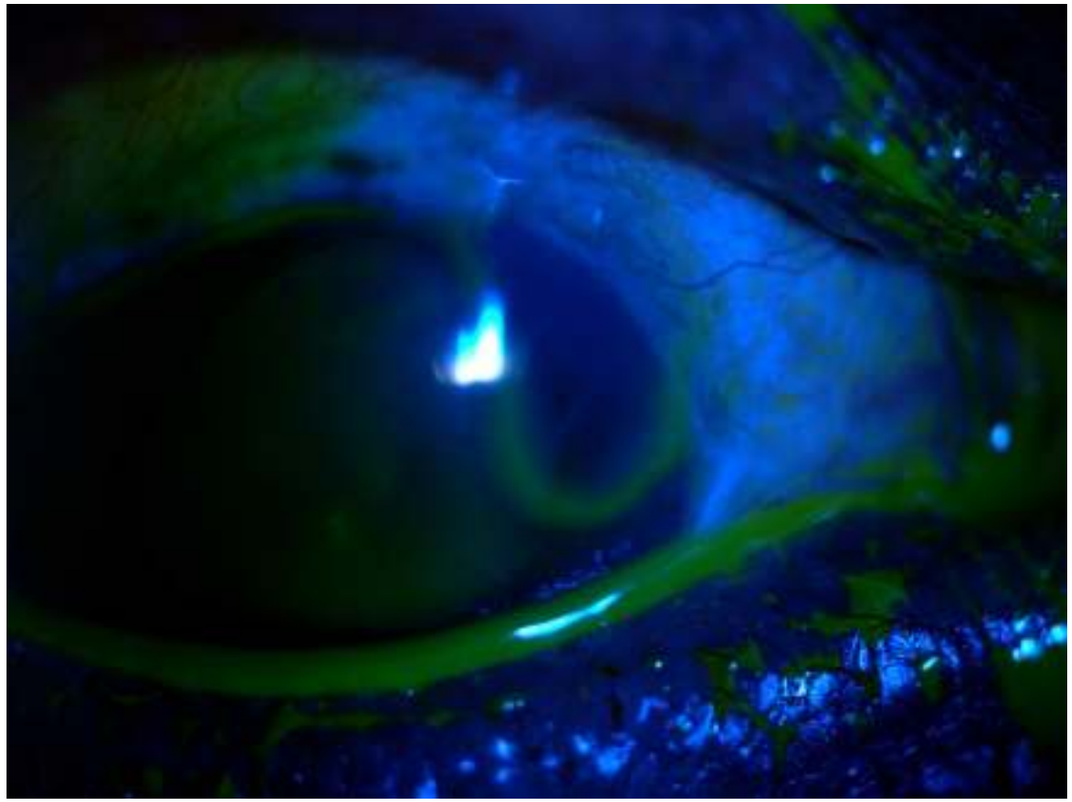
- Corneoscleral shrinkage
- Hypotony keratopathy
- Dystrophic calcification - Corneal epithelium, inner choroid, RPE
- Squarring of eyeball – Pull of EOM, high cylinder
- Detachment of ciliary body and retina
- Shrinkage of anterior vitreous - Cyclitic membrane
- Hypotony maculopathy, fixed folds, PRE and photoreceptor damage
- Intraocular hemorrhage and scarring



Schubert HD.. Survey of ophthalmology. 1996

# Early post trabeculectomy Hypotony

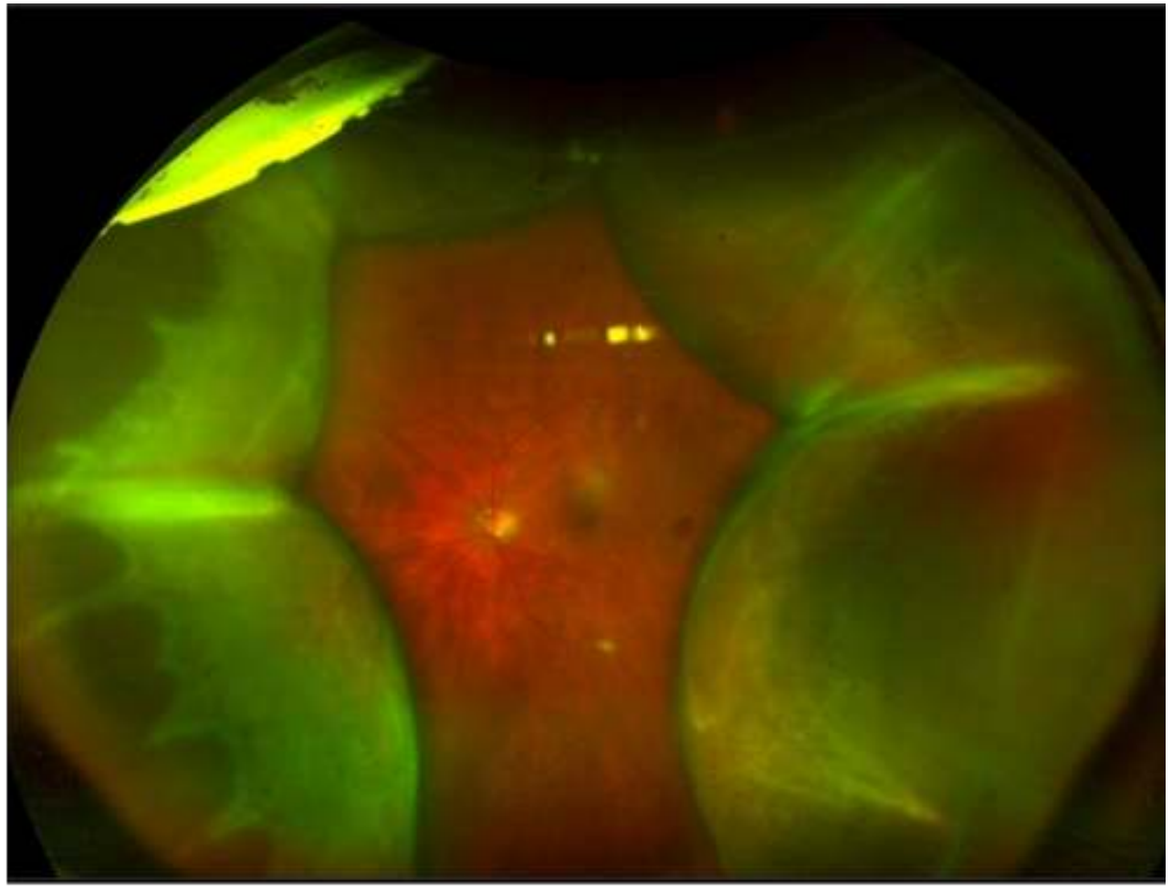
# In a Leak of its Own



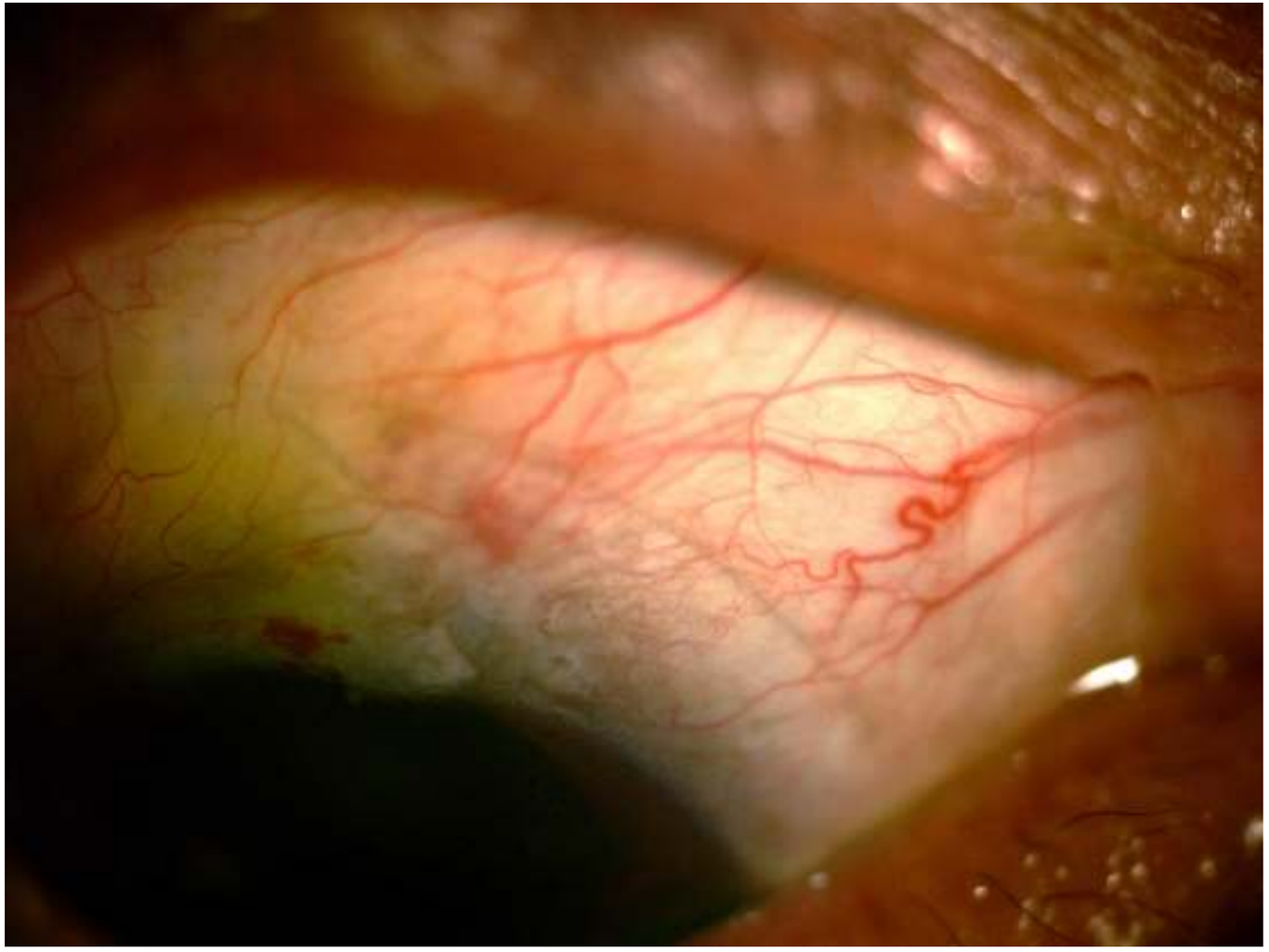
- 1 week post trabeculectomy with MMC
- IOP: 4 mmHg
- Shallow AC centrally & peripherally
- Leak from the edge of the wing suture
- Retina/choroid normal

What would be our next step?

# In a Leak of its Own



Would the decision change if there is a large choroidal detachment?

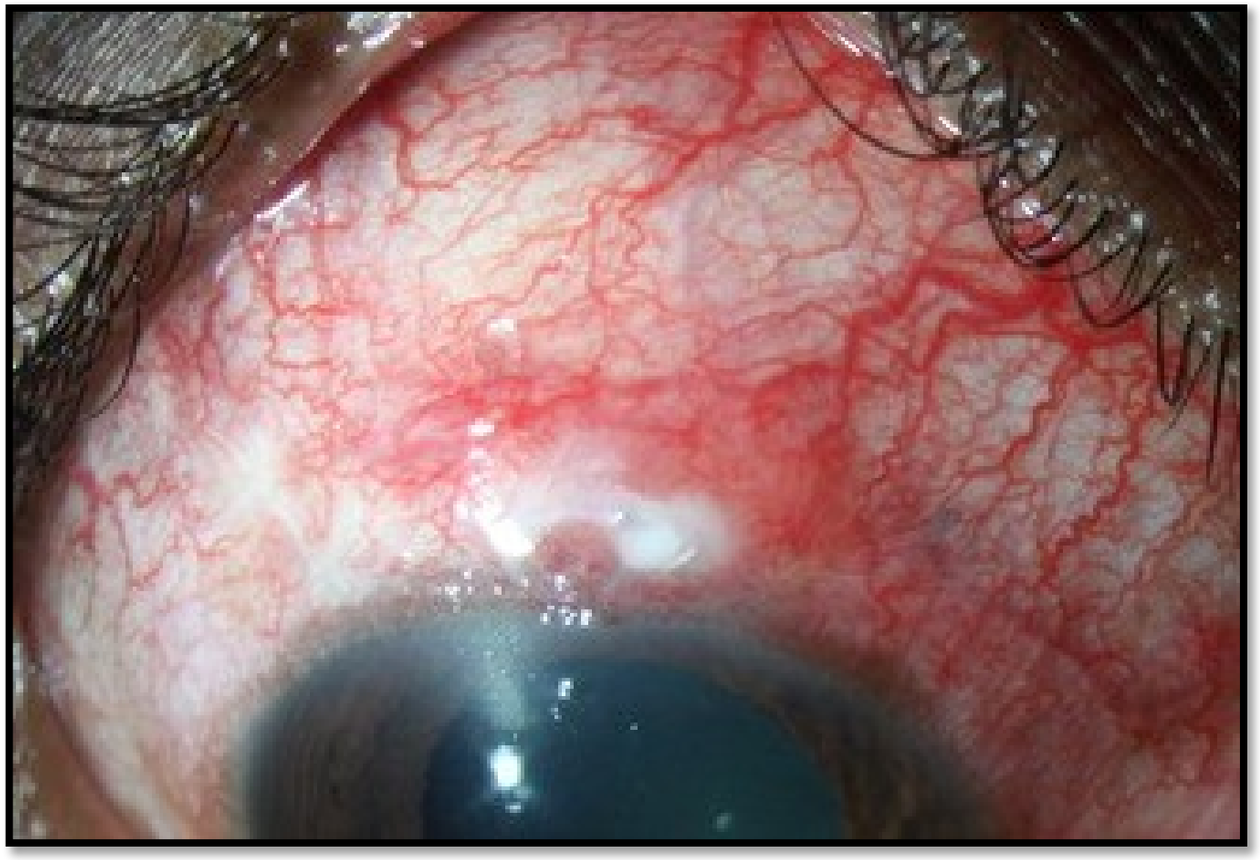


Large diameter BCL?

What size?

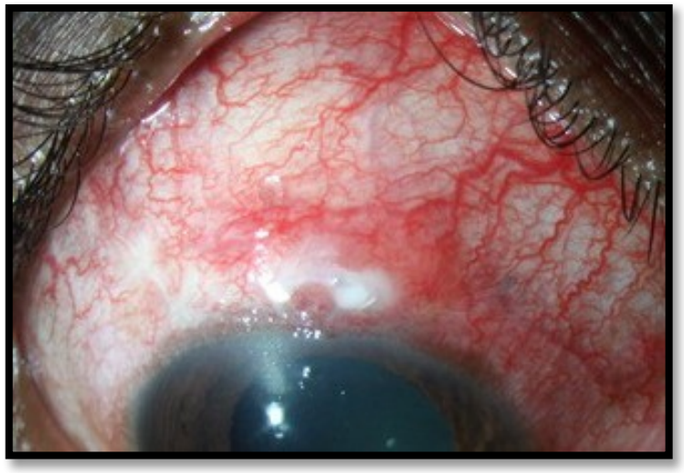
How long?

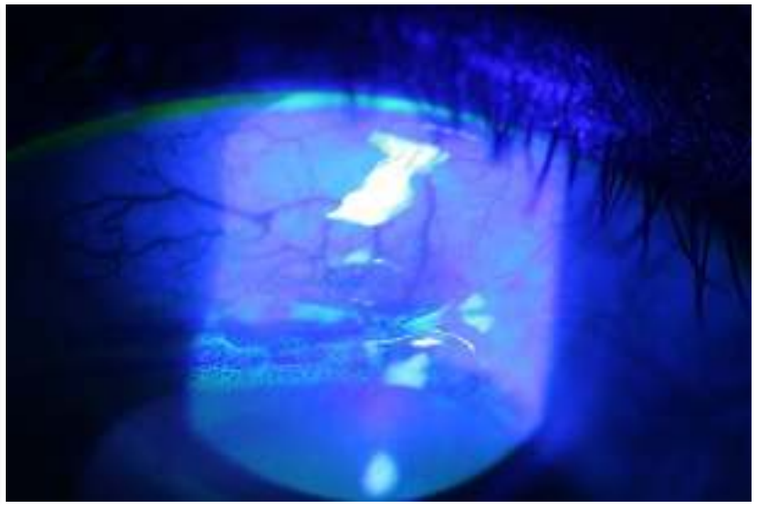
How does it help?



- 2 weeks post Trabeculectomy with MMC
- IOP 05 mmHg
- Flat bleb with localized avascular conjunctiva
- Bleb leak

What should we do??



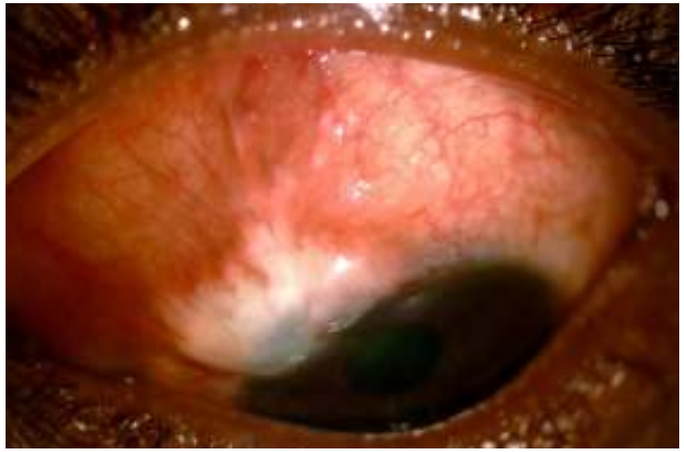


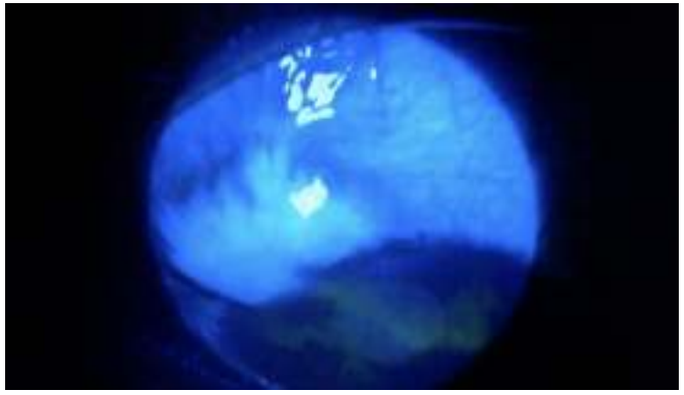
## Role of Oral Doxycycline?

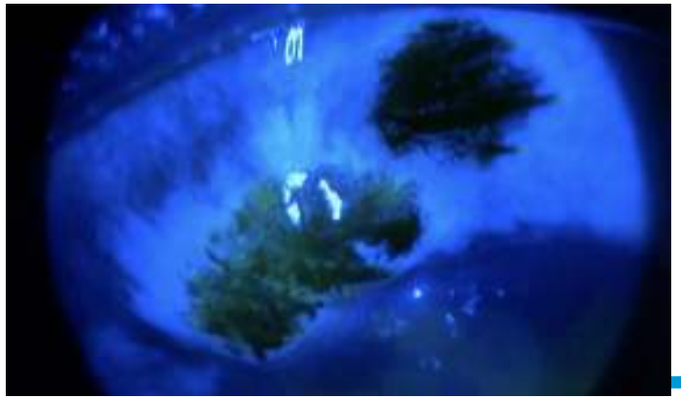
Tab Doxycycline 100 mg twice daily for 2 weeks

At 6 weeks, Good bleb, no leak, IOP maintained at 11 mmHg

# Late post trabeculectomy Hypotony







64-year-old lady

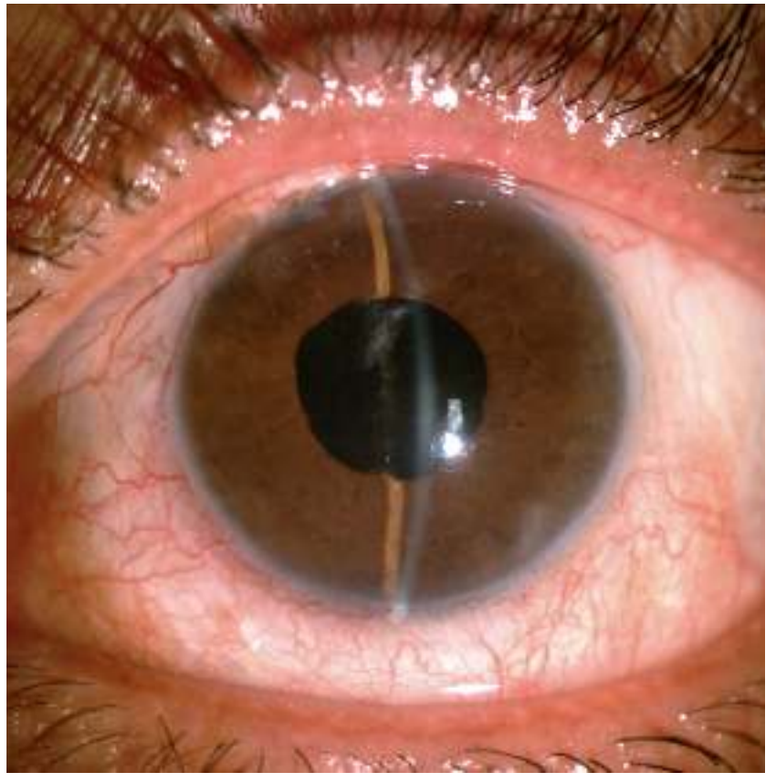
Trab MMC 5 years ago

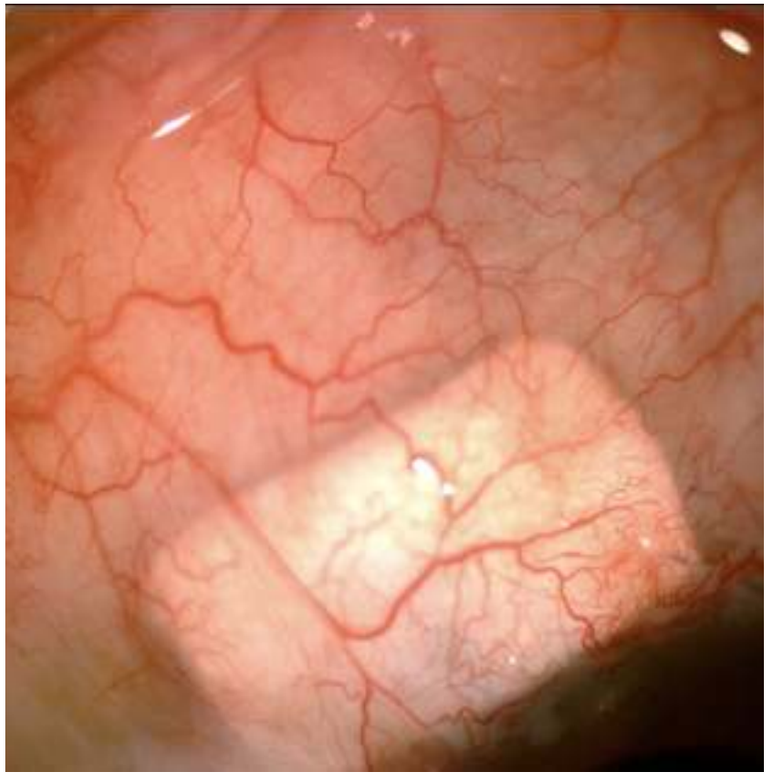
IOP: 02 mm Hg, vision 20/40, N8

What would be the next step?

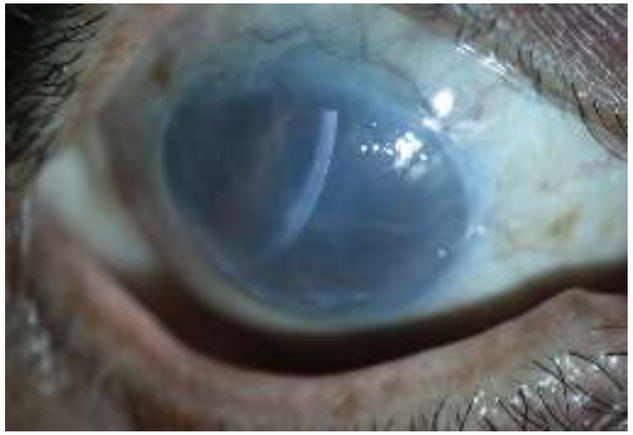
- Posterior segment evaluation
- Bleb sweating/ leak

Post bleb repair with conj. advancement

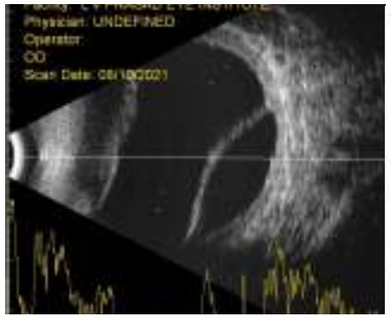


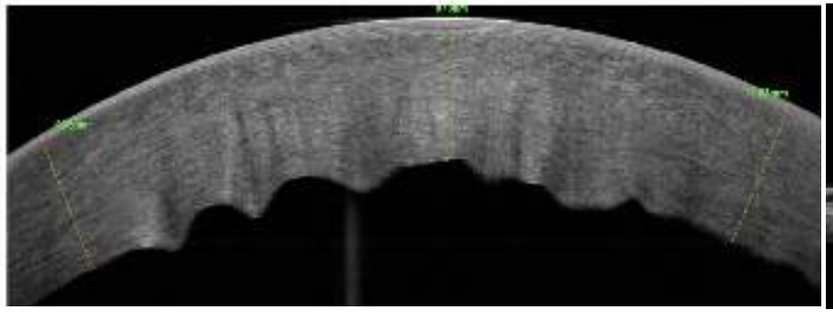


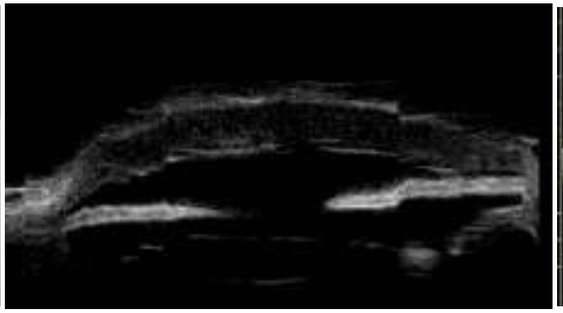
20/30, N6, IOP 13 mm hg,
Nil medications

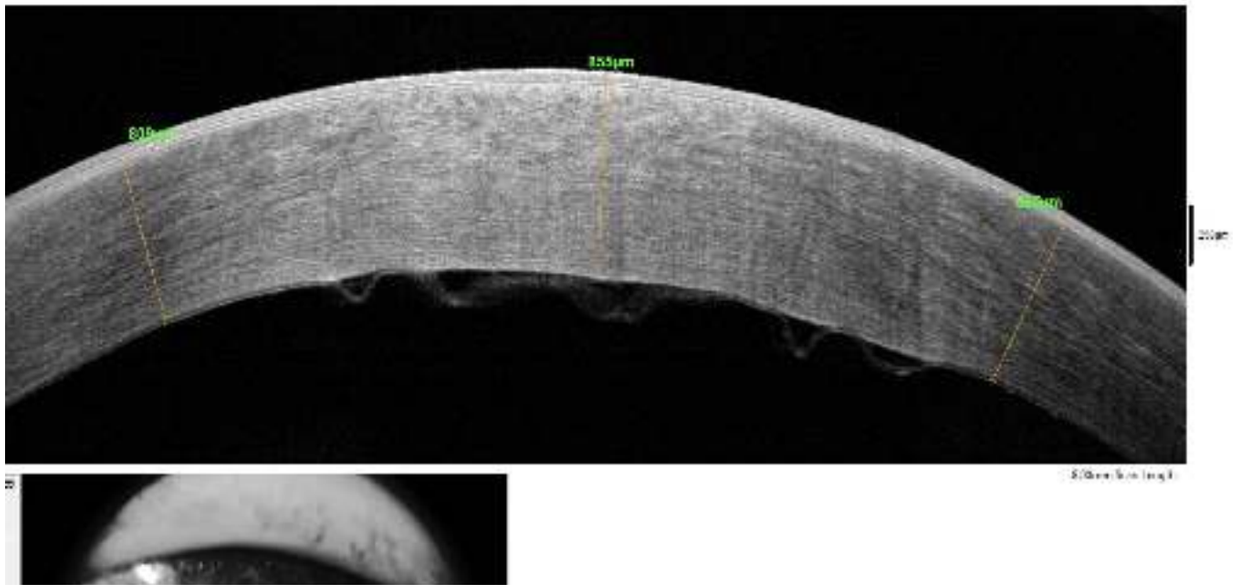


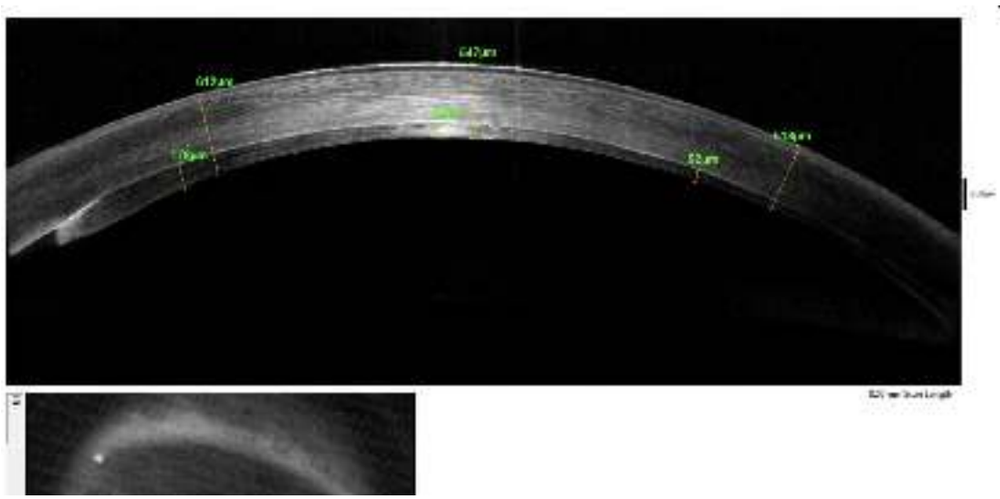
- 72-year-old, Operated 8 years ago, Phaco Trab MMC
- Flat bleb, was on 3 AGM for high IOP
- Sudden decrease in vision for 2 months
- No trauma
- IOP unrecordable, corneal edema, hypotony keratopathy, shallow AC
- Extensive choroidal detachment, no cleft



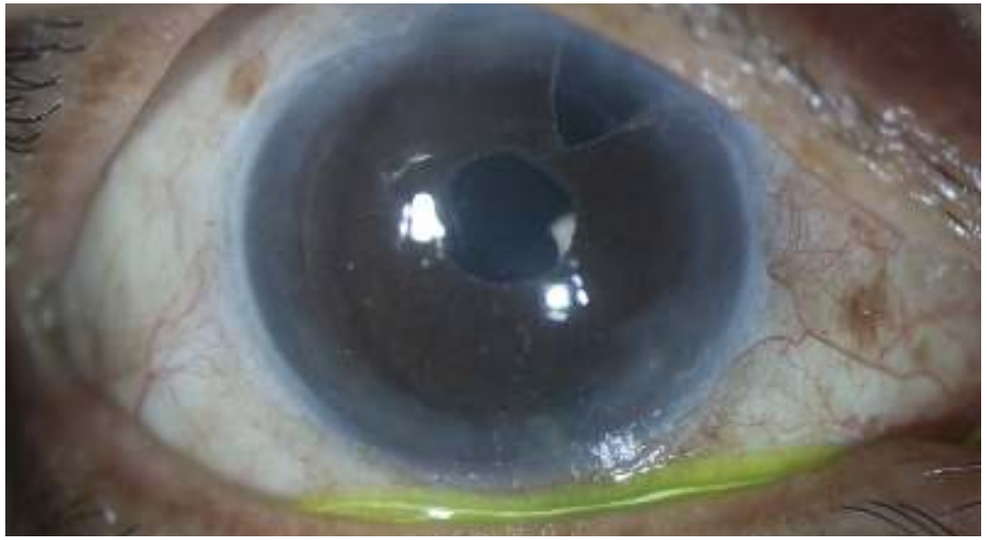




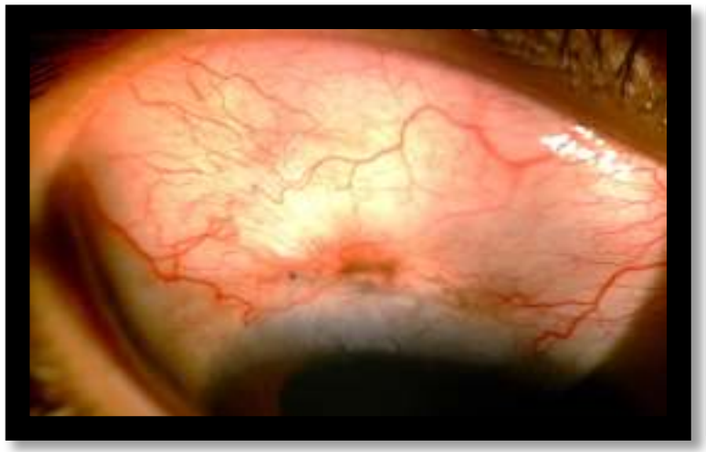
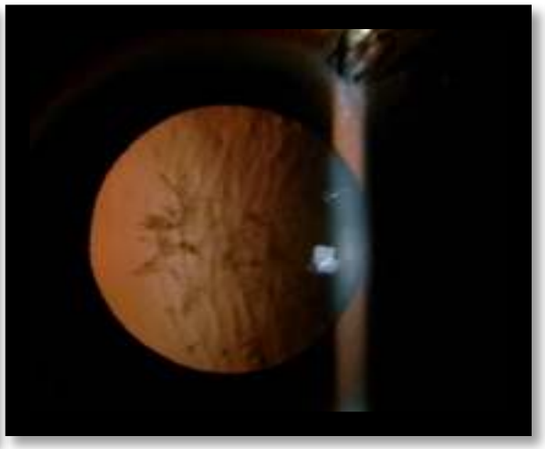
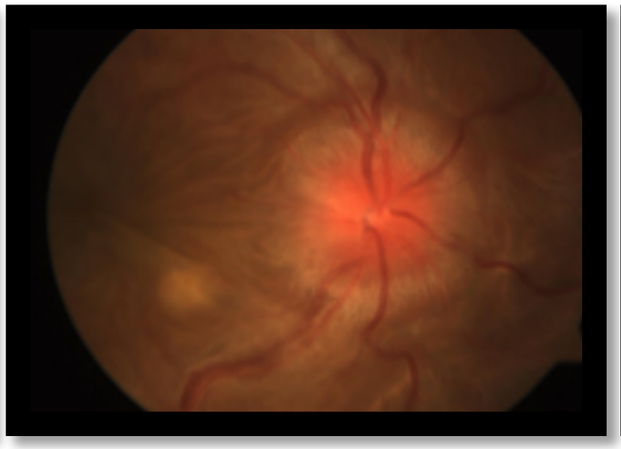
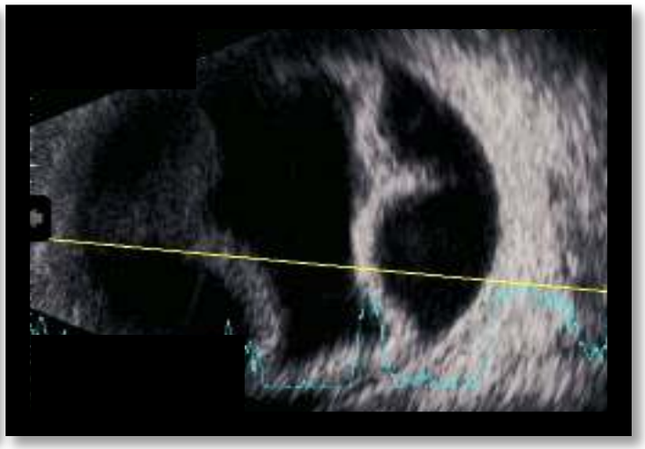
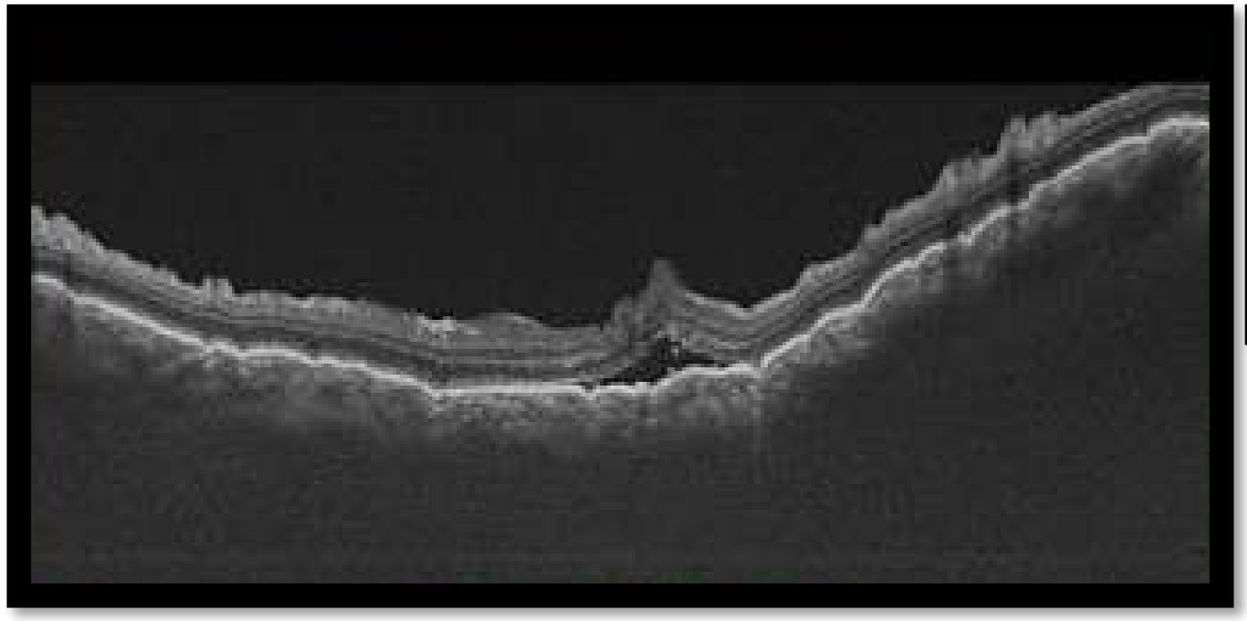


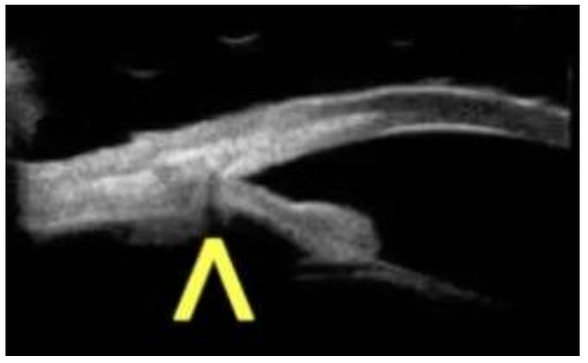
DSEK was performed
IOP and Vision maintained

Intensive topical and oral steroids– 2 months IOP stabilized
Cornea did not clear with fixed DM folds



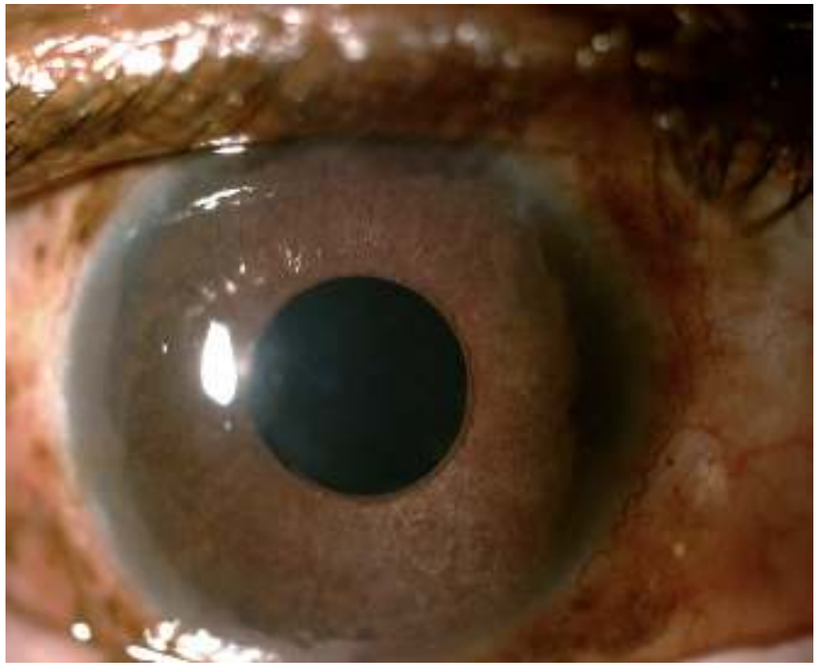
Hypotony with overfiltering bleb, bleb repair done, IOP continued to be low

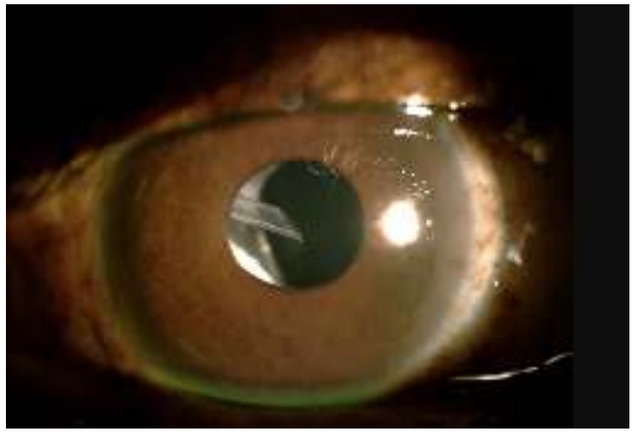






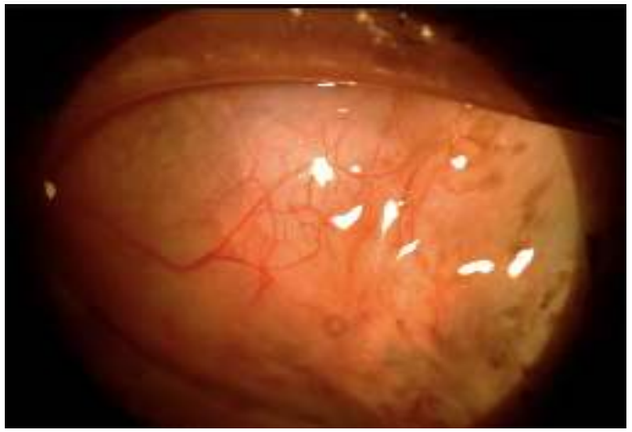


Cyclodialysis

NVG with closed angles extensive NVI, vision 20/40, post PRP and In. Vit. AntiVEGF

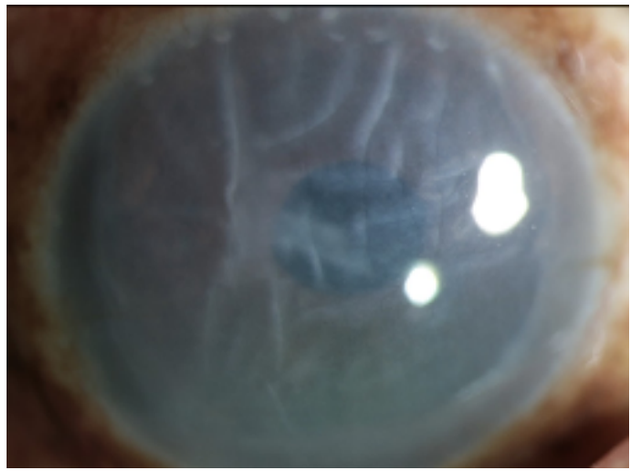






AGV on 2 AGM, IOP maintained at 14 mmHg

2 years later, IOP unrecordable, no CD, no cleft/CD detachment, no bleb problem

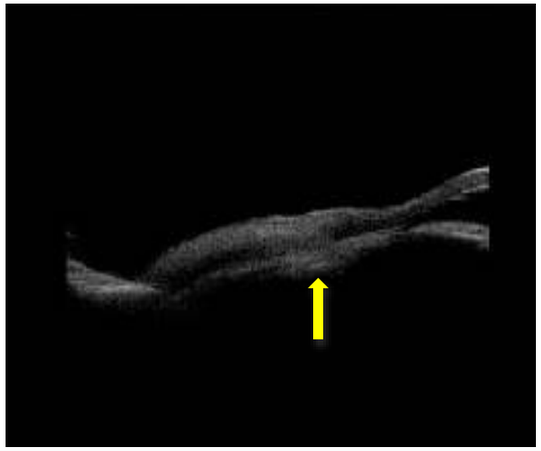


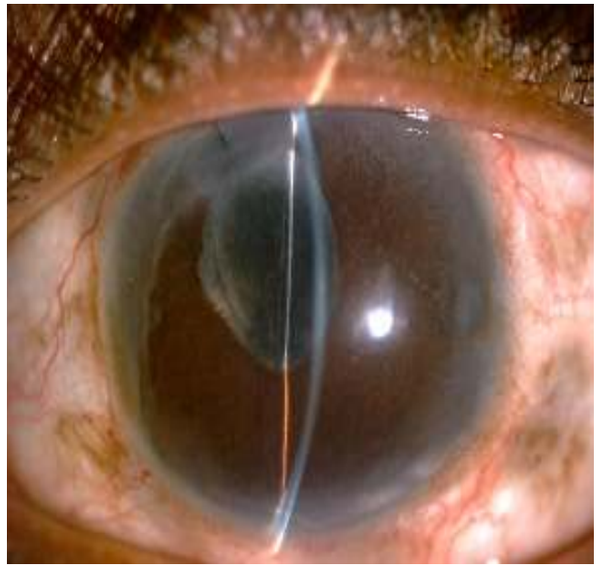
Treated with intense high potent topical steroids, cycloplegics, needed Avastin

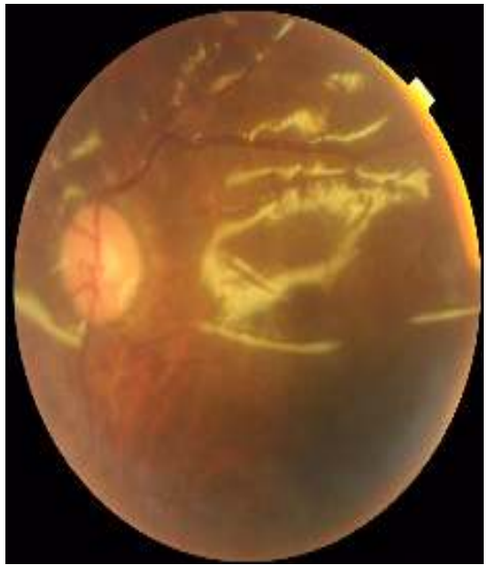
Cornea improved and vision was 20/80, continued steroids

58-year-old, PACG

1 year Following, HIFU
High intensity focused ultrasound







Right eye
Phakic

| | | | |
|---|---|---|---|
| AL [mm] | 22.11 | R1[mm/D/°] | 7.60 / 44.42 @ 52 |
| CCT [µm] | 582 | R2[mm/D/°] | 7.58 / 44.83 @ 142 |
| AD [mm] | 2.10 | R [mm/D] | 7.59 / 44.62 |
| ACD [mm] | 2.63 | +AST [D/°] | 0.40 @ 142 |
| LT [mm] | 4.61 | n | 1.3375 |
| | | WTW [mm] | 12.37 |

**Target Refraction: 0.00**

SA60AT
Alcon

| IOL [D] | Eye [D] |
|---|---|
| 22.50 | 0.79 |
| 23.00 | 0.39 |
| **23.50** | **-0.01** |
| 24.00 | -0.41 |
| 24.50 | -0.81 |

SRK-II

SA60AT
Alcon

| IOL [D] | Eye [D] |
|---|---|
| 23.50 | 0.58 |
| 24.00 | 0.24 |
| **24.50** | **-0.11** |
| 25.00 | -0.46 |
| 25.50 | -0.81 |

SRK/T

Left eye
Phakic

| | | | |
|---|---|---|---|
| AL [mm] | 19.28 | R1[mm/D/°] | 5.70 / 41.86 @ 8 |
| CCT [µm] | 580 | R2[mm/D/°] | 7.26 / 45.86 @ 99 |
| AD [mm] | | R [mm/D] | 7.73 / 43.86 |
| ACD [mm] | | +AST [D/°] | 4.20 @ 99 |
| [mm] | | n | 1.3375 |
| | | WTW [mm] | 11.77 |

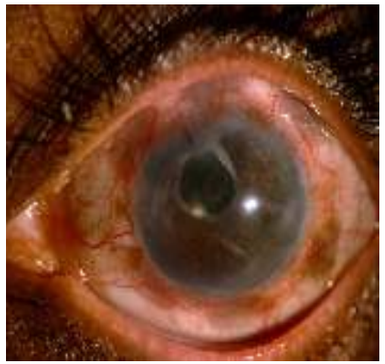
**Target Refraction: 0.00**

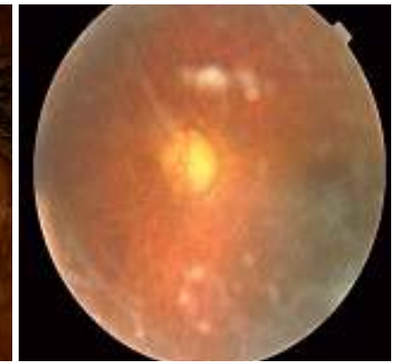
SA60AT
Alcon

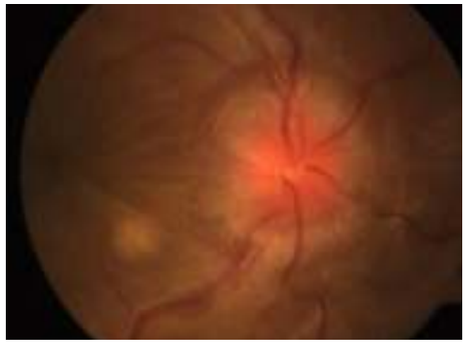
| IOL [D] | Eye [D] |
|---|---|
| 36.00 | 0.80 |
| 36.50 | 0.40 |
| **37.00** | **0.00** |
| 37.50 | -0.40 |
| 38.00 | -0.80 |

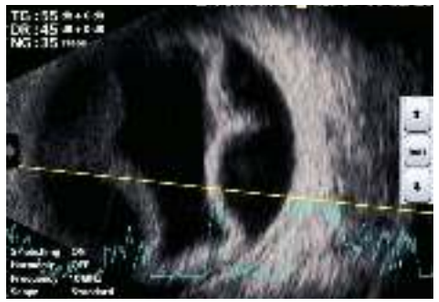
SRK-II

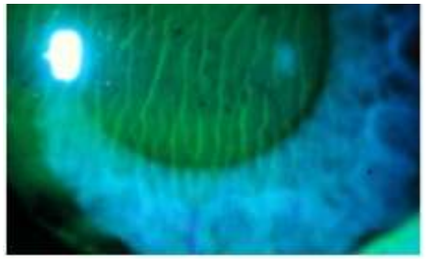
SA60AT
Alcon

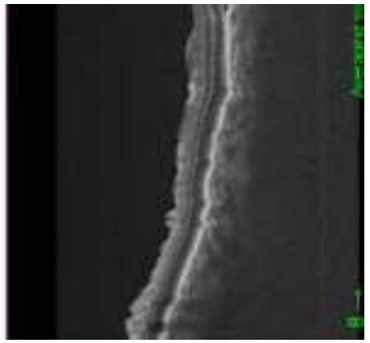






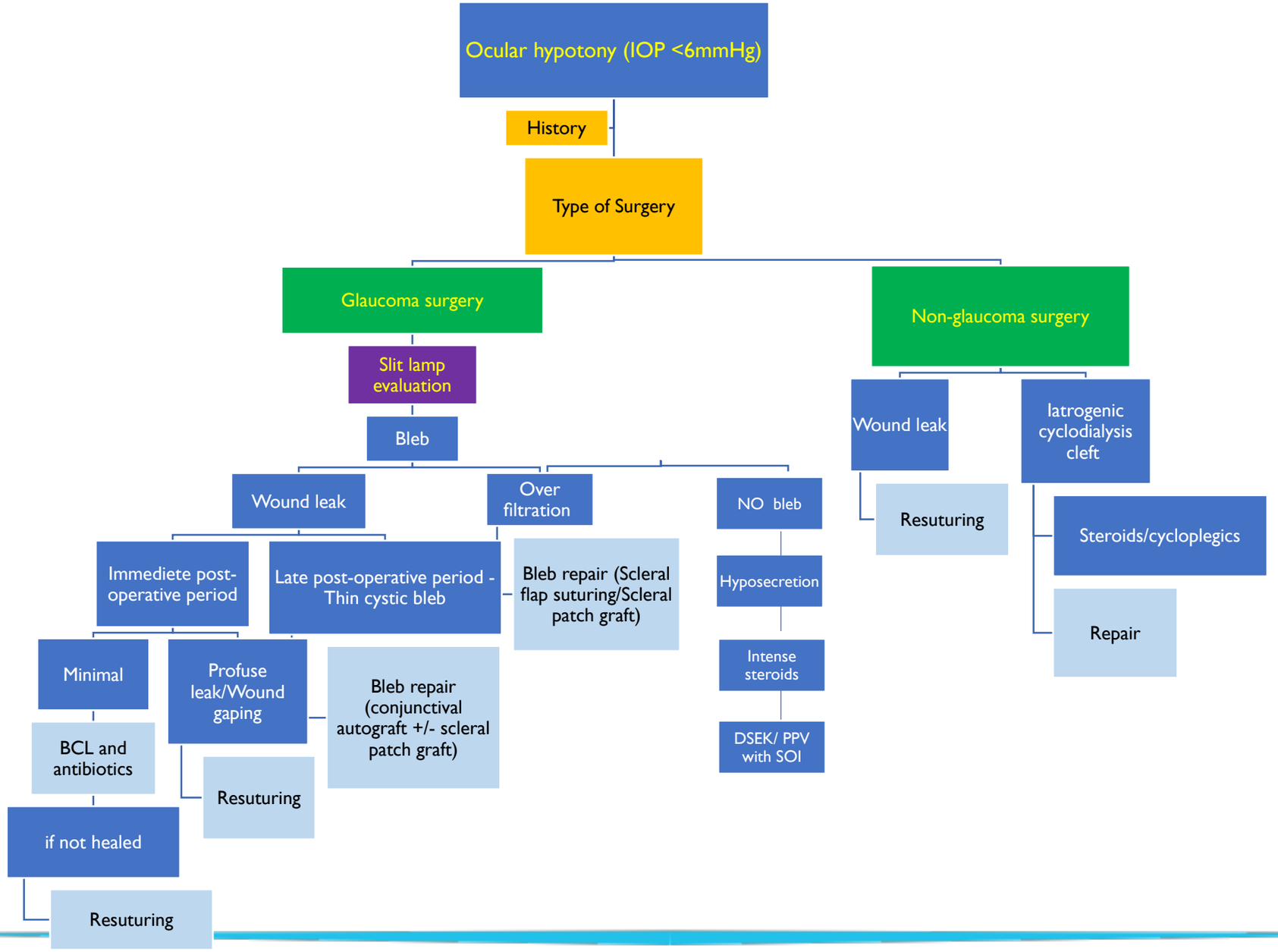






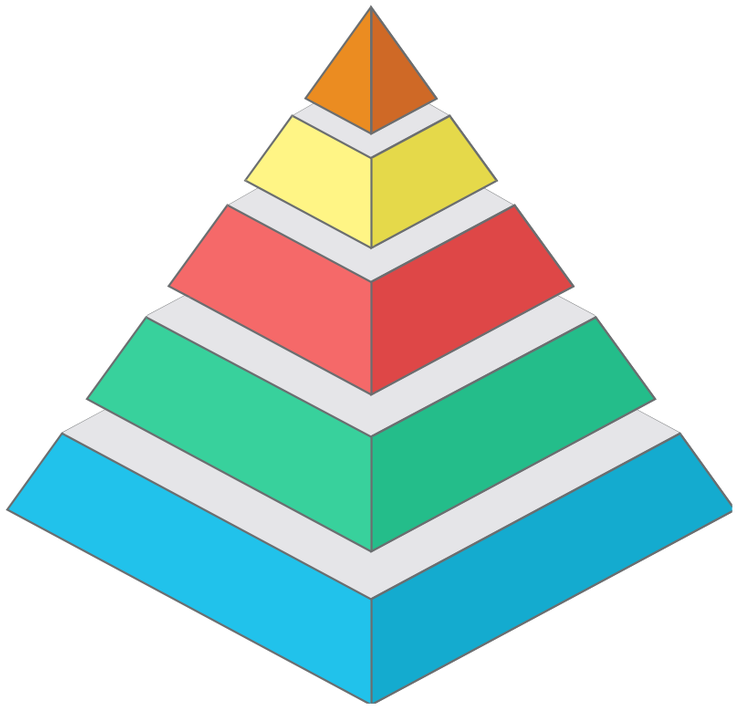
**LOW IOP (HYPOTONY), Serious complications**

- **When to wait?**
- **When to intervene?**
- **What to do?**


Ocular hypotony (IOP <6mmHg)
History
Type of Surgery
Glaucoma surgery
Non-glaucoma surgery
Slit lamp evaluation
Bleb
Wound leak
Over filtration
NO bleb
Wound leak
Iatrogenic cyclodialysis cleft
Immediete post-operative period
Late post-operative period - Thin cystic bleb
Bleb repair (Scleral flap suturing/Scleral patch graft)
Hyposecretion
Resuturing
Steroids/cycloplegics
Minimal
Profuse leak/Wound gaping
Bleb repair (conjunctival autograft +/- scleral patch graft)
Intense steroids
Repair
BCL and antibiotics
Resuturing
DSEK/ PPV with SOI
if not healed
Resuturing

LVPEI
So that all may see

**L V Prasad Eye Institute**



# Thank You