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Please be sure to complete your digital session evaluations for each course you attended! Your feedback is important to us as our Education Planning Committee considers content and speakers for future meetings to provide you with the best education possible.



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Speaker Financial Disclosure Statement

Jerry Robben, O.D. has no financial interests to disclose that are relevant to this course discussion.

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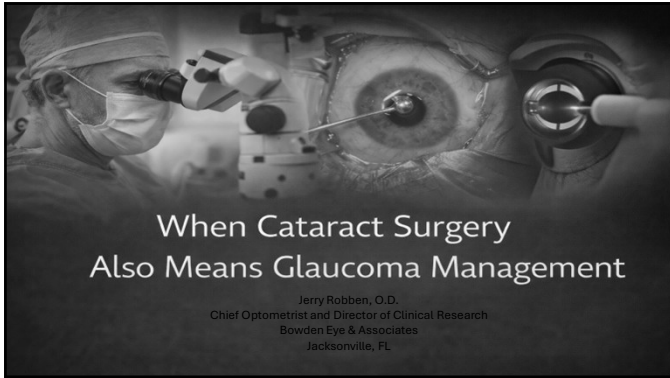


FINANCIAL DISCLOSURE: JERRY ROBBERN, OD

THESE DISCLOSURES HAVE BEEN MITIGATED

- Speaker/Consultant: Allergan/Abbvie, Bausch & Lomb, BioTissue, E-SWIN, EyeVance, I-MED Pharma, Johnson & Johnson Vision, Kala Pharmaceuticals, NovaBay, Novartis, Oyster Point, PECAA, Santen, Sun Pharma, Tangible Science, Tarsus, Thea, Viatrix. Research Investigator: Aerie, Allergan, Allysta Pharmaceuticals, Bausch & Lomb, Claris Pharmaceuticals, Formosa Pharmaceuticals, Novione Scientia, Johnson & Johnson Vision, Kala Pharmaceuticals, Kowa Research Institute, Ocufire, Oyster Point, Nicox Ophthalmics, Novallio, Novartis, Novome Biotherapeutics, Research Insight, LLC, Santen, Shire, Sun Pharma Global FEZ, Surface Ophthalmics, Sylentis, Inc, TearSolutions, Inc, Visus Therapeutics.

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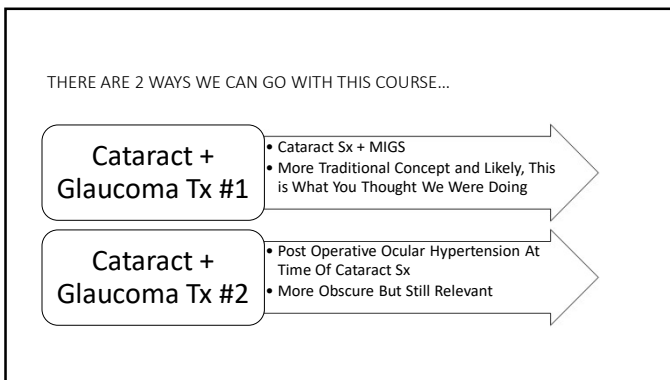
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- CATARACT SURGERY + MIGS
- GLAUCOMA SURGERIES TO EXPLORE
- SLT
  - Bimatoprost Implant (Durysta)
  - iStent (various versions)
  - Goniotomy/Trabeculotomy
  - Canaloplasty/ViscoCanaloplasty
  - Endoscopic Cyclophotocoagulation (ECP)
  - Xen Gel Drainage Stent
  - Hydrus
  - Trabeculectomy
  - Tube Shunts

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WHY CONSIDER GLAUCOMA SX?

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ISTENT

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ISTENT

- Adjunctive Tx option for OAG/OHT
- World's smallest medical implant – placed into TM to Schlem's Canal to increase outflow
- Generally done at time of cataract Sx but can be done independently (studies show similar response)
- Modest IOP reduction: Clinical Trial - 68% of glaucoma patients who received iStent remained medication-free at 12 months while sustaining a target IOP of  $\leq 21$  mm Hg vs. only 50% of patients who underwent cataract surgery alone
- Robust IOP Reduction: Phase 4 trial showed nearly 10mmHg IOP reduction or 2 med withdrawal sustained over 5 years (with or without cataract Sx)
- Contraindicated
  - Angle Closure Glaucoma or A/C anomalies
  - Active Uveitic Glaucoma
  - Active Neovascular Glaucoma
- Post Op Concerns (normal cataract Sx F/U at 1D then 2week (DFE) then 4-6 week final post op if clear)
  - corneal edema (8%), BCVA loss of  $\geq 1$  line at or after the 3-month visit (7%), posterior capsular opacification (6%), stent obstruction (4%) early post-operative anterior chamber cells (3%), and early postoperative corneal abrasion (3%) – if becomes obstructed, can YAG it open (sometimes)
  - Normal post op Tx following Cataract Sx

1. Cleveland Eye Clinic. iStent Glaucoma Technology. Retrieved January 29, 2024, from <https://www.clevelandeyeclinic.com/glaucoma/istent/>  
2. Hangerer, F. H. (2022, March). iStent inject Trabecular Micro-Bypass with or Without Cataract Surgery Yields Sustained 5-Year Glaucoma Control. Retrieved January 29, 2024, from <https://pubmed.ncbi.nlm.nih.gov/35114323/>

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# HYDRUS MICROSTENT

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**HYDRUS MICROSTENT**

- Indicated to lower IOP to be placed at time of Cataract Sx for Mild to Moderate POAG
  - Pigmentary
  - PXE
- 8 mm long, implantable stent that occupies Schlemm's made of a nickel-titanium alloy that possesses super-elastic properties, allowing for return to its original shape after deformation.
- Can dilate Schlemm's canal by four to five times the natural width of the canal, countering the collapse of Schlemm's canal induced by elevated IOP to increase outflow from baseline
- Studies show reasonable expectation of 20% reduction of IOP when compared to Cataract Sx alone sustained for 2-5 years based on various studies
  - Hydrus vs Canaloplasty are equal in effect in head to head trials
  - Hydrus vs iStent, Hydrus slightly superior in mean reduced IOP and/or reduction in IOP meds
  - Hydrus vs SLT, Equal in mean reduction in IOP but Hydrus has statistically significant reduction in IOP Meds
- Contraindicated: Any other than POAG (basically)
- Post Op Concerns (normal cataract Sx F/U at 1d then 1-2week (DFE) then 4-6 week final post op if clear)
  - Any normal intraocular/cataract Sx post op complications
  - Hyphema (1%-1.2%) usually resolved in a week
  - IOP spike early in Post op (26%) treat with meds and usually resolves as expected and med can be D/C'd in a few days to a week
  - Periph. Anterior Synech (PAS) (10%-20%) around device but generally no effect to device
  - Endothelial Cell Loss slightly more than Cat Sx alone (14% vs 10%)

1. Arel, A. A. (2023, December 23). Hydrus Microstent. American Academy of Ophthalmology. Retrieved February 3, 2024, from <https://www.aao.org/hydrus-microstent>  
 2. Richter CM, Coleman AL. Minimally invasive glaucoma surgery: current status and future prospects. Clinical Ophthalmology 2016; 10: 189-206.  
 3. Samiebin TM, Chang DF, Marajis R, et al. A Schlemm canal microstent for intraocular pressure reduction in primary open-angle glaucoma and cataract: the HORIZON study. Ophthalmology 2018; <https://doi.org/10.1016/j.ophtha.2018.05.012>

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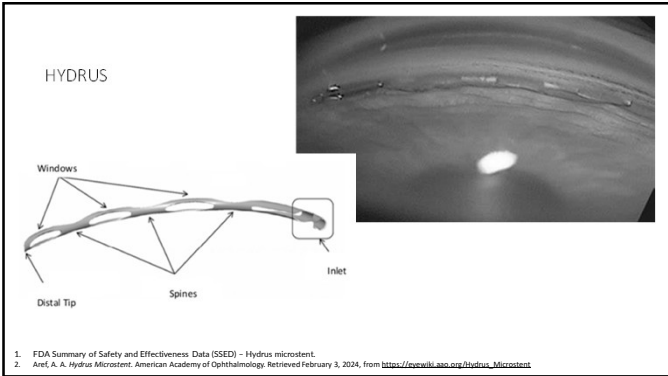
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# GONIOTOMY

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## GONIOTOMY/TRABECULOTOMY

- Adjunctive Tx option for OAG/OHT
- Intraocular surgical procedure where first layer of TM or more is cut/removed to increase outflow, done with multiple techniques
  - Traditionally done with MVR blade -- more prone to leave TM leaflets that can then scar
  - Trabectome electrocautery -- more prone to leave TM leaflets that can then scar
  - Kahook Dual Blade (2015)\* - dual blade is thought to remove more TM material and scar less
  - 27 gauge needle
- Can be done 360°, but usually done in quadrants
- Expect 80% or more Pt's reach 20% IOP reduction from baseline with same Med Tx or at least 1 medication reduction
- Good Candidates
  - OAG
  - Secondary Glaucoma
- Poor Candidates
  - Narrow Angles
  - Active Neovascular Glaucoma
- Post Op Concerns (normal cataract Sx F/U at 1D then 1-2week (DFE) then 4-6 week final post op if clear)
  - Any normal intraocular post op complications
  - Usual intraocular post op medications and F/U, some surgeons may use pillo. 1% to create tension on scleral spur to increase patency
  - Hyphema

1. Seibold, L. (2020, October 23). Getting Started with Goniotomy and the Kahook Dual Blade. Retrieved January 27, 2024, from <https://eyesonycan.com/resources/getting-started-goniotomy-kahook-dual-blade/>

2. Hirsch, L. (2023, July 7). Navigating the world of goniotomy/trabeculotomy and canaloplasty. Retrieved January 27, 2024, from <https://www.eyeworld.org/2023/navigating-the-world-of-goniotomy-trabeculotomy-and-canaloplasty/>

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## GONIOTOMY



1. University Eye Specialists, Retrieved February 3, 2024, from <https://universityeyespecialists.com/services/migs.html>

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# CANALOPLASTY/ VISCOCANALOPLASTY

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## CANALOPLASTY/VISCOCANALOPLASTY

- Adjunctive Tx option for OAG/OHT
- Visco canaloplasty – using viscoelastic injected through Schlemm’s Canal to expand it/clean it out and increase outflow
- Canaloplasty – uses a microcatheter to course through Schlemm’s 360 and then removed and then visco is inserted as above.
- Up to 30% reduced IOP from baseline and a 60% reduction in need for medication (CP better results than VCP)
- Good Candidates
  - OAG
  - Pigmentary glaucoma
  - Pseudoexfoliative glaucoma
- Contraindicated
  - Angle Closure
  - Active Neovascular Glaucoma
  - Angle Recession
- Post Op Concerns (normal cataract Sx f/U at 1D then 1-2week (DFE) then 4-6 week final post op if clear)
  - Any normal intraocular post op complications
  - Microhyphema (6.1% - 85.2%), a good sign of patency and generally resolves within days to a few weeks
  - IOP spikes within 1<sup>st</sup> week post op (30%) likely due to remnants of visco can treat PRN

1. Riva, J. (2010, January 7). Canaloplasty in the Treatment of Open-Angle Glaucoma: A Review of Patient Selection and Outcomes. Retrieved January 29, 2024, from <https://pubmed.ncbi.nlm.nih.gov/20466337/>

2. Wagle, F. M. (2017, January 25). Canaloplasty versus Visco canaloplasty in Primary Open Angle Glaucoma. Retrieved January 29, 2024, from <http://pubmed.ncbi.nlm.nih.gov/28243422/>

3. Koether, N. J. (2012, February 21). Canaloplasty in one eye compared with visco canaloplasty in the contralateral eye in patients with bilateral open-angle glaucoma. *Journal of Glaucoma*. Retrieved January 29, 2024, from <https://pubmed.ncbi.nlm.nih.gov/21728587/>

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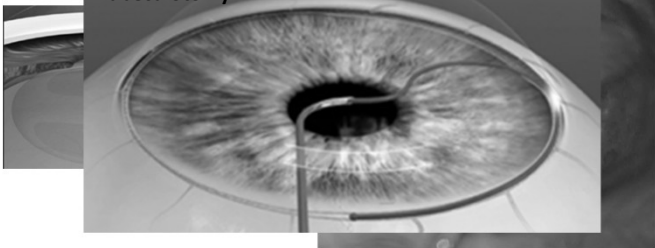
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## CAN OMNI: Combination of Canaloplasty with Trabeculotomy



Web Eye Clinic. Retrieved February 3, 2024, from <https://www.webeeyeclinic.com/glaucoma/canaloplasty>

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# ENDOSCOPIC CYCLOPHOTOCOAGULATION (ECP)

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## ENDOSCOPIC CYCLOPHOTOCOAGULATION (ECP)

- Adjunctive Tx option for OAG/OHT
- Cyclodestructive procedure developed in 1992 to ablate the ciliary body epithelium to decrease aqueous production resulting in lower IOP
- Uses an endoscope that serve 3 functions
  - Image guide – with light source provided direct view of the Tx area of the CB
  - Light source
  - Laser to deliver Tx energy target area and minimize "collateral damage" to deeper CB tor surrounding tissue
- Limited long term studies...Positive anecdotal evidence supports
- Studies suggest 4 – 10 mmHg IOP reduction with up to 70% success rate that does reduce effect year to clear
- Good Candidates – up for debate
  - OAG and CAG
  - Pigmentary glaucoma and Pseudoexfoliative
  - Neovascular, Traumatic and Pediatric glaucoma among others
- Controversial – improved technology, techniques and more Tx numbers have increased acceptance
- Becoming more popular to be done at time of cataract Sx but can be done in a phacic patient
- Post Op Concerns (normal cataract Sx F/U at 1D then 1-2week (DFE) then 4-6 week final post op if clear)
  - Any normal intraocular post op complications – course is very similar to post op cataract Sx
  - Inflammation, CME, anterior/posterior synechiae, PCO, Hypotony if too aggressive

1. Siegel, M. J. (2023, November 6). Endoscopic Cyclophotocoagulation (ECP). Eyewiki. Retrieved February 3, 2024, from [https://eyewiki.aao.org/Endoscopic\\_Cyclophotocoagulation\\_\(ECP\)](https://eyewiki.aao.org/Endoscopic_Cyclophotocoagulation_(ECP))  
 2. Seibold, L. K. (2015, January 6). Endoscopic cyclophotocoagulation. National Library of Medicine. Retrieved February 3, 2024, from <https://pubmed.ncbi.nlm.nih.gov/25628662/>  
 3. Endoscopic cyclophotocoagulation (ECP). Wilks Eye Hospital. Retrieved February 3, 2024, from <https://www.wilkye.org/endoscopic-cyclophotocoagulation-ecp/>

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ECP



1. Northern Sydney Cataract. Retrieved February 3, 2024, from <https://www.northernsydneycataract.com.au/endoscopic-cyclophotocoagulation-ecp/>

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PART 1 Q & A

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THERE ARE 2 WAYS WE CAN GO WITH THIS COURSE...

Cataract +  
Glaucoma Tx #1

- Cataract Sx + MIGS
- More Traditional Concept and Likely, This is What You Thought We Were Doing

Cataract +  
Glaucoma Tx #2

- Post Operative Ocular Hypertension At Time Of Cataract Sx
- More Obscure But Still Relevant

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1 DAY POST OP CATARACT SX (ANY LENS, FEMTO OR STANDARD SX)

Pt feels good and slept well, denies pain with only mild irritation and already can see improved VA.

DVA sc 20/25-  
EDM FULL  
CF FTFC

Pupils normal besides operative eye is still dilated and trace reaction

Conj: 1+ injection  
Cornea: Clear, no edema  
A/C: 1+ Cells and flare  
Iris: flat with mild dilation  
IOL: in good position and intact capsule

IOP = 24 No Hx of Glaucoma prior

Mostly likely Cause: Retained Viscoelastic and will resolve in a day or so without Tx

Normal Post Op Meds with AB, NSAID and Steroid

Start an IOP Med if you want to be extra safe.

Pt can come in early in a few days or week to ensure IOP is lower and keep 2 weeks apt

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1 DAY POST OP CATARACT SX (ANY LENS, FEMTO OR STANDARD SX)

Pt feels good and slept well, denies pain with only mild irritation and already can see improved VA.

DVA sc 20/25-  
EOM FULL  
CF FTFC

Pupils normal besides operative eye is still dilated and trace reaction

Conj: 1+ injection  
Cornea: Clear, no edema  
A/C: 1+ Cells and flare  
Iris: flat with mild dilation  
IOL: in good position and intact capsule

IOP = 29 No Hx of Glaucoma prior  
Mostly likely Cause: Retained Viscoelastic and will resolve in a day or so without Tx

Normal Post Op Meds with AB, NSAID and Steroid

Start an IOP Med if you want to be extra safe.

Pt can come in early in a few days or week to ensure IOP is lower and keep 2 weeks apt

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1 DAY POST OP CATARACT SX (ANY LENS, FEMTO OR STANDARD SX)

Pt feels good and slept well, denies pain with only mild irritation but vision is blurrier than they expected.

DVA sc 20/50-  
EOM FULL  
CF FTFC

Pupils normal besides operative eye is still dilated and trace reaction

Conj: 1+ injection  
Cornea: steamy...mild thickening, mild MCE  
A/C: 1+ Cells and flare  
Iris: flat with mild dilation  
IOL: in good position and intact capsule  
IOP = 39 No Hx of Glaucoma prior

Mostly likely Cause: Retained Viscoelastic and will resolve in a day or so without Tx

Normal Post Op Meds with AB, NSAID and Steroid

Start an IOP Med or 2...

Pt can come in tomorrow and keep 2 weeks apt

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1 DAY POST OP CATARACT SX (ANY LENS, FEMTO OR STANDARD SX)

Pt feels good and slept well, denies pain with only mild irritation and already can see improved VA.

DVA sc 20/30-  
EOM FULL  
CF FTFC

Pupils normal besides operative eye is still dilated and trace reaction

Conj: 2+ injection  
Cornea: clear, no KPs  
A/C: 3+ Cells and flare  
Iris: flat with mild dilation  
IOL: in good position and intact capsule

IOP = 26 No Hx of Glaucoma prior  
Mostly likely Cause: Trabeculitis from post operative inflammation

Normal Post Op Meds with AB, NSAID and Steroid (add extra steroids please)

Start an IOP Med if you want to be extra safe

Pt can come in 1-2 days and keep 2 week apt

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OTHER LESS COMMON CAUSES TO ELEVATED IOP AT 1 DAY POST OP CATARACT SX

**Steroid Responder:** Unlikely at day 1, unless they have been on steroids leading up to Sx and/or have a known Hx of sensitive steroid response.

Usually occurs days to weeks after using steroids ongoing

Treatment is a balance of tapering down steroids while continuing to treat post operative inflammation

Start IOP Meds and follow as closely as needed depending on case

**Pre-existing glaucoma:** More susceptible to changes in dynamics of aqueous outflow -> Increase IOP lowering meds and gain control

**Hyphema:** Blood blocks outflow. More common with more invasive Sx but can happen in cataract Sx.

Lower IOP with meds and consider A/C washout if moderate to severe.

**Anatomical Issue:** Narrow Angles Missed, Compromised Angle Access (PAS may form after inflammation usually beyond a week post op), Pupil Block (rare)

**Malignant Glaucoma/Aqueous Misdirection Syndrome:** Elevated IOP with shallow/flat A/C. A/C looks like IOP should be low but is High -> Back to surgeon today please!

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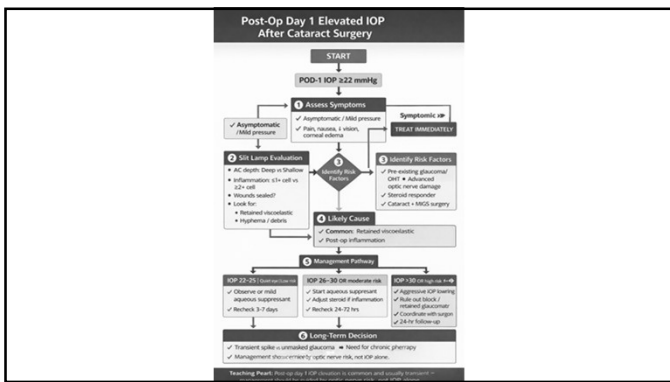
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OTHER COMMON CAUSES TO ELEVATED IOP BEYOND 1 DAY POST OP CATARACT SX

**Steroid Responder:** generally between day 5-21. More common with more potent steroids. Usually asymptomatic and found on routine IOP check

Treatment is a balance of tapering down steroids while continuing to treat post operative inflammation

Start IOP Meds and follow as closely as needed depending on case

**Persistent or Rebound Inflammation**  
 Inflammatory debris obstructs outflow  
 Seen with:

- Poor steroid compliance
  - Rapid steroid taper
  - Subclinical uveitis
- Often associated with:
- AC cell/flare
  - Injection

Management:  
 Increase or extend steroid  
 Add IOP-lowering therapy

**Pre-existing Glaucoma / Unmasked Disease**

Cataract surgery may reveal previously compensated outflow dysfunction  
 IOP rise reflects baseline disease, not surgery complication

Common in:  
 Early glaucoma suspects  
 OHT patients

Management:  
 Long-term glaucoma therapy  
 Full glaucoma workup

**Angle Compromise / PAS Formation/Pigment**

Post-op inflammation -> peripheral anterior synechiae  
 Especially in narrow-angle anatomy  
 Excessive Pigment release blocking outflow (seen with floppy iris or trauma during Sx)

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Differential Diagnosis of IOP Spikes at 1-2 Weeks after Cataract Surgery		
Likely Cause	Presentation Clues	Management Approach
<b>Steroid Response (most common)</b>	<ul style="list-style-type: none"> <li>✓ Classic timing: 7-21 days after starting steroids</li> <li>✓ Quiet eye with elevated IOP</li> </ul>	<ul style="list-style-type: none"> <li>✓ Taper or switch steroid</li> <li>✓ Add aqueous/suppressant</li> </ul>
<b>Persistent / Rebound Inflammation</b>	<ul style="list-style-type: none"> <li>✓ History: Glaucoma, steroid responder, glaucoma family history</li> <li>✓ 2+ anterior AC cell / flare</li> <li>✓ Inadequate or rapid taper</li> </ul>	<ul style="list-style-type: none"> <li>✓ Increase steroid frequency or duration</li> <li>✓ Add IOP-lowering therapy</li> </ul>
<b>Unmasked Pre-Existing Glaucoma</b>	<ul style="list-style-type: none"> <li>✓ Sustainably elevated IOP</li> <li>✓ Suspicious optic nerve findings</li> <li>✓ Prior history of borderline pressures</li> </ul>	<ul style="list-style-type: none"> <li>✓ Initiate long-term glaucoma therapy</li> <li>✓ Full glaucoma workup</li> </ul>
<b>Pigment Release</b>	<ul style="list-style-type: none"> <li>✓ Pigment in anterior Chamber (AC) or on gonioscopy</li> <li>✓ More common with floppy iris or iris trauma during surgery</li> </ul>	<ul style="list-style-type: none"> <li>✓ Treat with aqueous suppressant</li> </ul>
<b>Lens / IOL-Related</b>	<ul style="list-style-type: none"> <li>✓ Unusual inflammation at 1-2 weeks</li> <li>✓ Microphthema, or iris chaffing on slit lamp</li> </ul>	<ul style="list-style-type: none"> <li>✓ Treat with aqueous suppressant</li> </ul>
<b>Angle Compromise</b>	<ul style="list-style-type: none"> <li>✓ Gonioscopy shows PAS or residual narrow angles</li> </ul>	<ul style="list-style-type: none"> <li>✓ Add aqueous suppressant</li> <li>✓ Rare, but consider UGH syndrome (OU-related)</li> </ul>

- Steroid response is most common cause of IOP spike at 1-2 weeks post op
- Persistent Inflammation if inflammation is present
- Unmasked glaucoma if IOP does not respond as expected with other Tx

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PART 2 Q & A

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THANK YOU!

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