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ROYAL MAXIM PALACE KEMPINSKI, CAIRO

Managing Narrow Pupil in Phacoemulsification

Hytham El-Shawaf
MD, FRCS, FICO

Research Institute of Ophthalmology
(RIO)



Objectives

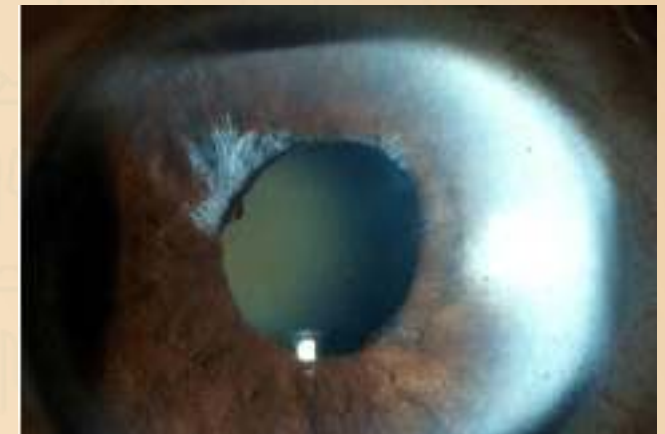
- Identify preoperative risk factors for small pupils and IFIS
- Plan a stepwise, escalation-based approach to dilation
- Apply intraoperative pharmacologic, viscomydriatic, and mechanical techniques
- Optimize fluidics and wound construction to protect the iris and capsule
- Prevent and manage complications; know when to convert or stop

Why Pupil Size Matters

- Small pupils obscure the capsule and zonules, increasing risk of capsular tears
- Higher rates of iris trauma, bleeding, IFIS, and retained lens material
- Challenging phaco dynamics: surge, iris prolapse, and poor visualization
- Adequate exposure improves safety more than any single phaco setting tweak

Preoperative Risk Factors

- Medication history: α 1-blockers (tamsulosin), miotics (pilocarpine)
- Poor baseline dilation at clinic
 - Pseudoexfoliation.
 - Posterior synechiae: Uveitis, Prior surgery/trauma, ocular diseases (e.g. chronic glaucoma, Fuchs)
 - Iris atrophy: Prior surgery/trauma, ocular diseases (e.g. chronic glaucoma, senile, Fuchs)
 - Systemic disease: diabetes of long duration



Preoperative Planning & Consent

- Set expectations: may need pupil expanders; possible longer surgery
- Topical NSAID (e.g., ketorolac) QID for 1–3 days preop to maintain dilation
- Choose appropriate anesthesia (consider block) if prolonged manipulation anticipated
- Have devices ready: hooks, Malyugin or i-Ring, cohesive & dispersive OVDs

Pharmacologic – Topical Regimen

- Standard mydriatics: phenylephrine + tropicamide $\pm$ cyclopentolate
- Add topical NSAID (ketorolac, nepafenac, bromfenac) to limit intraop miosis
- Avoid excessive preop pilocarpine; can worsen IFIS and narrow the pupil

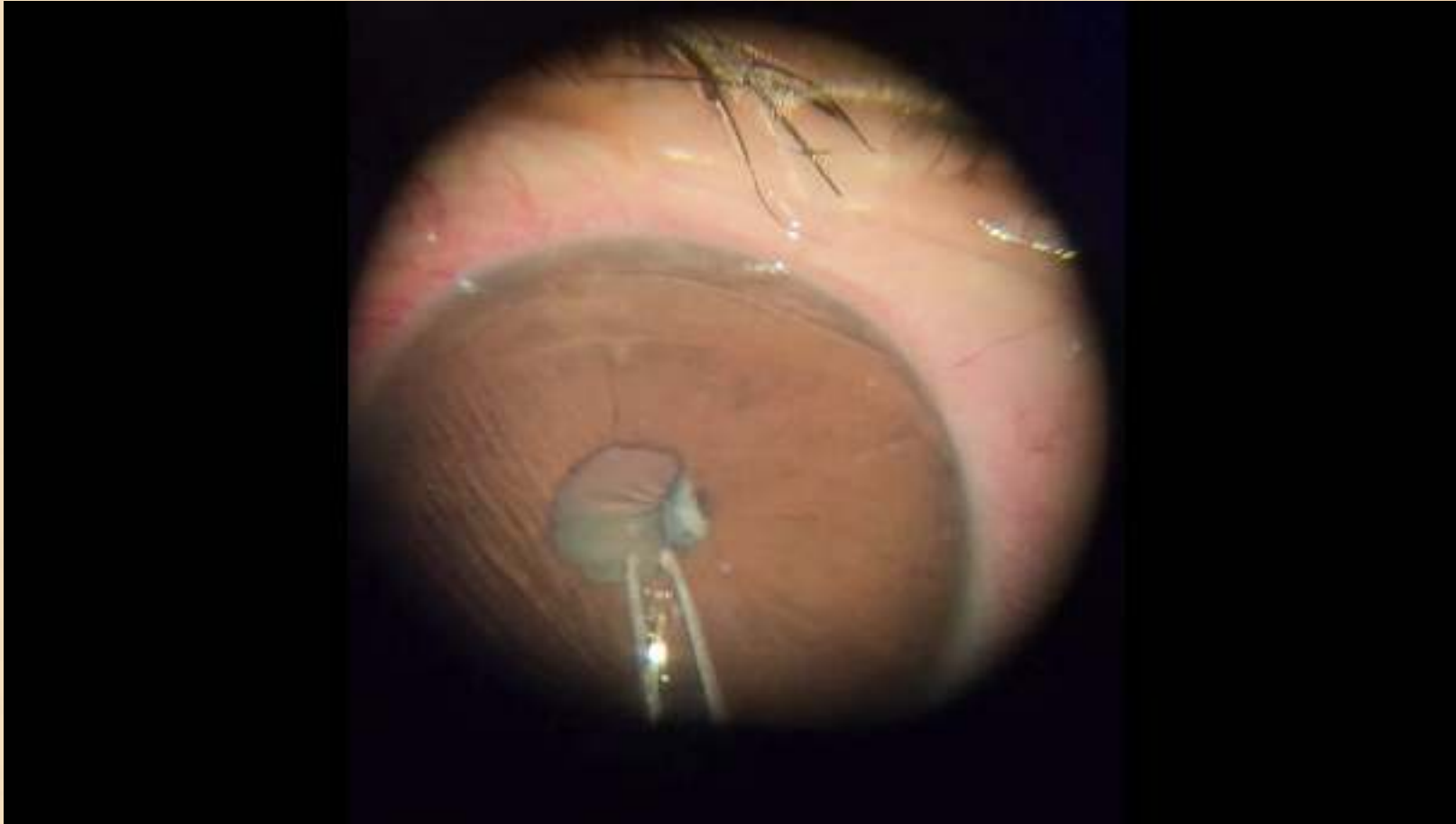
Pharmacologic – Intracameral

- Phenylephrine or epinephrine with preservative-free lidocaine (e.g., 0.5–1 mL) after paracentesis
- Commercial phenylephrine/ketorolac combo (if available) during irrigation
- Allow 20–30 seconds for sphincter response before escalating

Viscomydriasis & OVD Strategy

- Cohesive OVD (e.g., Healon) to deepen AC and gently press sphincter outward
- Dispersive OVD (e.g., Viscoat) to coat/protect endothelium and iris (soft-shell technique)
- For very small pupils: super-cohesive OVD (e.g., Healon5) to mechanically expand
- Remove OVD behind the iris at the end to prevent postoperative IOP spikes

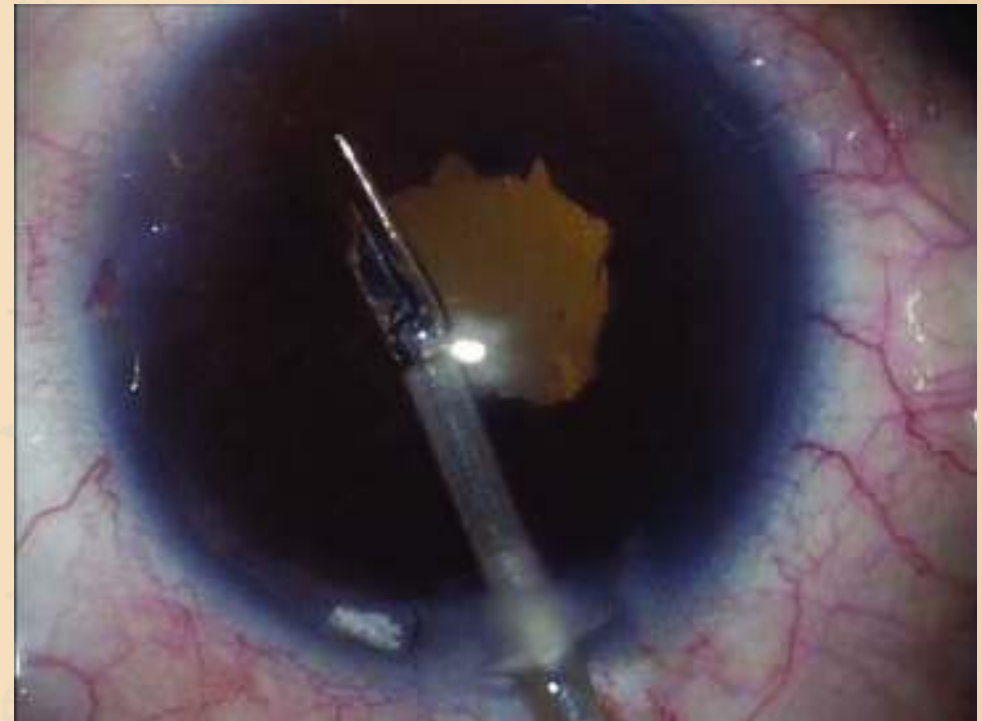
Removal of Pupillary Membranes



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Mechanical – Stretching & Sphincterotomies

- Bimanual stretching with Kuglen hooks: modest, controlled force only
- Micro-sphincterotomies with micro-scissors for fibrotic pupils (accept permanent change)
- Avoid extensive sphincter damage in young or cosmetically sensitive patients



Pupil Expanders

- Iris Hooks
- Malyugin Ring
- i-Ring and similar devices.

Intraoperative Floppy Iris Syndrome (IFIS)

- Risk: tamsulosin and other α 1-blockers; persists after discontinuation
- Triad: billowing iris, progressive miosis, iris prolapse
- Management: intracameral phenylephrine, viscomydriasis, pupil ring/hooks, low fluidics, small incisions

Fluidics & Wound Construction

- Tight main incision to prevent iris prolapse
- Lower I/A flow rate and vacuum; increase IOP gradually rather than high surges
- Use sleeve positioning and second instrument to shield iris
- Keep chamber formed during instrument exchanges and minimize its occurrence.

Capsulorhexis & Nucleus Management

- Stain capsule with trypan blue for visualization (poor red reflex with narrow pupil)
- Target ~5.0–5.5 mm rhexis to overlap optic without over-stressing iris
- Chop techniques reduce instrument travel under the iris (Vertical chopping rather than Horizontal chopping)

Complications – Prevention & Management

- Iris trauma/bleeding: minimize manipulation; tamponade with OVD; endo cautery if needed
- Capsular tears: stop, viscoelastic tamponade, assess; convert strategy early if necessary
- Retained material: thorough I/A with good visualization; consider secondary removal if unsafe
- Know your threshold to convert to ECCE/SICS

Postoperative Care

- Control inflammation: steroid + NSAID regimen
- Monitor IOP for OVD retention, especially with high-viscosity agents
- Assess for photophobia, irregular pupils; counsel on possible dysphotopsias
- Plan follow-up and consider sutures removal (if placed)

Stepwise Algorithm

- 1) Preop: NSAID + standard mydriatics
- 2) Intraop: intracameral phenylephrine/epi + viscomydriasis
- 3) If <5 mm: super-cohesive OVD or stretch (limited)
- 4) Early use of pupil ring or 4–5 iris hooks for <4.5–5 mm or IFIS
- 5) Adjust fluidics + wound; proceed with stained rhexis and safe chop

Patient Selection & Pre-Op Case Planning

- Screen and stratify: small/poor dilation at clinic (<5–5.5 mm), dark irides, pseudoexfoliation, posterior synechiae, prior surgery/trauma
- Medication history: current or prior α 1-blockers (esp. tamsulosin), chronic miotics; note diabetes, hypertension
- Inflammation: operate when uveitis is quiescent and inflammation is controlled per local protocol
- Anatomy/complexity: shallow AC, dense/brunescent nucleus, weak zonules/PXF, small palpebral fissure
- Plan resources: have hooks or a ring (Malyugin/i-Ring) and both cohesive & dispersive OVDs immediately available
- List planning: allocate time/anaesthesia (consider block) for eyes likely to need mechanical expansion
- Consent: potential need for pupil expander, longer surgery, iris changes, and rare conversion to ECCE/SICS

References

- American Academy of Ophthalmology Cataract/Anterior Segment Panel. Cataract in the Adult Eye Preferred Practice Pattern®. Ophthalmology. 2022;129(1):P1–P126. doi:10.1016/j.ophtha.2021.10.006.
- NICE. Cataracts in adults: management (NG77). Published 2017-10-26; last reviewed 2025-05-20.
- Christou CD, Tsinopoulos I, Ziakas N, Tzamalīs A. Intraoperative Floppy Iris Syndrome: Updated Perspectives. Clin Ophthalmol. 2020;14:463–471.
- Chang DF. Use of Malyugin pupil expansion device for intraoperative floppy-iris syndrome: results in 30 consecutive cases. J Cataract Refract Surg. 2008;34(6):835–841.
- Hovanesian JA, Sheppard JD, Trattler WB, et al. Intracameral phenylephrine 1.0%–ketorolac 0.3% during cataract surgery: Integrated results from two phase 3 studies. J Cataract Refract Surg. 2015;41(10):2060–2068.
- Shugar JK. Use of epinephrine for IFIS prophylaxis. J Cataract Refract Surg. 2006;32(7):1074–1075.
- Lockington D, Wang Z, Qi N, et al. Modelling floppy iris syndrome and the impact of pupil size and ring devices on iris displacement. Eye (Lond). 2020; Published online Feb 4, 2020.



Thank You !

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