Management of small pupil in phacoemulsification (personal experience)

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Small pupil
Etiology

- PEX
- IFIS
- Diabetes
- Post. Synechiae
- Trauma
- Age related
Etiology

- Fibrotic pupillary sphincter
- Posterior synechiae
- Alpha 1 antagonists

Tamsulosin (Flomax)

- There are several medications available for the treatment of benign prostatic hypertrophy.
- These medications are alpha 1 blockers and they improve the urinary outflow by relaxing the smooth muscle in the bladder neck and the bladder.
- Tamsulosin (Flomax) is favored by urologists because it has fewer systemic side effects than others such as doxazosin (Cardura), terazosin (Hytrin) or alfuzosin (Uroxatral).
- Flomax has a high affinity and specificity for the alpha 1-A receptor subtype, which is the predominant receptor in the prostate and the bladder.
**Intraoperative floppy iris syndrome (IFIS)**

- It has been shown that the alpha 1-A receptor is in the iris dilator muscle.

- The use of Flomax has led to a condition called intraoperative floppy iris syndrome (IFIS) described by Chang and Campbell.

- The syndrome involves a triad of findings:
  - First, the iris is floppy and tends to billow with the normal flow in the anterior chamber.
  - Second, the iris tends to prolapse into the phaco and side port incisions.
  - Finally, and most concerning, is the tendency toward progressive pupil constriction during surgery.

- This combination can lead to difficult surgery
Informing Patients

- Longer surgery
- Special steps and instruments
- Higher risk of complications
- Pupil appearance after surgery

Challenges during small-pupil phacoemulsification surgery

- Red reflex (visualization).
- Capsulorhexis (Small).
- Increased risk of iris damage (inflammation and cosmesis).
- Iris bleeding.
- Iris prolapse from one or more wounds.
- Anterior capsule damage and capsular phimosis (visualization and small).
- Incomplete evacuation of the cortical material (Blind removal).
- Difficulties with placing and aligning the IOL in the bag (Blind insertion).
- Toric lenses
- Femtosecond cataract surgery
Post Operative iris defects

Preoperative

- **Diagnosis** (history, other eye, maximum dilation)
- **Mydriatics**
- **Non-steroidal anti-inflammatory agent** (Nepafenac)
- **Stop prostaglandin analogues.**
- **If the patient is on miotics, stop them 2 weeks before surgery.**
- **Mannitol**
- **Be prepared to handle the iris with a variety of techniques**
The step-wise approach in managing small pupils

- Intracameral injection
- Viscodilatation
- Posterior synechiolysis
- Pupil stretching technique
- Sphincterotomies
- Pupil expander devices
**Pharmacologic Dilation**

- Traditionally, the use of topical mydriatics in the form of a sympathomimetic agent combined with a parasympathetic blocker fulfilled the goal of achieving mydriasis.

- Adding epinephrine to the balanced salt solution (BSS) infusion has supplemented and maintained dilation.

- With the introduction of Ocufen (Allergan, Irvine, CA), it was realized that a nonsteroidal anti-inflammatory drug (NSAID) also contributed to maintenance of dilation by blocking the miotic effect of prostaglandins released when the iris was manipulated.

- **Intracameral mydriatics** The instillation of 1% phenylephrine directly onto the anterior capsule has been found to be helpful in maintaining pupil size in patients with intraoperative floppy iris syndrome (IFIS) by

- Dr. Joel Shugar advocated “Shugarcaine” using 1:1,000 bisulfite-free epinephrine that is mixed in a 1:3 dilution with three parts BSS+ and one part nonpreserved lidocaine 4%. Approximately 1 mL of this mixture is slowly injected into the anterior chamber before instillation of the ophthalmic viscosurgical device (OVD).

- **Omidria** (phenylephrine and ketorolac 3% (Non-steroidal anti-inflammatory)

• **Epi-Shugarcaine:**
  - Lidocaine
  - Epinephrine
Viscodilation

- Healon 5
- Soft Shell technique or tri-soft shell (Arshinoff)

Soft shell technique
(Viscodilatation)
Posterior synechiolysis
and cutting of pupillary membranes

Fine’s Mini-sphincterotomies

* After the chamber is filled with viscoelastic,

* Six to eight equally spaced mini-sphincterotomies are performed.

* The incisions are made 0.5 mm into the pupillary sphincter,
Mini-sphincterotomies

- Cheaper
- Faster
- No extra side ports
- Less manipulation
- Permanent cure of the condition

Mini-sphincterotomies
(Indications)

- PEX
- Long standing miotics
- Diabetic
Mini-sphincterotomies (contraindications)

- IFIS
- Rupiosis
Nuclear Management in small pupil

- Slow Motion
- Hydrodelineation and Hydroprolapse
- Prechopping
- Vertical chopping
- Lens Tilt Technique
Slow motion phaco

• It is necessary to change your machine parameters to low flow techniques.

• The bottle height should be lowered to around 70 cm.

• The aspiration flow rate to below 25 cc/min.

• The vacuum to less than 250 mmHg.

Prechopping
Lens tilt technique

Blind I/A and IOL implantation
Pupil expansion devices

- Iris Hooks
- Malyugin Ring
- The Visitec I-ring
- The Assia Pupil Expander

Iris Hooks
The Malyugin Ring

The Visitec I-Ring
The Assia Pupil expander

Disadvantages

• Require additional steps.

• lengthening surgery time.

• Increasing costs.

• Introducing additional instruments into the eye.
WHEN INDICATED

• However, preventing complications related to performing surgery in a small pupil and IFIS outweigh these disadvantages.

THANK YOU