Innovative Iris Repair

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Disclosure Statement

I have no financial relationships with commercial entities that produce health-care related products and/or services pertinent to this presentation.

Abnormal Pupils: Etiology

- Acquired
  - Traumatic (blunt and penetrating)
  - Ischemic mydriasis (pupillary block sequelae)
  - Post surgical
  - ICE syndrome

- Congenital
  - Aniridia
  - Iris Coloboma
  - Albinism

Iris Defects Treatment Options

- Occlusive colored contact lenses
- Corneal tattoo
- Pupilloplasty/Iridoplasty
- Anterior segment reconstruction
- Artificial Iris-Lens diaphragm
- Prosthetic Irides

Iris Defects Treatment Options: Pupilloplasty

- Benefit:
  - Skills not difficult to acquire
  - Instruments readily available

- Limitations
  - Not all iris defects amenable to surgical repair
  - Can cause iris tear
  - May not be the ideal cosmetic outcome
  - Defects may remain

- Ideal for the smaller, superior defect!
Iris Defects Treatment Options: Pupilloplasty

For Very Large pupils:
- Standard Phaco: avoid cycloplegics or epi
- Multiple McCannel sutures of 10-0 prolene: Start with middle suture, then pupillary suture, then peripheral suture
- Tighten slowly to avoid tearing or root dialysis

Modified McCannel Suture using Siepser Slip Knot Technique
- 10-0 prolene on CIF-4 curved needle
- passed through a single paracentesis at limbus, through iris defect, out of the cornea at opposite limbus
- tied through a single paracentesis site using Siepser slip knot technique

Pupilloplasty with “purse-string” prolene suture
- Best for traumatic or ischemic circular mydriasis
- Even 10 mm pupils with bunched up iris in angle can be treated
- Requires 4 paracentesis sites
- CIF 10-0 prolene passed in and out of paracentesis sites with 8 total “bites” of pupillary margin
- Easily determine exact size of new pupil with only one knot

Blunt Trauma
- Iridodialysis
- Cataract
- Zonular Dehiscence

Tips:
- No dilating drops preop
- Repair iris root first, then intrascleral phenylephrine, then phaco

Iris Dialysis Repair: Closed Repair “Sewing Machine Technique”
- Engage iris edge with a 30 gauge needle and then insert 10-0 prolene into needle tip
- Re-Engage iris with needle carrying suture into ant ch and out
- Withdraw needle without the suture back into the anterior chamber
Iris Dialysis Repair: “Sewing Machine Technique”

- Re-engage iris edge with needle, exit needle through sclera
- Withdraw needle into Ant CS with suture
- Re-insert suture into needle tip
- Complete procedure: With only one buried knot
- Close scleral flap over knot

Completed procedure:

- With only one buried knot

Blunt Trauma

- Iridodialysis
- Cataract
- Zonular Dehiscence

Iridodialysis Repair: “Sewing Machine Technique”

- Repair of iris dialysis
- Traumatic cataract extraction
- Further pupilloplasty to reduce pupil size further can be done if desired

Anterior Segment Reconstruction with Iris Repair

- 33 y/o man with Lye burns to face and both eyes

Anterior Segment Reconstruction Technique

- Pre-op: Corneal Scar, PAS, Cataract, Vitreous, etc
- After trephination: Excise cornea without leaving PAS
- Perform vitrectomy, lens removal
- Scar excision with open sky
- Dissect PAS with Sponge tips
- Completion of circular artificial iris sphincter

Anterior Segment Reconstruction Technique

- Strip surface iris fibrosis membrane
- Pano-rising suture of iris with prolene sutures
Anterior Segment Reconstruction with Iris Repair

Large Iris Defects or Aniridia
- congenital or traumatic/acquired
- glare, photophobia, poor depth of field, poor functional vision, poor cosmesis, etc.

When not enough tissue left to repair:
Iris Prosthetics
- Morcher segments and “black out” IOLs
- Ophthec Implants
- Human Optics Implants
- Currently Requires Special Compassionate Use Exemption by the FDA to be used in the U.S.

Morcher IOL or Iris Implants
- aniridic IOL
  - IOL with an integrated iris diaphragm
  - > 11 mm incision
  - ciliary sulcus if capsular support or transclerally sutured
- Iris reconstruction implants
  - requires intact capsule and large rhexis
  - black PMMA — brittle
  - needs larger incision except for the newer models
  - only in black color

Ophthec Implants
- Ophthec BV (Groningen, The Netherlands)
  - 9.5 mm incision
  - 9.0 mm diameter, 4.0 mm clear optic diameter
  - brown, blue, green
  - aphakic, or pseudophakic
  - +10.00 to +30.00
  - sulcus or sutured

Ophthec model 311 IRI
- While effective at blocking glare, Cosmetic result is less than ideal
Human Optics Implants

Excellent Cosmetic Results
Relative easily placed in capsular bag or sewn to ciliary sulcus
Downsides:
- expensive ($5,000+)
- not FDA approved

All photos courtesy of Sam Masket, M.D.

Summary

- Pupillary abnormalities and iris defects can cause debilitating glare
- Preoperative evaluation is critical
- Evaluate extent and location of iris tissue loss, patient expectation, concomitant pathology, and need for other surgical intervention
- Conservative measures should be considered first
- Is the iris defect amenable to pupilloplasty? If so, this is the most desirable option for cost and cosmesis.
- Advances in iris prosthesis give new hope for our trauma patients

Thank you!