Congenital Cataract; Anterior Capsulotomy

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Professor Of Ophthalmology
University of California at Irvine
Children’s Hospital of Orange County
Thank You for Your Support!

Thank You from the Bottom of My Heart
How, When, Why and What?

• Anterior Capsulotomy; How to perform?
• Posterior Capsulotomy and When to place IOL
• Instrumentations and Minimalist and Why?
• IOL sections and What to Choose?
Question

• I am ____
  1. General Ophthalmologist
  2. Optometrists
  3. Pediatric Ophthalmologist
  4. Orthoptists/Ophthalmic Technicians
  5. Doctor in training (resident / fellows)
  6. Others
Question

- I perform congenital Cataract Sx (< 5yo)
  1. None
  2. 1 / month
  3. 1 / week
  4. 2-3 / week
  5. 4-5 / week
  6. > 5 / week
Question

• How do You perform Anterior Capsulotomy?
  1. Curvilinear capsulotomy
  2. Vitrectorhexis
  3. Can opener capsulotomy
  4. Two incision push-pull (TIPP) rhexes (or modified)
  5. Femto-second laser-assisted capsulotomy
  6. Plasma blade capsulotomy
  7. Precision Pulse Capsulotomy (PPC)/Zepto
  8. Diathermy
  9. Others
Question

- At what age do you start to place IOL in congenital cataract cases? Unilateral cases
  1. Never
  2. From birth to 6 mo
  3. 7 mo to 12 mo
  4. 13 mo to 24 mo
  5. >2 yo
  6. Prefer No IOL
Question

At what age do you try to place IOL in congenital cataract cases? Bilateral cases

1. Never
2. From birth to 6 mo
3. 7 mo to 12 mo
4. 13 mo to 24 mo
5. >2 yo
6. Prefer No IOL
Do you preform Dye assisted capsulotomy in Congenital Cat cases?

1. Yes
2. No
3. Sometimes
If Yes or Sometimes, What Do You Use?

1. ICG
2. Autologous blood
3. Fluorescein
4. Gentian violet
5. Trypan blue
6. Others
Surgical Planning

- Modify Surgical Techniques
  - Anterior chamber depth
  - Size of the pupil
  - Size of the eye / lens; PFV
  - Location of the cataract / opacity
  - Trauma
  - Anterior segment dysgenesis
  - Zonules status
  - Corneal Opacities / View of PC and Vitreous
Timing of Surgery

• Unilateral dense congenital cataract:
  – Unilateral: 4 - 10 weeks (health of the baby)
  – Risk of glaucoma with earlier cat sx IATS
    • < 4 weeks)

• Bilateral dense cataract:
  – Bilateral: 2 - 3 months
  – Short time interval between cases
  – Bilateral sx on same day not recommended
    • Cost/Risk of Anesthesia
      Travel/Location/Availability of Healthcare
Keep It Simple!

- “Simple can be harder than complex: You have to work hard to get your thinking clean to make it simple. Once you get there, you can move mountains.” - Steve Jobs
Anterior Capsulotomy
Surgical Technique
What Anterior Capsule Removal is Difficult in Babies

- Thinner and Elastic
- Convex shaped
- Tear easily run peripherally; Radial Force
- AC shallow / Smaller eye
- IOP lower / Less rigid sclera; easily collapsed
- Poor red reflex due to opacities
Honey vs. Gelatin Viscoelastics

Dispersive versus Cohesive
Cohesive OVD

• High-molecular-weight OVD
  1. Flatten the anterior capsule
  2. Keep the anterior capsule taut
  3. Counter the effects of low scleral rigidity and vitreous upthrust
Adult Lens
Direction of Forces
Direction of Pull
4 Tips for AC Capsulorrhesis

1. Pull more Centrally
   - 45° - 90° from intended direction
2. Viscoelastics: Cohesive material preferred
3. Trypan Blue dye
4. Take frequent bites of Ant capsule
   - Take Your Time: It is Not a Race!
Lensectomy

• Hydrodissection may be performed
• Remove ALL lens cortex due to vigorous inflammatory response
Anterior Capsulotomy
AC 5.0 mm (aim for slightly smaller)
PC 4.0 mm
Vitrectorhexis

• Reported to be superior to conventional CCC in some studies.
• Quicker/Simpler
• Lens aspiration with the same instrument
• Useful in fibrotic capsules.
Address Small Pupils

• Capsulorrhexis in cataracts with small pupil <4 mm
  – posterior synechiae secondary to trauma, anterior uveitis, PFV, and pupillary fibrosis.
Trypan Blue

- May stiffen the anterior capsule and thus increase unwanted tears of Capsulorrhexis
- Concerns that Trypan blue will negatively affect corneal endothelial cells and possibility of bacterial infection after injecting into the eye
  - Air Bubble to protect the Endothelium
Trypan Blue Dye
New Pediatric Anterior Capsule Microscissors
Thank You!
Donny W. Suh
Congenital Cataracts: Surgical Pearls

Management of Posterior Capsulotomy

LUIS JAVIER CARDENAS LAMAS
GUADALAJARA, MÉXICO
Posterior Capsule

• Affect the final outcome of the surgery
• The importance of taking care of visual development.
• Posterior Capsulotomy and Victrectomy are extremely important
• The posterior capsule opacification (PCO) is the most frequent complication.
• Prevent Amblyopia.
PCO

- The age at the time of surgery
- Associated Ocular Anomalies
- Cortical Cleanup
- Management of the posterior lens capsule and vitreous.
- IOL
- Surgical Trauma
Intact Posterior Capsule

- Rate PCO 100%
- Rapid and inevitable
- PCO membranes higher in Young children
Manual Posterior Continuous Capsulorhexis

- The gold estándar
- Technically difficult
- New Instrumentation
### Posterior capsule management in congenital cataract surgery

<table>
<thead>
<tr>
<th>Study*</th>
<th>Year of Publication</th>
<th>Mean Patient Age (Mo)</th>
<th>Total Follow-up (Mean) (Mo)</th>
<th>PCCC (Eyes)</th>
<th>VAO (%)</th>
<th>At Which Follow-up (Mean) (Mo)</th>
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PCCC = posterior continuous curvilinear capsulorhexis; sec pro = secondary procedure (membranectomy with pars plicata vitrectomy); VAO = visual axis opacification

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Abhay R Vasavada Posterior capsule management in congenital cataract surgery
IOL where/when?

- Acrylic Hydrophobic
- Acrylic Hydrophilic
- Capsular Bag
- > 6 months
- AP AXIS >19 mm
SECUNDARY IMPLANT

- <6 MONTHS
- Risk Secundary Glaucoma
- Contact Lens
- Visual rehabilitation
- Patch
Pediatric Cataract

< 6 months < 19 mm

Cataract Surgery

Visual Rehabilitation

2 Years

Secondary Implant
YAG LASER CAPSULOTOMY

- Primary capsulotomy
- Secondary capsulotomy
- Under Anesthesia
- Select the patient
- Good results
What Else?

Steroid?
YAG LASER CAPSULOTOMY
YAG LASER CAPSULOTOMY

- Effective Treatment for PCO
- Restore visual acuity
- Select the correct patient
Don't Forget the IOP
Select the best Technique in your hands

Make Posterior Capsulotomy

Think in Yag Láser

A Successful result is to Individualize
Orbis Webinar

Pediatric Cataract Surgery - April 30, 2021

Simplify Your Cataract Surgery

Techniques & Instrumentation

Serena Wang, MD
Professor of Ophthalmology & Pediatrics
UT Southwestern Medical Center at Dallas
Single Incision Cataract extraction with PCIOL +/- Anterior Vitrectomy
Bimanual Cataract Extraction with Anterior vitrectomy
Bimanual Lens Aspiration
Lens Aspiration
Lens Aspiration
Lid Speculum

Alfonso w/o tabs

.12 Forceps fixate the eye and keep the eye steady

Knives
- Super sharp blade
- 2.5 mm Keratome
- 3.5 mm Keratome

Microincision Utratta

Fine/Hoffman capsularorhexis 23G

Scissors
MONARCH III IOL delivery system

Hooks
- Sinskey
- Kuglen
- Maloney
Healon washout and wound closure
Important Technical Points

- Keep the eye fixated manually
- Maintain a stable anterior chamber
- Tight fitting wounds
- Minimalize times in and out of the eye
Important Technical Points

- Anterior capsulorhexis with microincision forceps or vitrector
- Lens aspiration, starting from the periphery “swipe clean”
- Posterior capsulotomy with vitrector
Intraocular Lens Implantation in Children

Scott A. Larson, MD
William E. Scott Chair of Pediatric Ophthalmology
IOL Lens Power

• Delayed emmetropia
  • Potential for better uncorrected vision throughout life

• Immediate emmetropia (to treat amblyopia)
  • Easier to calculate
  • Myopia guaranteed later
IOL Lens power- Lens Formula

• Growing number of IOL power formulas
  • Kane, Barrett, Olsen, Haigis, Hoffer Q, Holladay, SRK, SRK/T

• Need:
  • Keratometry
  • Axial eye length
  • IOL related constant
  • AC depth

• Pediatric clinical studies
  • More IOL formula errors
  • Not all have been studied well in children...
Best IOL Power Formula for Children?

Infant Aphakia Treatment Trial (IATS) (Vanderveen et al. 2013):
- SRK/T, Holladay 1

Chang et al. (2020)
- Compared 8 (SRK II, SRK/T, Holladay 1 & 2, Hoffer Q, Olsen, Barrett Universal II, Haigis) in 68 eyes <8 years old, 1 month post op.
  - SRK/T <2 years old or AL ≤ 21mm
  - Barrett and Haigis > 2 years AL > 21 mm

- [www.eyecalcs.com](http://www.eyecalcs.com)
  - SRK/T, Holladay 2, Hoffer Q, Haigis
Keratometry/ Axial eye length

• Partial coherence interferometry (contactless)
  • Requires cooperative older child
    • Keratometry
    • Anterior Chamber Depth
    • Axial length

• Hand-held keratometry
  • Accuracy

• A-scan ultrasound
  • Immersion technique
Targeted Post-Op Refraction

• Considerations
  • Amblyopia
  • Fellow eye status
  • Assumed Compliance
  • Parental Refractive Error

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<th>Age</th>
<th>Suggested Residual Refraction</th>
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<td>≥ 14 years</td>
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Source: M. Edward Wilson, Jr., MD
Medical University of South Carolina.
Lens Material

- Silicone
  - Silicone oil deposits
  - Open capsule: opacification with air-fluid exchange
  - Calcification with asteroid hyalosis
- Hydrophilic Acrylic
  - Late opacities (calcification)
  - Absorbs dye (fluorescein, trypan blue)
  - Triamcinolone deposits
- Hydrophobic Acrylic
  - Less likely to opacify
- PMMA
  - Not foldable
  - Good stability in sulcus


https://www.eyewworld.org/article-a-case-of-late-postoperative-opacification-of-a-silicone-iol
Blue Blocking IOL’s in Children

- Rodents exposed to prolonged blue light showed retinal oxidative stress
- Protect from AMD?
  - Human evidence is lacking...
- Reduces contrast sensitivity

- Blue light may inhibit myopic progression in growing eyes
- Children’s lenses are clear not yellow

- Without more evidence: restore normal physiology

Lens Design

• Driven by intended lens location (bag, sulcus, AC)
  • Goal: Mimic normal anatomic position
• Haptic design
  • Thinner / 3 piece for the sulcus
  • Angulation & Material
• Optic size
  • Sulcus; 6.5 mm
• Available Powers
• Other designs: Iris Claw, AC Angle supported
Multiple Lenses on hand

- Things change when you get in there!
  - Alcon SA60AT in the bag
  - Alcon MA50BM in the sulcus
  - Alcon CZ70BD scleral suture fixated

- B&L Akreos Adapt AO 60 with scleral suture fixation

- Zeiss CT Lucia 3 piece, sutureless scleral fixation (polyvinylidene fluoride haptics)
Lens insertion

• IOL Injectors
  • Smaller incisions
  • May be less traumatic
  • Proper folding required
  • Be prepared for the problems
    (upside down, haptic damage, optic damage, misplaced IOL)

• Strongly consider AC maintainer for Secondary IOL’s / complex cases