PRECISION AND EFFICACY IN CONGENITAL CATARACT SURGERY- A RETROSPECTIVE STUDY OF THE 27-GAUGE VITRECTOMY

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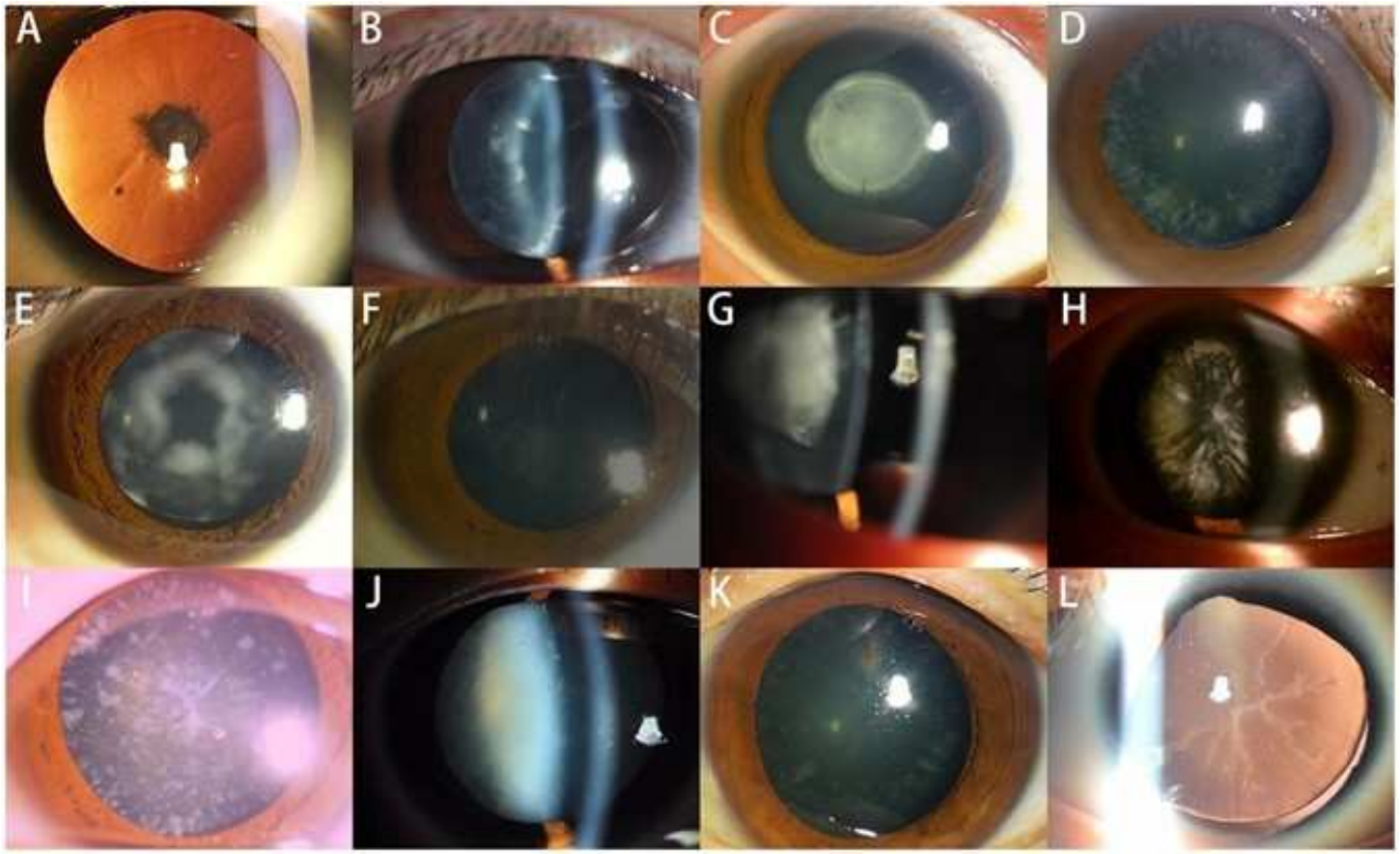
CONGENITAL CATARACT

Congenital cataract is a leading cause of preventable childhood blindness, and its timely surgical management is crucial to prevent irreversible visual deficits.

The 27-gauge vitrectomy (PPV) system, an innovation in micro-incisional surgery, promises increased precision and reduced trauma, particularly beneficial for pediatric cataract surgery, yet its safety and efficacy in this context remain underexplored.



Article | Open access | Published: 27 April 2017

Targeted Exome Sequencing of Congenital Cataracts Related Genes: Broadening the Mutation Spectrum and Genotype–Phenotype Correlations in 27 Chinese Han Families

Yi Zhai, Jinyu Li, Wangshu Yu, Sha Zhu, Yinhui Yu, Menghan Wu, Guizhen Sun, Xiaohua Gong & Ke Yao

Scientific Reports **7**, Article number: 1219 (2017) | Cite this article

Lambert, S. R., Lynn, M. J., Reeves, R., & Plager, D. A. (2006). Risk factors for aphakic glaucoma after congenital cataract surgery. American Journal of Ophthalmology, 141(5), 776-783.

Wu, Z., Huang, Z., & Wang, Y. (2018). Microincision vitrectomy surgery in pediatric retinal diseases. Ophthalmic Research, 59(2), 65-73.

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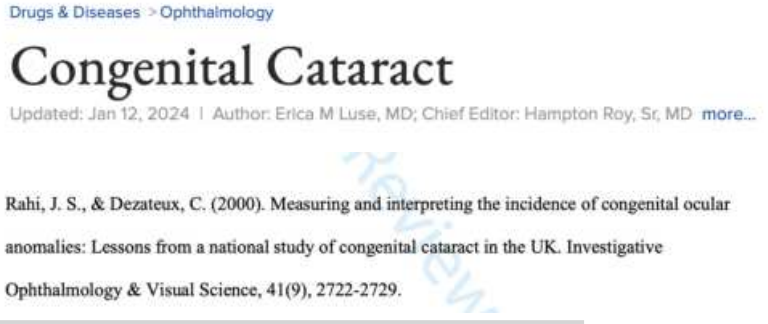
Congenital Cataract

Updated: Jan 12, 2024 | Author: Erica M Luse, MD; Chief Editor: Hampton Roy, Sr, MD more...

ABSTRACT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Rahi, J. S., & Dezateux, C. (2000). Measuring and interpreting the incidence of congenital ocular anomalies: Lessons from a national study of congenital cataract in the UK. Investigative Ophthalmology & Visual Science, 41(9), 2722-2729.

This retrospective study aims to evaluate the precision, efficacy, and safety profile of 27-gauge vitrectomy in the surgical management of congenital cataracts.

By analyzing clinical outcomes, intraoperative parameters, and postoperative complications, this study seeks to clarify the potential role of this advanced surgical modality in optimizing visual rehabilitation for pediatric patients.

METHODS 1

Study Period: January 2021 – December 2024

Subjects: 44 eyes from 22 children (aged 3–5 months) with bilateral congenital cataracts

Cataract evaluation: Morphology, metabolic/infection screening, genetic analysis

Preoperative assessment (under general anesthesia):

- Anterior segment evaluation (surgical microscope)
- IOP measurement (Perkins tonometer)
- Corneal diameters (surgical caliper)
- Axial length (A-scan ultrasonography)
- Fundus examination (binocular indirect ophthalmoscopy, B-scan ultrasonography)

Platform: STELLARIS ELITE PhacoVitrectomy (Bausch & Lomb)

Vitrectomy: 27G vitrectomy kit (cannula system & Bi-Blade cutter);

Visualization: ZEISS ARTEVO 800 with 3D visualization system


ZEISS
9.6x
20%
LED
100:35
NONE
DR. PIOPPO
Anterior

STEP 1

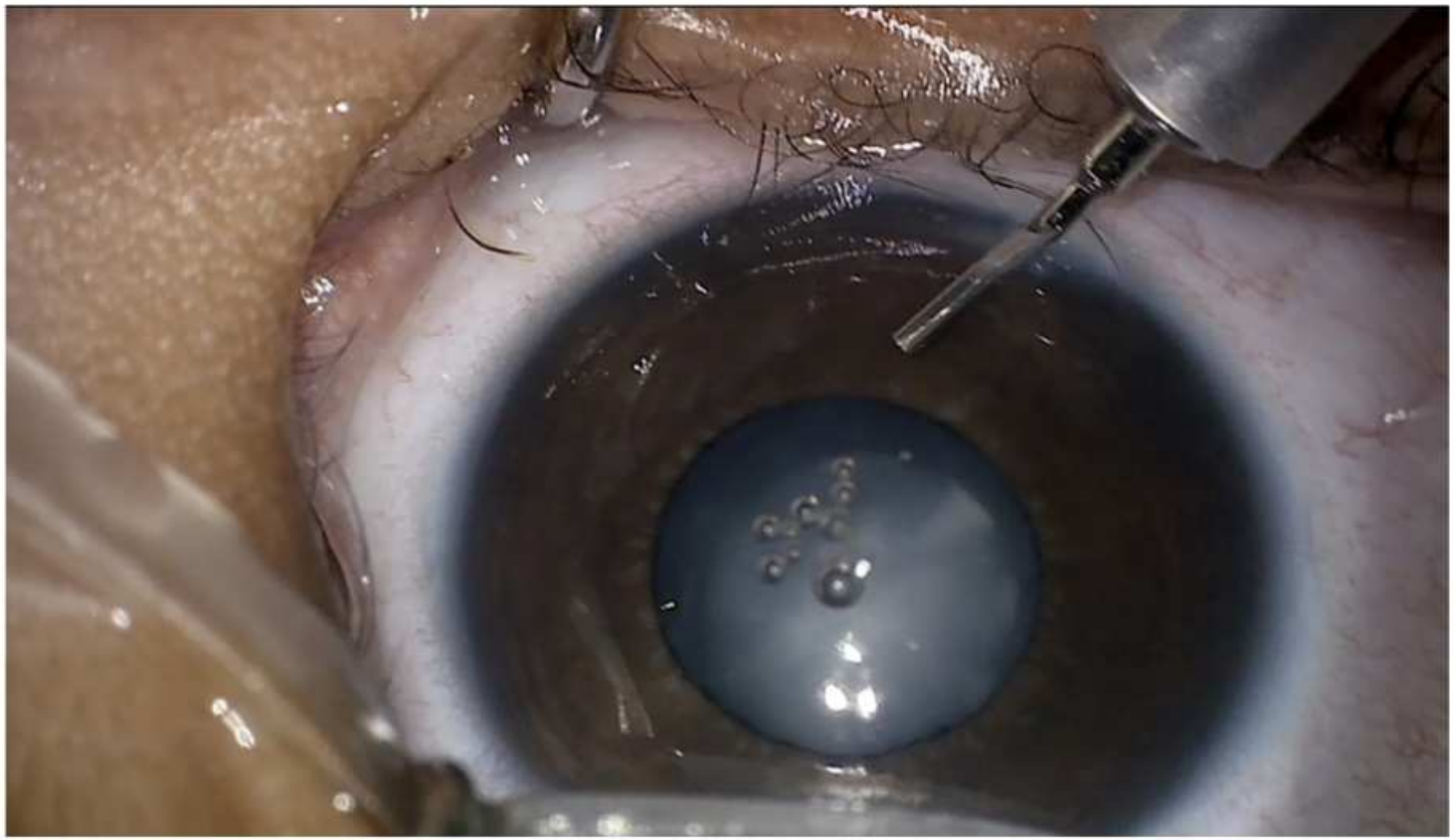

Fig 1. Surgical technique: Insertion of a 27G trocar through 0.4 mm clear corneal incisions, one inferior for BSS infusion into the anterior chamber and one superior.

STEP 2

Fig 2. Surgical technique: Insertion of Trypan Blue into the anterior chamber to stain the anterior capsule.

STEP 3

Fig 3. Surgical technique: Anterior capsulotomy using the vitrectomy cutter (with the blade oriented downward to create the initial central capsular opening, then upward to enlarge the anterior capsulotomy).

STEP 4

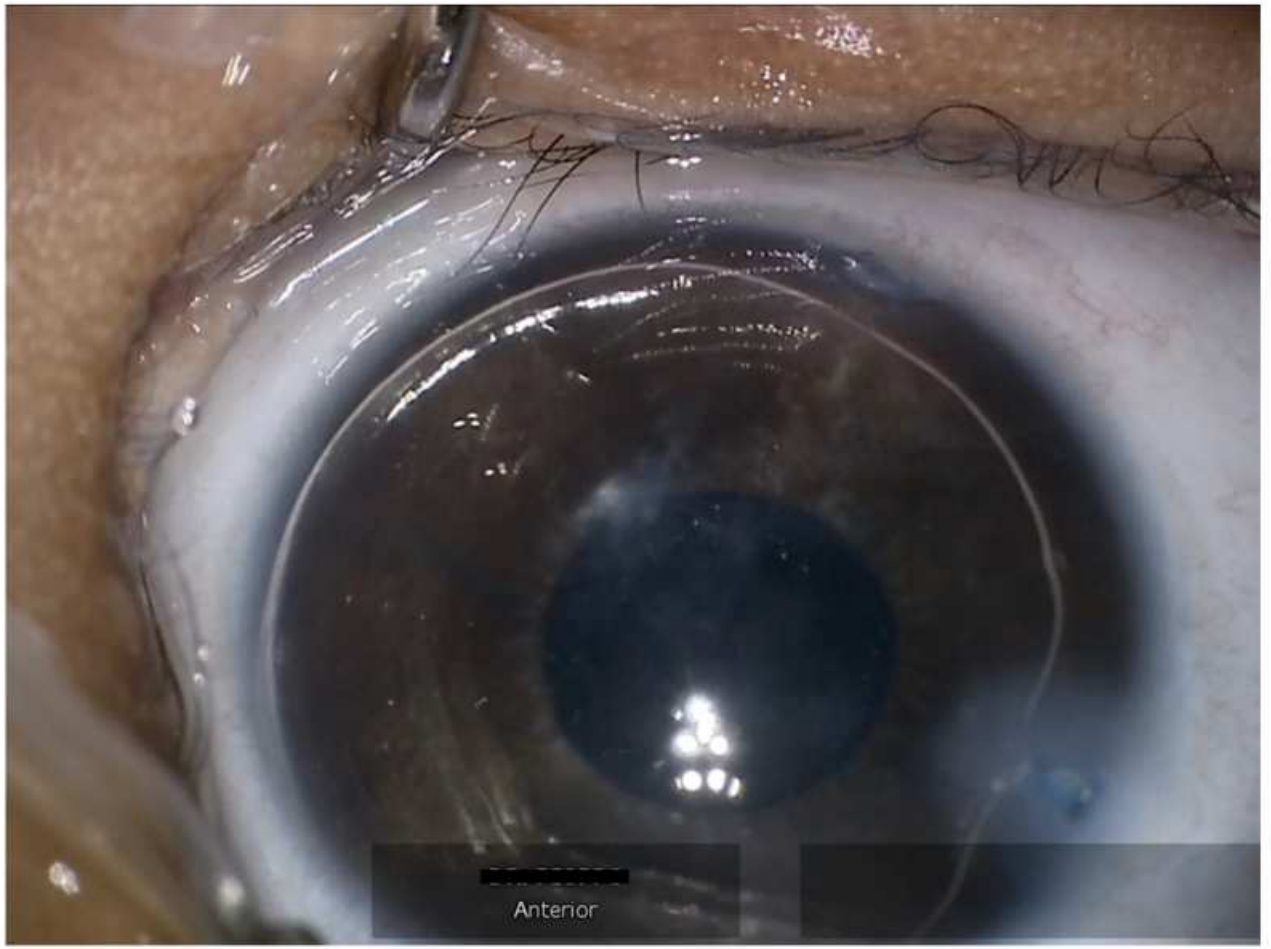

Fig 4. Surgical technique: Hydrosuturing of the corneal incisions. Air bubble in the anterior chamber.

All patients left aphakic

Evaluation of the Efficiency and Safety of a 27-gauge 20,000 cuts per minute Vitreous Cutter

September 2022

DOI:10.21203/rs.3.rs-2098426/v1

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- Cut rate: **800 cpm**
- Aspiration: **10–15 cc/min**
- Vacuum: **Max 400 mmHg**
- Infusion pressure: **~25 mmHg**

METHODS 2

Etiology & Morphology

- **Presumably idiopathic:** 50% (11 patients)
- **Familial:** 50% (11 patients)
- **Cataract morphology:**
  - **Nuclear:** ~60% (26 eyes)
  - **Polar:** ~40% (18 eyes)

Preoperative Ocular Measurements

- **Axial length (mean ± SD): 17.88 ± 1.44 mm**
  - Boys: **18.2 ± 1.66 mm**
  - Girls: **17.89 ± 1.56 mm** (NS difference)
- **Corneal diameters (mean ± SD):**
  - **Horizontal:** 10.05 ± 0.34 mm (Boys: 10.12 mm, Girls: 10.00 mm)
  - **Vertical:** 9.6 ± 0.38 mm (Boys: 9.65 mm, Girls: 9.58 mm)
- **Fundus & B-scan:** Normal macula & optic disc, no posterior segment pathologies

Patient Demographics & Cataract Characteristics

- **Total eyes:** 44 (22 pediatric patients)
- **Sex distribution:**
  - **Female:** 28 eyes (63.6%)
  - **Male:** 16 eyes (36.4%)
- **Age range:** 3–5 months (mean age)
- **Bilateral congenital cataracts in all cases**

RESULTS

Intraoperative & Postoperative Outcomes

- Surgical duration: 20–40 minutes
- Anterior chamber stability: No iris/vitreous prolapse
- All patients left aphakic
- Post-op complications:
  - **Conjunctival hyperemia:** 13 eyes (30%) → Resolved in 1 week
  - **Mild anterior chamber reaction:** 5 eyes (12%) → Resolved in 1 week
  - **Transient IOP elevation:** 2 eyes (5%) → Resolved

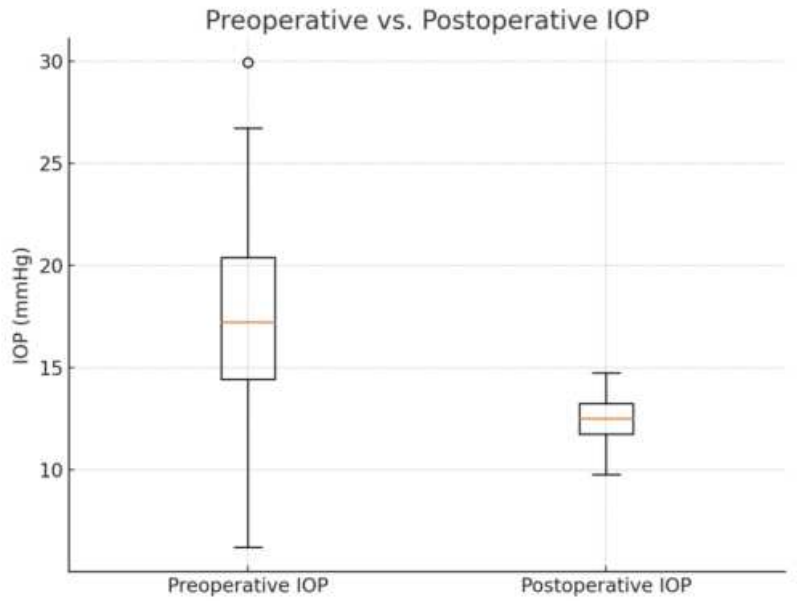

Fig 5. Box Plot: Preoperative vs. Postoperative IOP. Visualizes the IOP reduction postoperatively.

Intraocular Pressure (IOP) Outcomes

- Pre-op IOP: 15.8 ± 5.7 mmHg
- Post-op IOP: 12.2 ± 1.1 mmHg

GRAZIE A TUTTI!