

Surgery for angle closure: Tackling difficult cases

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Operating on angle closure eyes

- Potential problems and pitfalls
- Intra and post-operative complications
- Tips for avoiding problems

Lens/ cataract surgery

Preparing for surgery

- Spend time on pre-op counseling and consent

Discuss:

- Aqueous misdirection
- CMO
- Corneal decompensation
- Refractive outcome
- Other eye

★ Look at the biometry before day of surgery!

Biometry and refractive outcome

- Use 3rd or 4th generation theoretical formula
 - ➔ Predict IOL position in eye
- Effective lens position (where IOL settles post-op) more difficult to predict in small eyes
- Risk of myopic surprise (esp post LASIK)
- Hoffer Q, Holladay 1 or Haigis, Olsen, Barrett
- Hoffer Q consistently evidenced as predictable in small eyes
- In most cases aim for emmetropia or hyperopia

Aristodemou P, Cartwright NE, Sparrow J et al. *J Cataract refract surgery* 2011;37:63-71

ARTICLE

Formula choice: Hoffer Q, Holladay 1, or SRK/T and refractive outcomes in 8108 eyes after cataract surgery with biometry by partial coherence interferometry

Petros Aristodemou, FRCOphth, Nathaniel E. Knox Cartwright, MRCOphth,
John M. Sparrow, DPhil, FRCOphth, Robert L. Johnston, FRCOphth

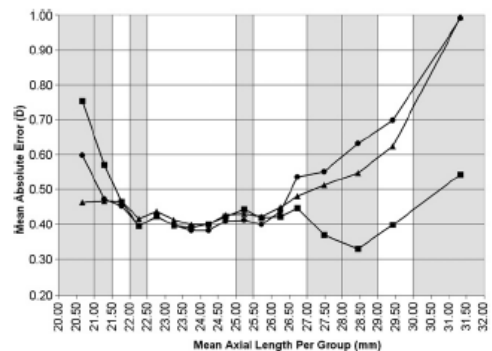


Figure 1. Mean absolute error plotted against AL for the Hoffer Q formula (triangles), Holladay 1 formula (circles), and SRK/T formula (squares) for the Sofport IOL sample. The gray shading shows the groups with statistically significant differences in MAE.

ARTICLE

Factors related to corneal endothelial damage after phacoemulsification in eyes with occludable angles

J Cataract Refract Surg 2008; 34:46–51

Yu-Chieh Ko, MD, Catherine Jui-ling Liu, MD, Ling-Ing Lau, MD,
Chih-Wei Wu, MD, Joe C. Chou, MD, Wen-Ming Hsu, MD

CONCLUSIONS: The corneal endothelial cell loss after phacoemulsification in eyes with occludable angles was associated with preoperative AL measurement and postoperative IOP within 24 hours. To minimize corneal endothelial cell damage, it is critical to avoid an IOP spike during the early postoperative period and to exercise extreme caution intraoperatively in eyes with an AL less than 22.6 mm.

Effect of a Previous Acute Angle Closure Attack on the Corneal Endothelial Cell Density in Chronic Angle Closure Glaucoma Patients

Clement C. Y. Tham, FRCS*†, Yolanda Y. Y. Kwong, FRCS*‡, Jimmy S. M. Lai, MD,
FRCOphth,*§ and Dennis S. C. Lam, FRCS, FRCOphth*‡

Conclusions: A previous acute angle closure attack correlates with a significantly reduced corneal endothelial cell density in CACG patients.

J Glaucoma • Volume 15, Number 6, December 2006

Surgery – Tips for avoiding problems

Iris prolapse

- ➔ Long anterior corneal wound and paracentesis
- ➔ Intracameral phenylephrine, iris hooks, ring

Poor view due to corneal oedema

- ➔ General Anaesthesia, vision blue

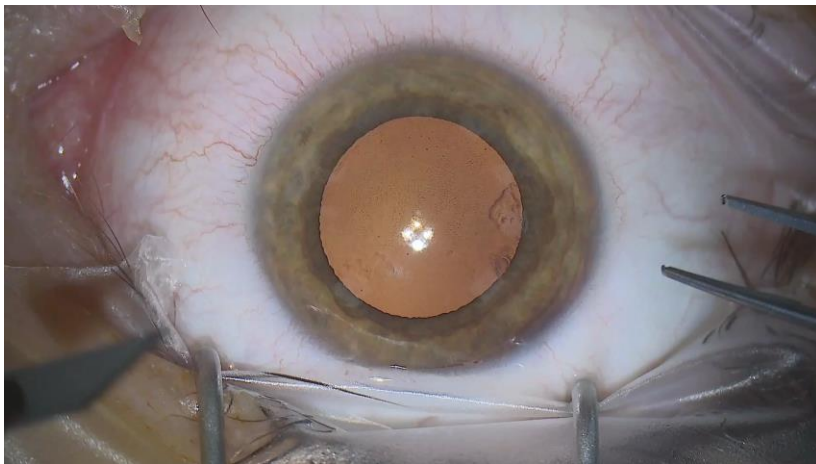
Shallow unstable Anterior chamber, bulgy vitreous

- ➔ AC maintainer
- ➔ Careful hydrodissection
- ➔ Small anaesthetic volume or GA

Zonular weakness



- 24 yr old woman
- Iridotomies
- Recurrent symptoms
- PAS
- Axial length: 21.05mm



Post-op complications

Corneal decompensation

- Soft shell technique
- Avoid IOP spike, post-op Diamox

Aqueous misdirection

- Counsel patient, Surgical PI, Atropine,

Fibrinous uveitis and Cystoid macular oedema

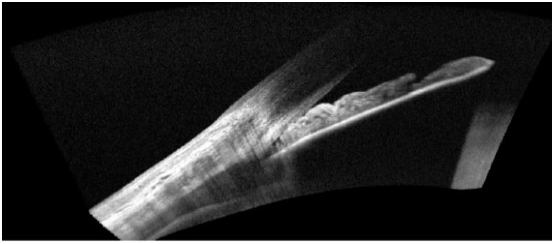
- Frequent topical steroids

Refractive surprise

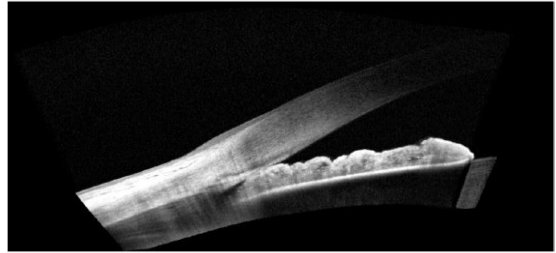
Case example

- 48 year old female
- Hyperopic LASIK
- Bilateral Acute Angle Closure 2011– Laser iridotomies
- Residual Iridotrabecular contact
- Stable for several years
- Noticeably shallower AC and symptoms suggestive of angle closure
- IOP, Discs and VF normal

Anterior Segment OCT



Right temporal angle



Left nasal angle

Management?

Plan: Right Clear lens extraction + IOL

Risks: Aqueous misdirection, refractive surprise

Biometry: Axial length = 20.06mm

Patient requested low myopia for reading and computer work

- Uncomplicated surgery under GA

Biometry

Formula: **Hoega 4 (Hyperopic)**
Target ref: **plane**
K: 1.3173

ZEISS

Examination date: 10/06/2018
Surgeon: **Optical IOLMASTER**

The measurements should be checked for plausibility, as there may be pathological changes!
Valid for hyperopic LASIK/LASEK/PRK only! Do not use after RK or anyopic treatment!

OD	AL: 20.51 mm (SNR = 488.0) K1: 43.55 D / 7.41 mm @ 92° K2: 47.20 D / 7.13 mm @ 2° R: NS: 7.28 mm @ 6.34 D Cyl: -1.65 D @ 92° ACT: 1.82 mm Refraction: 0 D 0 D @ 0°	OS	AL: 20.53 mm (SNR = 362.4) K1: 46.82 D / 7.24 mm @ 53° K2: 47.32 D / 7.07 mm @ 144° R / SE: 7.16 mm / 47.18 D Cyl: -1.22 D @ 37° ACT: 2.09 mm Refraction: 0 D 0 D @ 0°
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Status: Phakic

Opt A119.1MA60AC	Opt A119.8NS60WF	Opt A119.1MA60AC	Opt A119.8NS60WF
A0 const: 1.498 A1 const: 0.011 A2 const: 0.147	A0 const: -0.782 A1 const: 0.286 A2 const: 0.221	A0 const: 1.498 A1 const: 0.011 A2 const: 0.147	A0 const: -0.782 A1 const: 0.286 A2 const: 0.221
150. (D) 817. (D) 19.8 -1.74 19.5 -0.77 19.2 -0.47 18.9 -0.09 18.5 0.21 18.2 0.68 17.9 1.25	150. (D) 817. (D) 19.9 -1.27 19.5 -0.59 19.2 -0.25 18.9 -0.14 18.5 0.22 18.2 0.59 17.9 1.25	150. (D) 817. (D) 19.5 -1.01 19.2 -0.44 18.9 -0.28 18.6 0.07 18.3 0.41 18.0 0.77 17.7 1.11	150. (D) 817. (D) 19.9 -1.03 19.5 -0.64 19.2 -0.29 18.9 0.06 18.6 0.41 18.3 0.77 18.0 1.13

Opt A118.7SA60AT	Opt 118.54 NTA3U0	Opt A118.7SA60AT	Opt 118.54 NTA3U0
A0 const: -0.191 A1 const: 0.231 A2 const: 0.179	A0 const: -0.765 A1 const: 0.400 A2 const: 0.100	A0 const: -0.191 A1 const: 0.231 A2 const: 0.179	A0 const: -0.765 A1 const: 0.400 A2 const: 0.100
150. (D) 817. (D) 19.8 -1.56 19.5 -0.78 19.2 -0.40 18.9 -0.03 18.5 0.28 18.2 0.73 17.9 1.37	150. (D) 817. (D) 19.5 -1.49 19.2 -0.58 18.9 -0.19 18.6 0.16 18.3 0.58 18.0 1.16 17.7 1.85	150. (D) 817. (D) 19.5 -1.29 19.2 -0.51 18.9 -0.14 18.6 0.10 18.3 0.51 18.0 1.10 17.7 1.71	150. (D) 817. (D) 19.5 -1.46 19.2 -0.56 18.9 -0.18 18.6 0.14 18.3 0.57 18.0 1.17 17.7 1.81

Biometry by J Hamilton SN. No hx of CL wear. Both LASIK for hypermetropia 2010.

IOL Calculator for I (Print out with text)

Please enter all data available and press "C"

Cornea Name: [] K1: [] K2: [] Target Ref: []

Pre-LASIK/PRK Data: [] Vertex (if any, 12.5 mm will be used): []

Post-LASIK/PRK Data: []

Optical/Wounded Biometric Data: []

Level Consideration: []

Handwritten: *Toric IOL - +0.50*

1 week post op:

- VA = 6/18
- AC – Central and peripheral shallowing
- IOP – 14mmHg
- Autorefractation = -1.50 D

Diagnosis = Aqueous misdirection

Treatment

- Atropine 1% bd – Good response
- YAG capulotomy and hyaloidotomy – central and peripheral

Stopped Atropine 1 week later



Attended Emergency department with pain + blurred vision



IOP 40mmHg RE and shallow AC

Options

1. Long term Atropine
2. Ciliary body cyclodiode laser
3. Pars plana vitrectomy



20 shots , 1500 mw, 1500ms

1 week Post –op :

- AC deeper, IOP normal
- VA = 6/6
- Auto-refraction = -0.75

Aqueous misdirection



- Always anticipate in small eyes
- Myopic refractive error unusual in small eyes post-phaco
- IOP may be normal

Differential diagnosis

	Aqueous misdirection	Pupil block	Suprachoroidal Haemorrhage	Serous choroidal effusions
IOP	→ Or ↑	↑	→ Or ↑	↓
AC depth	Shallow peripheral + CENTRAL	Shallow peripheral	Flat peripheral + Central	Shallow peripheral + Central
Relieved by iridectomy?	No	Yes	No	No
Fundoscopy	Normal	Normal	Dark choroidal elevations	Choroidal elevations

Treatment

- Atropine
- YAG hyaloidotomy
- Acute → Cyclodiode laser
- Chronic with PAS and disc damage
 - Pars plana vitrectomy +/- aqueous shunt
- Plan for fellow eye surgery

Summary

- Spend time counseling patients for surgery
- Prepare for aqueous misdirection in small eyes
- Plan and review biometry well before day of surgery
- Lens and cataract surgery achieve good results in most cases