Managing Acute Angle Closure: Tips and Experiences

Joey Yen-Cheng Hsia, MD
Assistant Professor of Ophthalmology
Glaucoma Service
University of California, San Francisco

No Financial Disclosures
Introduction

- Acute elevation of IOP to a very high level due to abrupt closure of TM
- Most commonly due to pupillary block
- Potential blinding disease requiring rapidly decrease the IOP
- Determine the etiology of the attack and treat accordingly

Acute Angle Closure

**Risk Factors:**
- Hyperopia
- Age
- Female
- Inuit or Asian ethnicity
- +Family or personal history

**Signs:**
- Corneal edema
- Conjunctival injection
- Mid-dilated pupil
- Segmental Iris atrophy
- Glaukomflecken

**Symptoms:**
- Eye pain / headache
- Nausea/vomiting
- Blurry vision
- Halo
Examination

- Examination can be difficult: patient in severe pain, nausea/vomiting, edematous cornea
  - Lower the IOP fast!
- Careful slit-lamp examination including gonioscopy of both eyes
- Glaucomatous cupping and extensive PAS suggest CACG

Determine the Etiology

- **Pupillary block**
  - Acute primary angle closure
  - Subluxed lens: PXE, ectopia lentis

- **Non-pupillary block**
  - Plateau / pseudo-plateau iris
  - Ciliochoroidal effusion
  - Lens-induced: phacomorphic
Time to Treatment

- *Li and Han et al.* Risk factors of immediate blindness and the critical treatment window for acute primary angle closure: A large retrospective study (Submitted, 2019)
- Retrospective case series from China, N=1,030
- Presenting IOP and time to treatment are predictors for blindness
- <1% risk of blindness if treated within 12 hours

Success of Medical Therapy

- Time to treatment correlate with the success of medical therapy alone
- Success of medical therapy <50% if treatment is delayed of 24-72 hours
- Patients who failed medical therapy are more likely to develop chronic glaucoma

<table>
<thead>
<tr>
<th>Table III - Association of selected single factor characteristics and risk of chronic glaucoma</th>
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</thead>
<tbody>
<tr>
<td><strong>Characteristics</strong></td>
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<tr>
<td>Age of patient</td>
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<tr>
<td>40-49 yrs</td>
</tr>
<tr>
<td>50-59 yrs</td>
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<tr>
<td>&gt;60 yrs</td>
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<tr>
<td>Duration of symptoms</td>
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<tr>
<td>&lt;24 hrs</td>
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<tr>
<td>24-72 hrs</td>
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<td>&gt;72 hrs</td>
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*Wong et al. Singapore Med J. 1997*
Acute Medical Therapy

- Topical aqueous suppressants
  - Beta-blocker
  - Alpha-adrenergic
  - Carbonic anhydrase inhibitor

- Miotic (Pilocarpine)
  - Induce miosis
  - Avoid 4% - increase iris vascular congestion and anterior rotation of lens iris diaphragm

Carbonic Anhydrase Inhibitor

- IV or oral tablet
- Methazolamide slower onset
- Okay to use in patient with self reported minor sulfonamide antibiotic allergy
- Avoid in patient with GFR < 10

Shah et al. Ophthalmol ther. 2018
Mannitol

- IV mannitol (1g/kg)
  - 20% mannitol (20g/100ml)
- Osmotic agent - Dehydrate the vitreous
- Infuse over at least 30 minutes
  - Rapid infusion can lead to CHF and pulmonary edema
- Avoid in patient with cardiac and renal insufficiency

Procedural Intervention

- Ocular massage
- Anterior chamber paracentesis
  - 30 gauge needle on syringe without plunger
  - Pressure force through 30 gauge needle is about 12 mmHg
- Laser peripheral iridoplasty
  - Effective in lowering IOP in acute phase
  - At least 180 degree treatment
  - Can address non-pupillary block angle closure
Addressing Pupillary Block

Laser peripheral iridotomy
• Adequate size (~200um)
• Sequential argon-yag for thick iris
• Effective mid-term IOP control, but not long term
• Will not affect clinical outcome of subsequent cataract surgery

Cataract Surgery

• Preop IOP 50 → 15mmHg on 0.1 medications at 2 years
• Phaco alone is an effective treatment for APAC
LPI vs Phaco

Phaco is more effective than LPI in preventing IOP rise after APAC

At 18 months:

- LPI: ~50% IOP ↑
- Phaco: 3% IOP ↑


Cataract Surgery in APAC

- **Challenges:** corneal edema, shallow chamber, poor dilation with floppy iris, large lens, and possible zonulopathy
- Abort acute attack medically and with laser, then proceed with phaco
- **Surgical tips:**
  - preoperative mannitol, high viscosity OVD
  - Consider iris hooks to avoid iris prolapse
Other Surgical Consideration

• Primary trabeculectomy has high failure rate (>50%) with high rate of postoperative shallow chamber (25%)
  – Aung et al. Ophthalmology, 2000

• Can consider Phaco+GSL if ≥180° PAS remains at conclusion of phaco in patients without severe glaucomatous cupping
  – Teekhasaenee et al. Ophthalmology 1999
  – Husain et al. JAMA ophthalmology 2019

Preoperative
Postoperative

Treat the Fellow Eye

• High risk (>50%) of developing APAC

• Avoid dilation, but if needed use tropicamide only

• Pilocarpine can be consider if patient refuse intervention

• LPI is effective, but up to 25% will still be concludable and 10% will experience IOP elevation

• Consider cataract if fellow eye has PAC or early PACG of if there’s visually significant cataract/anisometropia
Take Home Points

• AACG is an ocular emergency requiring prompt IOP reduction
• Time to treatment is predictive of visual outcome and response to medical therapy
• Address the underlying etiology to prevent recurrent attack
• LPI is effective for mid-term IOP control but cataract surgery offers long-term control
• Treat the fellow eye

Thank you

Email: Joey.hsia@ucsf.edu
FAX: 415-353-4250