Topiramate Associated Bilateral Angle Closure and Myopic Shift

A 23-year-old female, who recently began treatment on topiramate, presents with bilateral blurred vision. Examination reveals bilateral myopic shift, elevated intraocular pressures, shallow anterior chamber and narrow angles on gonioscopy.

Case History
- 23 year old female
- Onset: morning of presentation
- Worsening throughout the day
- Starbursts around lights
- Previously has never had to wear glasses
- Denies any eye pain
- Artificial tears but do not help

Pertinent findings
Day 1
- Uncorrected VA: 20/400 OD/OS
- Refraction: OD -5.25 DS: 20/25-2Phph
  - OS -5.50 DS: 20/30
- Motility: full, no eye pain OU
- Confrontation VF: Full to finger count OU
- Pupils: PERRL (-)APD OU
- Anterior Segment
  - Cornea: clear OU
  - IOP: 39/38
  - A/C Shallow OU
  - Van Herrick: <1/4:1, N/T OU
- Undilated Posterior Segment evaluation unremarkable
- Consultation with ophthalmology indicated 24-hour follow-up at the ophthalmology clinic for evaluation
- Instilled timolol, brimonidine, and latanoprost in office and instructed to use the drops until the next day.

Day 2: Ophthalmology Clinic
- IOP 24/26
- Laser peripheral iridotomy was performed in each eye
  - Post-op IOP 12/17

Day 3: Blurred vision persists
- Uncorrected VA: 20/400 OD/OS
• Refraction:  OD -6.25: 20/30+2
  - OS -6.25: 20/25-2
• Anterior Segment
  o IOP: 12/12
  o A/C Shallow, quiet OU
  o Van Herrick: <1/2:1, N/T OU
  o Patent LPI OD @ 1100, OS @ 0100
• Dilated Posterior segment evaluation unremarkable
• Start atropine 1% BID OU
• Discontinue all other ocular medications
• RTC 1 week

Day 12 Distance VA improved, near vision blurred 2’ atropine therapy
• Uncorrected VA: OD: 20/30-1
  - OS: 20/25
• Refraction:  OD +0.50 DS: 20/20-1
  - OS +0.50 DS: 20/20-1
• Anterior Segment
  o IOP: 13/13
  o A/C Deep, quiet OU
  o Van Herrick: 1:1, N/T OU
  o Patent LPI OD @ 1100, OS @ 0100
• Dilated Posterior segment evaluation unremarkable
• Discontinue atropine therapy
• RTC 1 week

Patient lost to follow-up

Medication
• Topiramate for chronic back pain
  o Started one week prior to onset of symptoms
  o Used only three times

Differential Diagnosis
• Topiramate induced bilateral angle closure
• Anatomically narrow angles with bilateral acute angle closure attack
• Nanophthalmos with bilateral choroidal effusion
• Bilateral malignant glaucoma (aqueous misdirection)

Diagnosis and Discussion
Topiramate associated bilateral angle closure and myopic shift

Topiramate
• Sulfamate substituted monosaccharide
• FDA approved for treatment of epilepsy, migraine, and weight loss
One of the off label uses includes treatment of chronic lower back pain ¹
Most cases of topiramate induced myopic shift and angle closure occur within two weeks
Onset of symptoms range from first few hours to seven weeks after treatment ²
Fraunfelder et al. reported varying dosages of topiramate in symptomatic eyes – few cases occurred within hours after dosage was doubled ³
Case report – patient took the medication only three times one month prior to the onset of symptoms ⁴

Pathophysiology
- Idiosyncratic reaction to topiramate
- Symptoms result from suprachoroidal effusion
  - Leads to anterior rotation of the ciliary body and forward displacement of the lens iris diaphragm
  - Outcome: shallow anterior chamber and appositionally closed angle
  - Forward displacement of the lens creates a myopic shift
  - Zonular relaxation from anterior rotation of the ciliary body leads to lens thickening, contributing to the myopic shift ²,⁵
  - Acute myopic shifts reported up to -8.75 D ⁵

Treatment
- Discontinue topiramate in conjunction with prescribing physician
  - Especially if prescribed for seizures
- Topical ocular hypotensive agents to control elevated IOPs
- Topical pilocarpine contraindicated – may cause further anterior rotation of the ciliary body ²
- Caution should be taken with CAIs, as other sulfa-based drugs, such as acetazolamide, have been associated with secondary angle closure ²
- Cycloplegia
  - Relaxes the ciliary body, deepening the anterior chamber ³
  - Causes posterior displacement of the lens reversing the myopic shift ³
- Topical steroid helps stabilize the cell membranes to reduce the suprachoroidal effusion ³
- The mechanism for topiramate induced angle closure does not involve pupillary block; therefore, laser peripheral iridotomy is not indicated ³
- Cases unresponsive to topical treatment may benefit from intravenous mannitol and methylprednisolone ⁶

Conclusion
The use of topiramate may lead to bilateral myopic shift and angle closure secondary to choroidal effusion causing anterior rotation of the ciliary body. Treatment includes discontinuation of the medication, topical cycloplegic, topical steroid, and ocular hypotensives. Laser peripheral iridotomy is not indicated, as the mechanism of action does not include pupillary block.


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