A forceful impact can give you closure: a case of trauma induced phacomorphic glaucoma

Abstract: Blunt ocular trauma can induce a multitude of ophthalmic complications including secondary angle closure. Diagnosis, optometric management, and treatment strategies for the optometrist are discussed in this case of delayed onset phacomorphic glaucoma after trauma.

I. Case History

- Chief complaint: 68 year old male presented with a chief complaint of redness and constant excruciating pain (a 12 out of 10) in the left eye (OS) upon awakening with onset of intermittent pain one week prior. Additional symptoms included light sensitivity and resolving swollen left eyelid. Relieving factors included acetaminophen/oxycodone for pain.
- Ocular history: Blunt force trauma OS three weeks prior from a fist punch resulting in left medial wall fracture, open angle glaucoma suspect secondary to moderate cupping in both eyes (OU), dry eye syndrome with allergic component OU, early cataracts OU
- Medical history: unremarkable
- Medications: acetaminophen/oxycodone, etodolac

II. Pertinent findings

- Clinical:
  - Entering visual acuities with correction were 20/20 in the right eye (OD) and 20/count fingers at 5 feet OS with pinhole to 20/100
  - Pupil OS mid-dilated with minimal nasal movement, negative afferent pupillary defect
  - Extraocular muscle movements full and confrontation visual fields full OU
  - Intraocular pressures (IOP) in units mmHg were 11 OD and 50 OS
- Physical:
  - External examination revealed edema in the upper and lower lids OS
  - Biomicroscopy revealed mild corneal haze OS with inferior endothelial pigment, diffuse injection 2+, a shallow anterior chamber with mild cells iridocorneal touch inferotemporal with almost no anterior chamber. Van Herick angle estimation was 1 nasal and 0 temporal and lens assessment was anterior cortical cataract 2+ and nuclear sclerosis 3+. OD was within normal limits, had open angles and trace nuclear sclerosis only.
  - Undilated fundus evaluation revealed pink discs with moderate cupping 0.60 OU
- Imaging studies:
  - Pentacam revealed an anteriorly displaced lens causing pupillary block OS, normal OD
  - OCT of optic nerve and macula: unremarkable OU
  - Patient unable to sit for ultrasound biomicroscopy (UBM) due to discomfort

III. Differential diagnosis

- Primary/leading: phacomorphic glaucoma, secondary angle closure due to lens subluxation
- Others: Posner-Schlossman, acute primary angle closure

IV. Diagnosis and discussion

- Blunt ocular trauma can precipitate angle closure by mydriasis, lens intumescence, anterior lens displacement, or lens subluxation causing pupillary block. Treatment methods vary for
patients with secondary angle closure glaucoma due to lens intumescence (phacomorphic glaucoma) and subluxation than those with primary acute angle closure given morphological differences including shallow anterior chamber, vitreous herniation, and zonular involvement in the former.\textsuperscript{1}

**Present case study**

- At his initial emergency ophthalmologic consult, it was revealed that the patient sustained a left medial wall fracture without muscle entrapment. He presented with reduced acuities from 20/20 to 20/40 OS, full externals, and traumatic iritis OS, while OD remained unaffected. It was three weeks later that he presented to optometry with new onset signs and symptoms of secondary angle closure by lens intumescence and subluxation. Unique features of this case are in the evolution of the patient’s symptoms, diagnoses, and optometric management. Assessment of the angle with gonioscopy was deferred given potential for exacerbating iridocorneal touch.

**V. Treatment, management**

- One round of dorzolamide 2%/timolol 0.5%, brimonidine 0.2%, latanoprost 0.005% was instilled to decrease IOP OS to 36 mmHg and the patient was referred for immediate peripheral iridotomy. Apraclonidine, typically used for IOP reduction, was swapped out in favor of brimonidine to eliminate the potential for pupil mydriasis.\textsuperscript{2} Neodymium-doped yttrium aluminium garnet (Nd:YAG) laser iridotomy is the preferred choice in cases involving pupillary block.\textsuperscript{3} When previous methods fail to reduce IOP, trabeculectomy is recommended.\textsuperscript{3}

- Zonular imaging should be performed with ultrasound biomicroscopy (UBM) prior to cataract extraction.\textsuperscript{1} Depending on the amount of zonular involvement, different modes of cataract extraction may be recommended. When the lens is dislocated, lensectomy or combination lensectomy and vitrectomy within one month of trauma is preferred.\textsuperscript{3} The combination treatment is preferred due to the risk of vitreous prolapse into the anterior chamber which can result in permanent damage to the trabecular meshwork.\textsuperscript{3}


**VI. Conclusion**

- Patients who present with acute angle closure attacks should be evaluated for secondary causes. Prompt evaluation and treatment should be initiated given the severity of presentation and elevation in IOP. Case history, in addition to careful slit lamp examination, is especially important and can aid the examiner in deciding treatment options.