



## Case report

## Acute angle closure in the setting of high axial myopia: A case report

Cheng-Wen Su<sup>a</sup>, Hsin-Yi Chen<sup>a, b, \*</sup><sup>a</sup> Department of Ophthalmology, China Medical University Hospital, Taichung, Taiwan<sup>b</sup> School of Medicine, Medical College, China Medical University, Taiwan

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## ABSTRACT

Acute angle closure is common in hyperopic eyes but uncommon in myopic eyes. Here, we report a case of angle closure attack in a 59-year-old female patient with high axial myopia. The patient presented without underlying medical history or drug history with marked congestion and progressively blurred vision in her right eye (RE) for 1 week. Initial intraocular pressure (IOP) was 40 mmHg in the RE and 19 mmHg in the left eye. Slit lamp examination revealed a very shallow anterior chamber in both eyes and marked corneal microcystic edema in the RE. Acute angle closure of the RE was diagnosed. Conservative IOP-lowering management followed by laser iridotomy was effective in managing acute high IOP crisis; however, early cataract extraction was necessary for long-term IOP control. Clinicians should be mindful of the possibility of acute angle closure even in highly axially myopic eyes.

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## 1. Introduction

Acute angle closure attack, which typically features a short axial length (AL) as well as a shallow and narrowing anterior chamber (AC), is common in hyperopic eyes [1]. By contrast, myopia with a long AL is typically related to an increased risk of open angle glaucoma [2]. Acute primary angle closure (PAC) in highly axially myopic eyes is relatively rare. Here, we report a case of a patient with acute angle closure in a highly axially myopic eye.

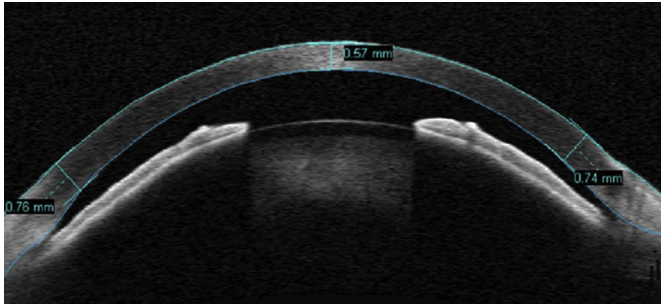
## 2. Case report

A 59-year-old female patient without underlying medical, drug or ocular trauma history presented with marked congestion and progressively blurred vision in her right eye (RE) for 1 week. Informed and written consent was obtained from the patient. Her initial intraocular pressure (IOP) was 40 mmHg in the RE and 19 mmHg in the left eye (LE). Slit lamp examination revealed a very shallow AC in both eyes and marked corneal edema in the RE. RE acute angle closure was diagnosed. After management with mannitol infusion, the RE IOP was lowered to 16 mmHg by using topical brimonidine (Alphagan-P 0.15%, Allergan), pilocarpine (Isopto-Carpine 2%, Alcon), and prednisolone (Econopred Plus 1%,

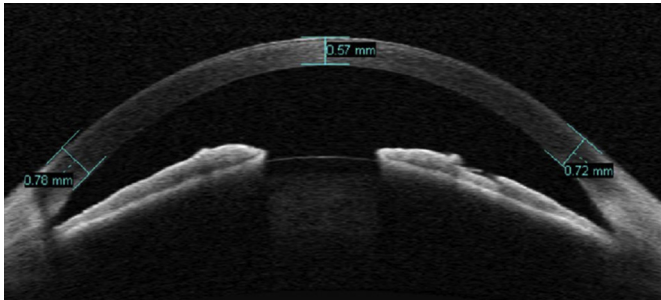
Alcon). Gonioscopy revealed a closed angle of the entire angle in the RE (Schaffer grade 0) and a moderately narrow angle in the LE (Schaffer grade 2). Sequential argon:YAG laser peripheral iridotomy (LPI) in the RE was completed without complication, the IOP remained within the normal limit (ranging between 16 and 20 mmHg) with the use of topical pilocarpine, and alphagan-P. Prophylactic LPI was performed on the LE to avoid acute angle closure attack. However, a persistent shallow AC was observed 2 months later and was demonstrated through anterior segment optical coherence tomography (AS-OCT) with an anteriorly displaced lens vault (Figs. 1 and 2). Slit lamp examination revealed a very shallow AC with patent LI (Fig. 3) in the RE. We discontinued the use of pilocarpine and brimonidine in the RE, but the IOP increased to 28 mmHg. Xalatan was administered thereafter, and the IOP was 20 mmHg in the RE. Gonioscopy was reevaluated, and the results revealed approximately 180° closure in the RE without perception of Schwalbe's line. Funduscopic examination revealed no glaucomatous damage in her RE (Fig. 4). Her previous refractive status was −8.25 diopters in the RE and −8.75 diopters in the LE. Her AL was 26.92 mm in the RE and 26.70 mm in the LE respectively. Incipient cataracts were noted in the both eyes. Two months later, because of the strong hyperemic response to xalatan and poor IOP control, early cataract extraction was suggested. During the RE cataract surgery, zonule dehiscence with subluxated lens was noted. After surgery, the AC became deeper (Fig. 5), as revealed by AS-OCT (Fig. 6). The IOP was within normal limits right now.

\* Corresponding author. Department of Ophthalmology, China Medical University Hospital, Taichung, Taiwan.

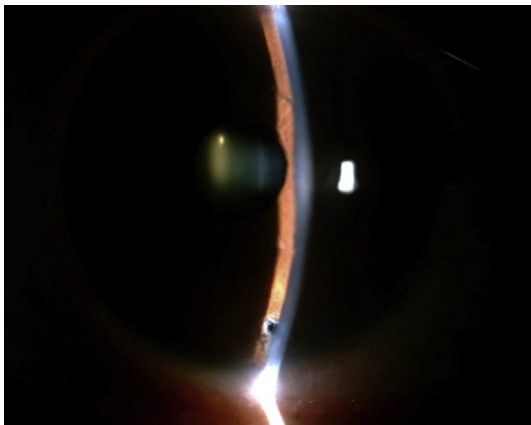
E-mail address: [hsin7850@url.com.tw](mailto:hsin7850@url.com.tw) (H.-Y. Chen).



**Fig. 1.** Anterior segment optical coherence tomography image of the right eye. The image revealed an anteriorly displaced lens vault and shallow anterior chamber after the treatment with LI and topical pilocarpine.



**Fig. 2.** Anterior segment optical coherence tomography image of the left eye. The image revealed a slightly anteriorly displaced lens vault and mildly shallow anterior chamber.

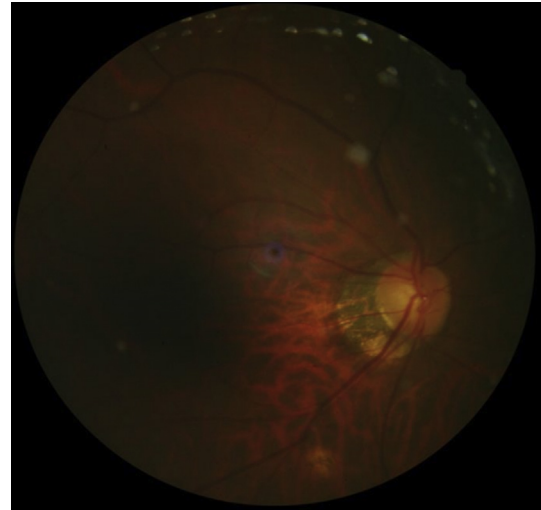


**Fig. 3.** Slit lamp examination revealed a very shallow anterior chamber with patent LI placed inferiorly in the right eye.

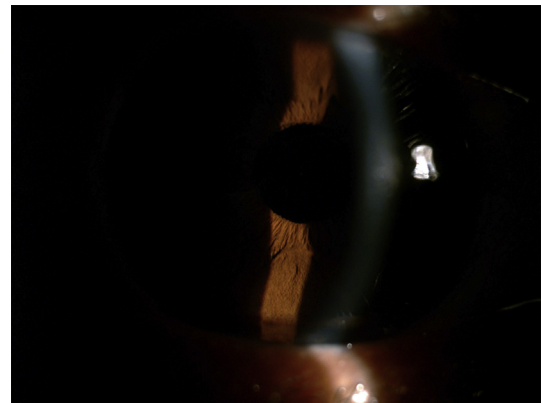
### 3. Discussion

Acute angle closure is common in hyperopic eyes, but rare in highly axially myopic eyes [3,4]. Eyes with high myopia have a longer AL than those in the general population and a deep AC; hence, incidents of angle closure in myopia are relatively rare [3,4].

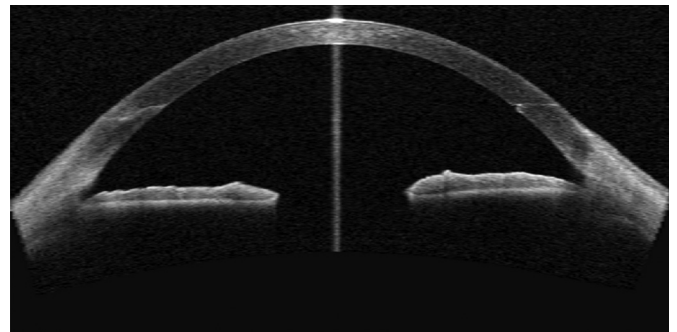
Barkana et al. [4] published a retrospective case series and identified 20 patients with high myopia and angle closure among 17,938 patients. Among these 20 patients, 9 had primary pupillary block. They indicated that primary relative pupillary block is the main cause of angle closure in highly myopic eyes; furthermore, iridocorneal apposition accounted for the minor mechanism. Furthermore, continued growth of the lens with aging might also



**Fig. 4.** Fundusoscopic examination revealed no obvious glaucomatous damage in the right eye.



**Fig. 5.** Slit lamp examination revealed a deep anterior chamber with an intraocular lens after right eye cataract surgery.



**Fig. 6.** Anterior segment optical coherence tomography image of the right eye revealed a deep anterior chamber after the cataract surgery.

result in a progressively increased lens thickness, forward movement of the anterior lens surface, and decreased AC depth (ACD) and volume [5]. In our case, medication-induced idiosyncratic angle closure was excluded. The RE and LE AL were 26.92 and 26.70 mm, respectively. Another notable finding is that RE zonule dehiscence with lens subluxation was noted during cataract

surgery on the RE. In this case, induced acute angle closure may be attributable to the relationship between RE zonule dehiscence and the anteriorly displaced lens vault. Further observation is needed when we encounter other cases of acute angle closure in highly axially myopic eyes.

A review of the literature revealed that the incidence of angle closure in myopic eyes is extremely low. Charkravarti et al. [6] retrospectively reviewed 322 PAC cases, among which 6 involved axial myopia with  $\leq 5$  diopters of myopia or an AL of  $< 25$  mm. They revealed that 2% of the PAC cases involved  $\leq 5$  diopters of myopia. Yong et al. [7] conducted a prospective and cross-sectional study, enrolling 427 angle-closure patients (94 subjects with myopia, 222 subjects with hyperopia, and 111 subjects with emmetropia). Among the 94 myopic angle closure patients, 11 (11.7%) had high myopia with a refraction error of less than  $-5.00$  diopters. They also indicated that those with myopic angle closure had a longer vitreous cavity and longer AL compared with the emmetropia and hyperopia groups, but there was no significant difference in ACD, lens thickness, or lens vault. Their results suggest that the risk of angle closure is related to ACD, but not the refractive status or AL. Therefore, performing gonioscopy is crucial for all patients suspected of having glaucoma, regardless of refractive status [7].

In our case, this middle-aged woman presented with the typical features of acute angle closure in an eye with a long AL. The pathological mechanism should be the pupillary block caused by anteriorly displaced lens vaults and shallow ACD. Initial short-term pilocarpine use in addition to administration of intravenous mannitol and acetazolamide oral use was effective in lowering the IOP. Gonioscopic findings also revealed complete angle closure. Therefore, LPI was necessary to resolve the pupil block. Sequential argon:YAG laser peripheral iridotomy (LPI) is a good technique in Chinese eyes with dark iris [8]. The location of LPI was performed inferiorly at 5 o'clock to avoid the glare because of upper eyelid mild retraction in this high axial myopic eye. The effect of pilocarpine could cause miosis through contraction of the iris sphincter, which would relieve appositional angle narrowing and closure [9]. However, long-term pilocarpine use is not recommended because of some adverse effects such as iris posterior synechia [10], atypical

band keratopathy [11], and, rarely, exacerbation of acute angle closure [12]. Early cataract extraction was recommended for long-term IOP control [13] in this case.

Although acute angle closure in myopic eyes is not common, clinicians should be mindful of the possibility of acute angle closure even in highly axially myopic eyes.

### Financial disclosure

The authors have no proprietary or commercial interest in any of the materials discussed in this article.

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