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Acute Attack of Primary Angle Closure in a Highly Axially Myopic Eye: A Case Report

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Female, 53-year-old
Final Diagnosis: Acute angle closure • high axial myopia
Symptoms: Blurring of vision • eye pain
Medication: —
Clinical Procedure: Laser peripheral iridotomy
Specialty: Ophthalmology

Objective: Rare co-existance of disease or pathology

Background: Primary angle closure (PAC) is common in hyperopic eyes, but it is rarely observed in highly myopic eyes. Myopic eyes have a longer axial length and a deeper anterior chamber compared with emmetropic eyes and are considered to be protected from angle closure secondary to pupillary block. PAC can lead to irreversible loss of vision if left untreated. Hence, detection of these atypical cases is important to prevent the permanent sequelae associated with PAC.

Case Report: We present a case of acute attack of PAC in a patient with high axial myopia. A 53-year-old woman with diabetes presented to the Emergency Department with a 1-week history of pain and redness in the right eye. Ophthalmic examination revealed a high intraocular pressure of 40 mm Hg associated with shallowing of the anterior chamber peripherally in the right eye. The patient's spherical equivalent was -11.00 diopters in the right eye. Gonioscopy confirmed the presence of a 360° appositional closure of the iridocorneal angle. An acute attack of PAC was diagnosed, and the intraocular pressure was decreased using topical and systemic antiglaucoma medications. Laser peripheral iridotomy was performed to abort the acute attack.

Conclusions: Although PAC is unusual in highly myopic eyes, ophthalmologists should maintain a high level of suspicion when such atypical cases are encountered. Myopic refraction does not exclude the possibility of angle closure, and gonioscopy should therefore be performed on all patients at the initial assessment.

Keywords: Glaucoma, Angle-Closure • Intraocular Pressure • Myopia

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/931002

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Background

Primary angle closure (PAC) typically occurs in hyperopic eyes, which are characterized by a short axial length (AL), shallow anterior chamber (AC), and increased lens thickness; these characteristics are predisposing factors for angle closure [1,2]. By contrast, highly myopic eyes have been considered to be protected from PAC secondary to the longer AL and deeper AC that are typical of highly myopic eyes compared with emmetropic and hyperopic eyes [3]. Patients with high myopia are not considered to be at risk for PAC, which is very uncommon in this population. Hence, given the availability of an effective treatment, detection of atypical cases is crucial to prevent blindness associated with this condition. Here, we report a case of an acute attack of PAC in a patient with high axial myopia.

Case Report

A 53-year-old woman with diabetes presented to the Emergency Department owing to pain and blurring of vision in her right eye (RE) for 1 week. The patient denied any family history of glaucoma, drug history, or previous history of ocular trauma. The patient was born following an uneventful full-term pregnancy and had a normal birth weight. Her ocular history was positive for myopia, and she had worn glasses for a long time. On examination, the best-corrected visual acuity was 20/100 in the RE and 20/60 in the left eye (LE). Her initial intraocular pressure (IOP) was 40 mm Hg in the RE, with a central corneal thickness of 522 µm, and 16 mm Hg in the LE, with a central corneal thickness of 518 µm. Anterior segment examination showed a quiet conjunctiva, clear cornea, moderately deep AC centrally and shallow AC peripherally, grade I nuclear sclerosis in both eyes, and mid-dilated nonreactive pupil in the RE (**Figure 1A, 1B**). There was no phacodonesis or iridodonesis. Optic disc examination showed bilateral tilted discs with a cup-disc ratio of 0.4 and 0.3 in the RE and LE, respectively, without evidence of glaucomatous optic neuropathy. Fundus examination showed a tessellated highly myopic fundus with peripapillary atrophy in both eyes (**Figure 1C, 1D**). Gonioscopy was performed, and it revealed a 360° appositional closure of the angle in both eyes. Her spherical equivalent was -11.00 diopters (D) in the RE and -10.25 D in the LE. A-scan ultrasonography showed an AL of 25.34 mm in the RE and 25.08 mm in the LE. Keratometry readings were 43.50/45.75 D in the RE and 42.25/43.50 D in the LE. The AC depth was 2.39 mm in the RE and 2.35 mm in the LE. Ultrasound biomicroscopy of both eyes showed 360° closed angles by peripheral iris secondary to pupillary block with no evidence of choroidal effusion (**Figure 2**). The diagnosis of acute attack of PAC in RE was confirmed, and the IOP was decreased to 23 mm Hg with the use of topical timolol 0.5% and brimonidine 0.15% along

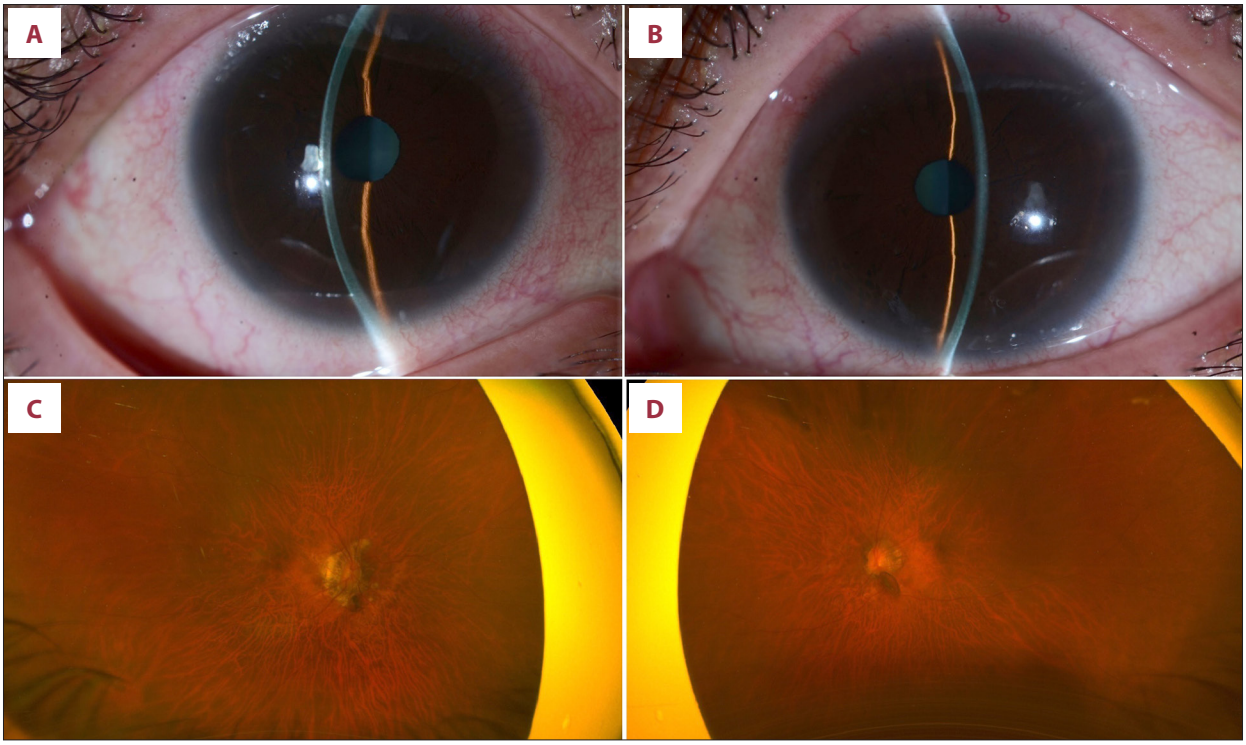

Figure 1. (**A, B**) Slit lamp images showing a moderately deep anterior chamber centrally and shallow anterior chamber peripherally in the (**A**) right and (**B**) left eye. (**C, D**) Wide-field Optos images showing a highly myopic fundus associated with tilted disc and peripapillary atrophy without obvious glaucomatous optic neuropathy in the (**C**) right and (**D**) left eye.

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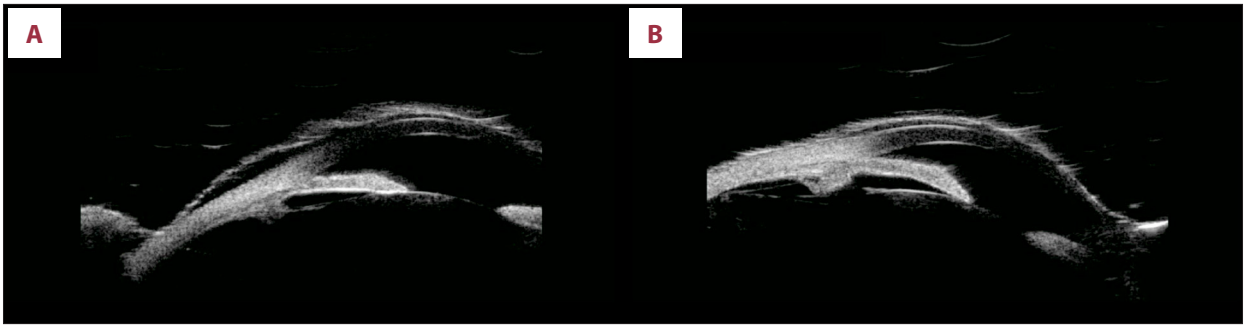

Figure 2. Ultrasound biomicroscopy images showing anterior bowing of peripheral iris closing the iridocorneal angle in the (**A**) right and (s**B**) left eye.

with oral acetazolamide. YAG laser peripheral iridotomy (LPI) was performed in both eyes at a single session to abort the acute attack in the RE and to prevent an acute angle closure attack in LE. There was an immediate deepening of the anterior chambers of both eyes. The patient was seen 4 weeks after LPI, and gonioscopy examination showed an open angle in all quadrants in both eyes with no peripheral anterior synechia (PAS) formation. IOP remained within normal limits in both eyes without medications.

Discussion

PAC is recognized as a significant cause of irreversible blindness worldwide [4]. It has been estimated that 79.6 million individuals will be affected by PAC in 2020, of whom 5.3 million will become blind [5]. PAC is considered to represent an early stage of PAC disease spectrum. PAC is characterized by occludable angles and the presence of raised IOP and/or PAS without evidence of glaucomatous damage to the optic disc [6]. PAC is associated with multiple risk factors, including hyperopia, short AL, shallow AC, and increased lens thickness [7,8]. PAC is rarely encountered in eyes with high axial myopia because these eyes typically have a longer AL and deeper AC than the general population [3]. We reported here a rare occurrence of acute PAC in the setting of high axial myopia.

Angle closure secondary to pupillary block is the most common mechanism in patients with PAC, which is characterized by blockage of the flow of the aqueous humor from the posterior chamber to the anterior chamber at the junction between the anterior lens surface and the pupillary portion of the iris. When a sufficient amount of aqueous humor accumulates in the posterior chamber relative to the anterior chamber in a predisposed eye with shallow AC and short AL, the peripheral iris can move forward to press on the trabecular meshwork, blocking the flow of aqueous humor and causing an acute attack of PAC [9]. In addition, the lens thickness increases with aging, which causes forward movement of the lens and exacerbates the pupillary block and angle closure [10]. It is of a great importance to detect PAC early in the disease process to relieve the iridotrabecular apposition with LPI, which is considered to be a definitive treatment for PAC [11]. Timely intervention is necessary to prevent the progression of the disease and the development of glaucomatous optic neuropathy, progressive PAS, and trabecular meshwork dysfunction. Our patient presented at an early stage with a healthy optic disc and without evidence of PAS formation in either eye.

Barkana et al [12] studied almost 18 000 patients with high myopia (spherical equivalent of more than -6.00 D) and reported 20 cases (0.1%) of PAC, of which 9 had primary relative pupillary block. The authors concluded that primary relative pupillary block is the most common mechanism for PAC in patients with high myopia. Chakravarti et al [13] reviewed 332 cases of PAC and found that 6 cases (1.9%) occurred in patients with high axial myopia (spherical equivalent of more than -5.00 D or an AL of more than 25 mm). Lowe [7] reviewed 127 eyes with PAC glaucoma and reported that only 2 eyes (1.6%) had high myopia of more than -6.00 D. Yong et al [14] reviewed 427 patients with PAC and reported 11 cases (2.6%) involving patients with high myopia of more than -5.00 D. They found that patients with myopic angle closure had a longer vitreous cavity and AL than their emmetropic and hyperopic counterparts, but there was no significant difference in AC depth, lens thickness, lens vault, or corneal curvature. The authors also analyzed the relative lens position and found no significant difference between eyes with high myopia and eyes with mild and moderate myopia in terms of relative lens position. Moreover, the authors reported that myopic patients with PAC were predominately axial myopes with long vitreous cavities; however, the features of the anterior segment of the myopic eyes were similar to those of emmetropic and hyperopic eyes. The study concluded that AC depth is the most important risk factor in the development of angle closure in myopic eyes, regardless of refractive status or AL. Marchini et al [15] reported on 54 patients with PAC glaucoma and found that none of the patients were myopic. Michael et al [16] reported myopia and angle closure developing in 2 adults with a history of retinopathy of prematurity. Hagan and Lederer [17,18] reported a

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myopic patient who had an initial diagnosis of PAC glaucoma and was discovered to have lens subluxation on subsequent follow-ups. Su and Chen [19] reported a case of acute PAC in a patient with high axial myopia that was not relieved by LPI. The patient was later found to have zonule dehiscence and lens subluxation during cataract surgery, and the authors attributed the acute attack of PAC to the pupillary block caused by the anteriorly displaced lens vault secondary to the zonule dehiscence. In our case, the patient had a 360° appositionally closed angle in both eyes, which was relieved by LPI, with no evidence of phacodonesis or lens subluxation. Moreover, the patient was not using medications, which excluded the possibility of drug-induced acute angle closure.

Conclusions

We described a patient with high axial myopia who presented with an acute attack of PAC. Although PAC is unusual in highly myopic eyes, ophthalmologists should maintain a high level of suspicion when such atypical cases are encountered. Myopic refraction does not exclude the possibility of angle closure, and gonioscopy should therefore be performed on all patients at the initial assessment.

Conflict of Interest

None.

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