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Bilateral acute myopia and angle-closure glaucoma in a migraine patient receiving topiramate: a case report

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ABSTRACT

We present a case of topiramate-induced angle-closure glaucoma that was treated with cycloplegia. A 40-year-old woman with a history of migraine presented with bilateral acute onset of blurred vision and headache. She had been prescribed 50 mg of oral topiramate bid for migraine prophylaxis 10 days prior to her presentation. On her ocular examination visual acuity was 20/20 with a myopic correction of -4.0 diopters in both eyes. Biomicroscopic examination revealed bilateral shallow peripheral anterior chambers. Intraocular pressures were 37 OD and 36 OS. On gonioscopic examination bilateral 360 degrees of angle closure was seen. B-scan ultrasonography showed peripheral choroidal effusions. The mainstay of the treatment for topiramate induced secondary angle closure is cyloplegia. Whenever a case of bilateral acute angle-closure glaucoma associated with myopia and shallow anterior chambers is encountered, ciliochoroidal effusion syndrome induced by drugs should be considered in the differential diagnosis.

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Keywords: Acute myopia; glaucoma; migraine; topiramate

Introduction

In this case report we present a case of topiramate-induced angle-closure glaucoma (TiACG) that was treated with cycloplegia. This case emphasizes the importance of interrogating use of medications that may cause angle closure as a side effect, in diagnosis and management of acute angle closure glaucoma patients.

Case Presentation

A 40-year-old woman applied to our emergency department with bilateral acute onset of blurred vision and headache. She had no history of hypertension, diabetes or glaucoma. She also did not have history of excessive reading, or psychiatric disorder. She had a history of migraine and had been prescribed 50 mg of oral topiramate twice a day for migraine prophylaxis 10 days prior to her presentation.

On her ocular examination visual acuity was 20/40, which improved to 20/20 with a myopic

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correction of -4.0 diopters in both eyes. The patient declared that she had no refractive problems previously. Bio-microscopic examination revealed bilateral mild conjunctival hyperemia and shallow peripheral anterior chambers. Pupil reactions were normal, the lenses were clear, and any sign of pupillary block in either eyes was not observed. Intraocular pressures (IOPs) were 37 mmHg, OD, and 36 mmHg, OS, by Goldmann applanation tonometry. On gonioscopic examination bilateral 360 degrees of angle closure was seen. Fundus examination revealed normal appearance of retina and optic discs in both eyes. These findings suggested bilateral acute onset of myopia with angle-closure glaucoma.

B-scan ultrasonography (USG) was performed which showed peripheral choroidal effusions, bilaterally (Figure 1). Baseline anterior chamber depth measurements were also recorded as 2.04 mm, OD, and 2.03 mm, OS.

Regarding this information, topiramate-induced angle-closure glaucoma and acute myopia secondary to ciliochoroidal effusion was suspected. The patient was asked to discontinue topiramate, 450 ml of intravenous mannitol 20% was given, and topical anti-glaucoma medications (i.e.; a combination of brimonidin tartarat 0.2% and timolol maleat 0.5%), and a topical steroid (dexamethasone %0.1) were prescribed. Two hours later IOPs were 36 mmHg, OD, and 35 mmHg, OS. The patient refused to be hospitalized and was sent to home with topical treatment. The next morning her IOPs were 37 mmHg in both eyes. Her refractive error remained unchanged. One drop of a cycloplegic agent (cyclopentolate 1%) was administered on both eyes and IOPs were decreased to 25 mmHg, OD, and 26 mmHg, OS in one hour with significant deepening of the anterior chambers (Figure 2 and 3). Two hours later, her IOPs were 18 mmHg, OD, and 19 mm Hg, OS. Ciliary

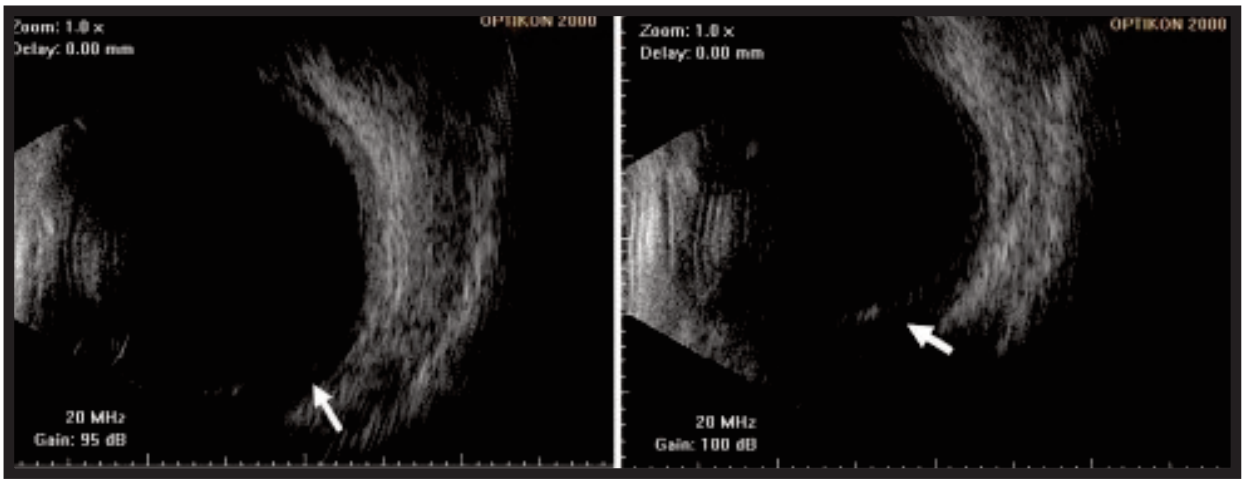

Figure 1. B-scan ultrasonography suggested bilateral mild peripheral choroidal effusions

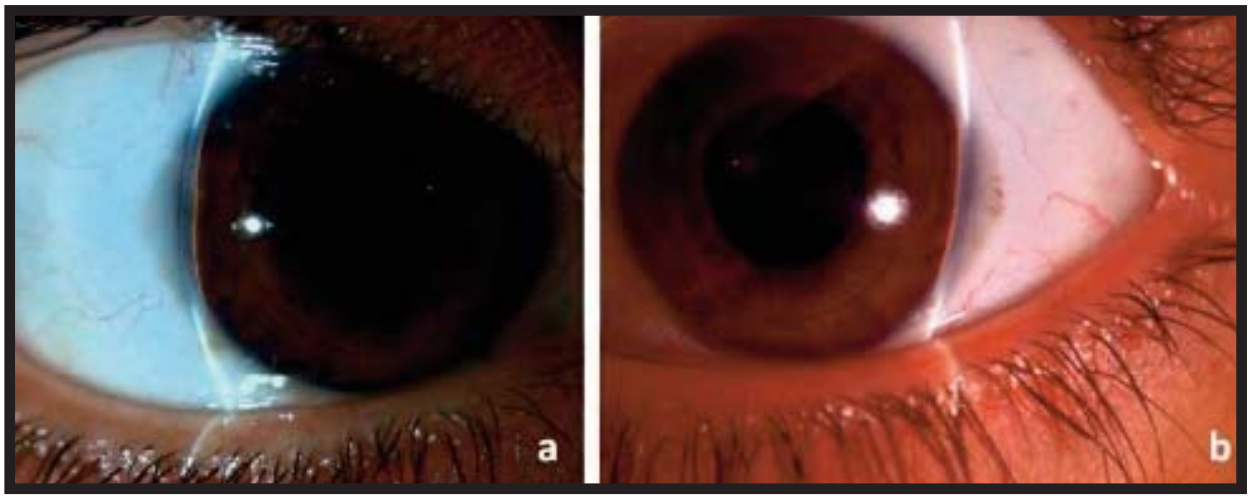

Figure 2. Bilateral shallow peripheral anterior chambers

edema was observed through the angle mirror of the Goldmann's three mirror contact lens (Figure 4).

Cyclopentolate three times a day was added to the topical regimen. On the third day her refractive errors appeared to regress. Her vision was 20/20 with -2.25 D in the right eye, and was 20/20 with -2.75 D in the left eye, while IOPs were 17 mmHg and 16 mmHg, respectively. Her optical coherence tomography scans were also obtained and no pathological finding was observed, central foveal thickness measurements were within normal limits bilaterally. The next day IOPs were measured as 14 mm Hg, with -1.0 D myopia in both eyes. On the fifth day, her refractive status was normalized, intraocular pressures were 11 mm Hg in both eyes and gonioscopy revealed bilateral open angles. Anterior chamber depths were 3.06 mm, OD, and 3.11 mm, OS. All topical medications were discontinued on the tenth day and her examinations remained uneventful thereafter.

Discussion

Topiramate (Topamax ®) is a sulfamate-substituted anticonvulsant drug which is primarily used for the control of seizures and the prophylaxis of migraine attacks. Ocular side effects related to topiramate use are: abnormal vision, acute myopia, supra-choroidal effusions, and acute secondary angle closure glaucoma [1]. The main intraocular effect of

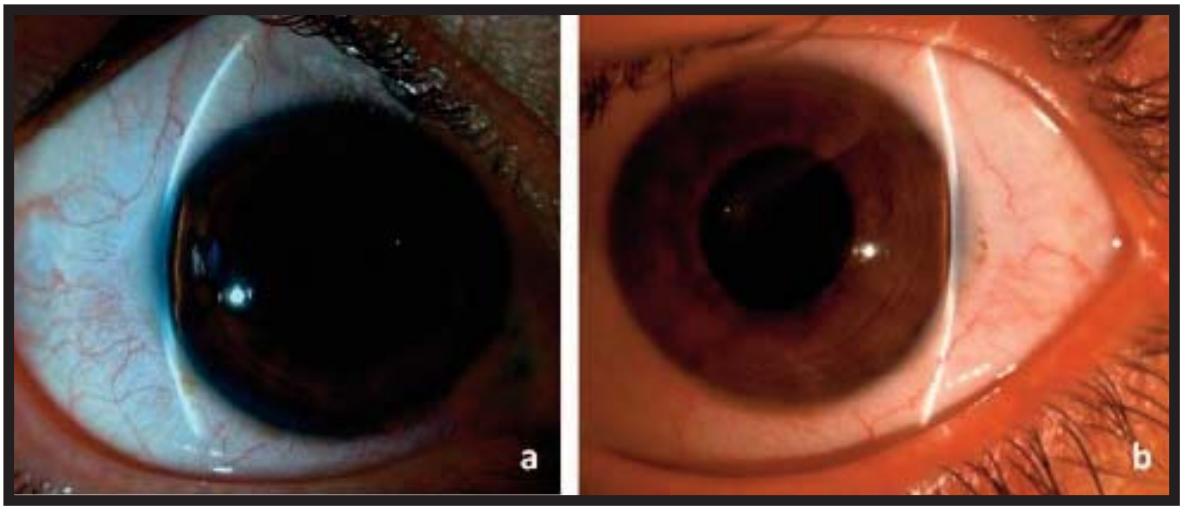

Figure 3. Bilateral peripheral anterior chambers widened after cycloplegic treatment.

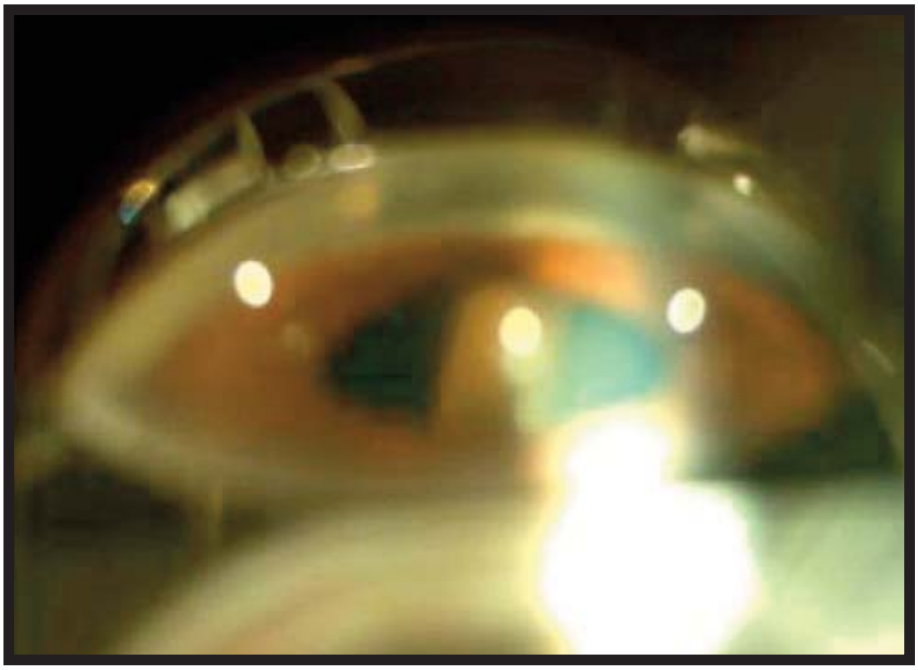

Figure 4. Ciliary edema is seen through Goldman 3 mirror lens. Angle closure is also observed.

topiramate is ciliochoroidal effusion which develops due to weak carbonic anhydrase activity and prostaglandin mediated effect [2, 3]. Ciliochoroidal effusion and/or ciliary edema leads to forward rotation of the ciliary body and anterior displacement of the iris-lens diaphragm. This results in myopia and consequent secondary angle closure. These mechanisms seem to be involved in our case in which myopia and angle closure as ciliary edema was observed through the angle mirror of the Goldmann's three mirror contact lens.

Cycloplegia relaxes the ciliary body and tightens the zonulas, restoring the position of the iris-lens diaphragm. Therefore, it is the mainstay of the treatment for TiACG. Topical corticosteroids have also been reported to help resolve the ciliary edema. Systemic corticosteroids and hyperosmolar agents are also suggested to mediate faster recovery and to avoid the need for surgical intervention in severe cases [4]. In our case, initial topical anti-glaucoma treatment turned out to be ineffective until the initiation of cycloplegia. Ten days of topical treatment with cessation of topiramate resulted in complete resolution of the symptoms.

The differential diagnoses include primary angle closure and accommodative spasm. Accommodative spasm is defined as an involuntary accommodative response that is greater than normal for a given accommodative stimulus and it is commonly associated with pupillary miosis and convergence spasm [5]. It may be seen after sustained near work, in head trauma and emotional problems [6, 7]. The patient becomes artificially myopic with asthenopic complaints. However, angle closure or IOP rise are not typical components of this clinical situation. Our patient who declared no previous refractive problems admitted with bilateral myopia of 4 diopters. She did not report any preexisting period of prolonged reading or other near work either. Additionally, neither angle closure, nor glaucoma has not been reported in accommodative spasm cases.

Differential diagnosis of TiACG and acute angle closure glaucoma (AACG) might be a challenging issue. TiACG does not respond to standard topical treatment of AACG with pilocarpine and aqueous suppressants. Pilocarpine may even worsen the clinical course by causing further anterior displacement of the iris-lens diaphragm. Our patient's young age and acute myopia was not quite compatible with primary angle closure. Young age, progressive myopic refractive status and ciliochoriodal effusions on B-scan USG are the features which may help to differentiate TiACG from primary angle closure [8].

Any drug use should be questioned in history of angle closure glaucoma cases. Many drugs have been reported to cause a forward shift of the iris-lens diaphragm; the most important group being sulfonamide derivatives including acetazolamide, indapamide, and topiramate [8]. Ophthalmologists will probably be the first to see these patients and they should be aware of this potential side effect. Whenever a case of bilateral acute angle-closure glaucoma associated with myopia and shallow anterior chambers is encountered, ciliochoroidal effusion syndrome induced by drugs should be considered in the differential diagnosis. Pediatric or mentally retarded patients on topiramate should be monitored for this potential side effect during the first 2 weeks of treatment because angle-closure is particularly seen in this period [8]. This information is consistent with our case, who was under topiramate prophylaxis for 10 days before she became symptomatic.

Conclusion

Bilateral acute angle-closure glaucoma associated with myopia and a shallow anterior chambers should suggest ciliochoroidal effusion syndrome and systemic medications should be considered in the etiology and differential diagnosis. Cycloplegia should be started as the first step in the treatment of TiACG, in contrast to primary angle closure glaucoma. Additionally, patients or relatives in charge should be warned about this potential side effect and its clinical presentation when prescribing sulfonamide derivatives.

Informed Consent

Written informed consent was obtained from the patient for the publication of this case report.

Conflict of interest

The authors declared that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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