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Bilateral vitreomacular traction syndrome associated with topical pilocarpine 1% ophthalmic solution

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ABSTRACT

To describe a case of transient bilateral vitreomacular traction syndrome associated with topical 1% pilocarpine ophthalmic solution in both eyes as a treatment for advanced glaucoma.

Observations: Spectral-domain OCT demonstrated bilateral vitreomacular traction syndrome after initiation of topical 1% pilocarpine solution in both eyes for advanced glaucoma. Follow-up imaging revealed the resolution of vitreomacular traction after cessation of the drug without a complete posterior vitreous detachment.

Conclusions and Importance: In the advent of new pilocarpine formulations, this case raises the concern of vitreomacular traction syndrome as a serious potential sequela of long-term topical pilocarpine use.

1. Introduction

Vitreomacular traction syndrome (VTS) occurs when an overly attached posterior vitreous causes anteroposterior traction at the macula because of an anomalous posterior vitreous detachment (PVD).[1] The tractional changes may decrease central visual acuity due to altered anatomical and functional foveal changes. The incidence of VTS has been estimated to be around 22.5:100,000 and has been associated with other concurrent retinal diseases including cystoid macular edema, age-related macular degeneration, macular telangiectasias, retinal vein occlusions, and intraocular tumors.[2] Common sequelae of VTS include macular edema, epiretinal membrane formation, and progression to full-thickness macular holes.[3] The diagnosis of VMT may be suggested by clinical examination but is usually confirmed by ancillary testing, particularly spectral domain optical coherence tomography (SD-OCT). The management of VTS ranges from observation to surgery depending on the level of visual impairment and patient motivation.

In recent years, topical therapies have been associated with the resolution or development of VTS. In 2021, Torregrossa et al. reported a case of vitreomacular traction syndrome that spontaneously resolved with topical tropicamide 1%.[4] In 2007, Walker et al. reported a case of VTS following administration of topical pilocarpine 2% for the reversal of pharmacological mydriasis.[6] In 2022, Al-Khersan et al. published a series of rhegmatogenous retinal detachments associated with the use of pilocarpine for presbyopia (Pilocarpine 1.25%).[5] We report a case of transient vitreomacular traction associated with topical pilocarpine 1% for advanced glaucoma with complete resolution after cessation of therapy.

2. Case report

A 69-year-old male without any systemic illness was evaluated in our clinics due to advanced glaucoma. He denied prior ophthalmic surgeries or other significant past ocular history. His glaucoma treatment plan included bilateral topical carteolol and bimatoprost. He was also on oral acetazolamide therapy. Visual acuity was 20/25 and 20/30, right eye (OD) and left eye (OS) respectively. His intraocular pressures were 23 mmHg OD and 24 mmHg OS. Physical examination of the anterior and posterior segments of both eyes (OU) was remarkable for age-related cataracts and glaucomatous cupping of the disc. Due to his disease's uncontrolled progression and the patient's reluctance towards surgical treatment, the patient was started on pilocarpine 1% ophthalmic solution OU. Due to the adverse effects reported with pilocarpine use in recent literature,[4–6] our patient had a baseline fundoscopic examination and a macular SD-OCT prior to the initiation of treatment. At the time, macular SD-OCT showed the absence of a complete posterior vitreous detachment and vitreomacular adhesion without traction (Fig. 1a and b). These figures reveal a normal retinal architecture with a foveal thickness of 201 and 204, right and left respectively. Six weeks after initiation of therapy, macular SD-OCT, revealed an incidental VTS and disturbances in the outer retinal layers OU (Fig. 2a and b). Of note, there appears to be traction from the posterior vitreous as it displaces the

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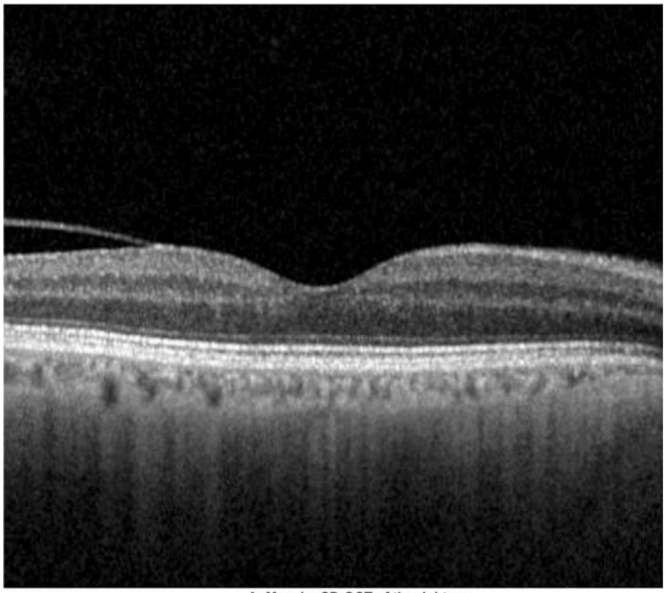

Fig. 1a. Macular SD-OCT of the right eye.

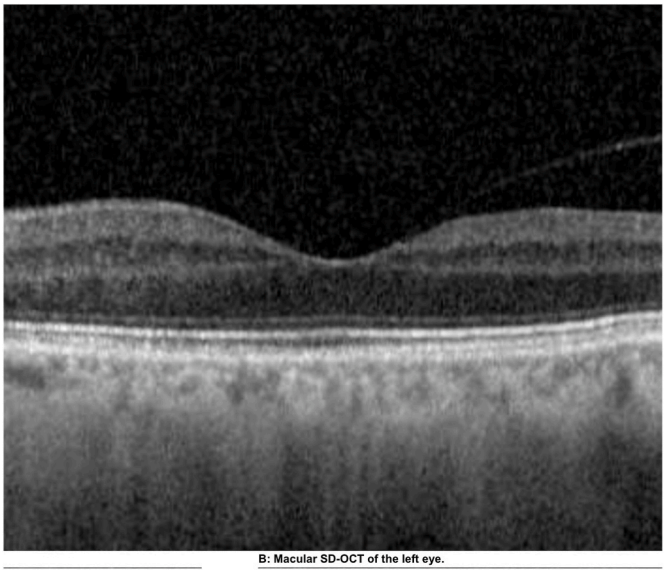

Fig. 1b. Macular SD-OCT of the left eye.

Fig. 2a. Macular SD-OCT of the right eye while using topical pilocarpine.

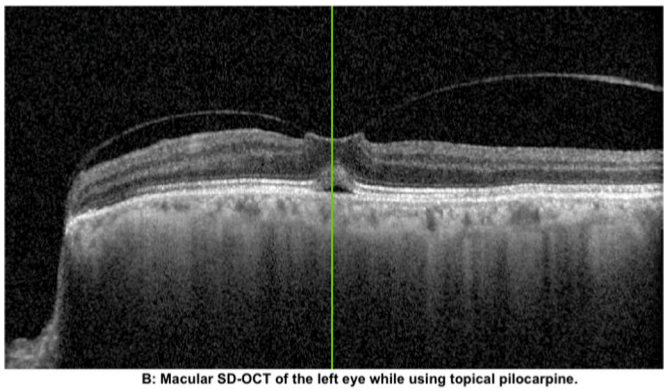

Fig. 2b. Macular SD-OCT of the left eye while using topical pilocarpine.

fovea anteriorly at its point of attachment. Note that the follow-up macular OCT was done for routine reasons, as our patient remained asymptomatic. At the time, the decision was made to discontinue topical pilocarpine solution due to the onset of vitreomacular traction syndrome. Eight weeks after discontinuation of pilocarpine, macular SD-OCT showed resolution of vitreomacular traction without a complete posterior vitreous detachment but persistent vitreomacular adhesion (Fig. 3a and b). Retinal thickness at the fovea was calculated at 212 and 202, right and left respectively.

3. Discussion

Topical pilocarpine solution is a pharmacological agent used for the treatment of ocular hypertension and glaucoma.[7] Pilocarpine mimics acetylcholine in the eye's muscarinic receptors, inducing contraction of the pupillary sphincter, ciliary muscle, and ciliary body. By contracting the ciliary body, pilocarpine may cause anterior displacement of the vitreous base and lens complex. In some patients with an incomplete posterior vitreous detachment, contraction of the vitreous base may increase anteroposterior vitreous traction that ultimately leads to VTS in patients with preexisting vitreomacular adhesion and incomplete PVDs, like our case.

Due to the adverse effect profile of pilocarpine, its use in the long-term management of glaucoma has fallen out of favor, being reserved mostly for severe or refractory cases. However, newer pilocarpine formulations have been recently developed for the treatment of presbyopia

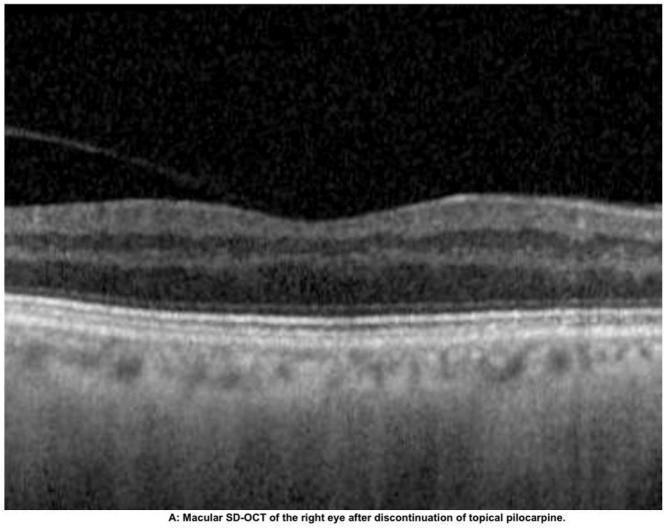

Fig. 3a. Macular SD-OCT of the right eye after discontinuation of topical pilocarpine.

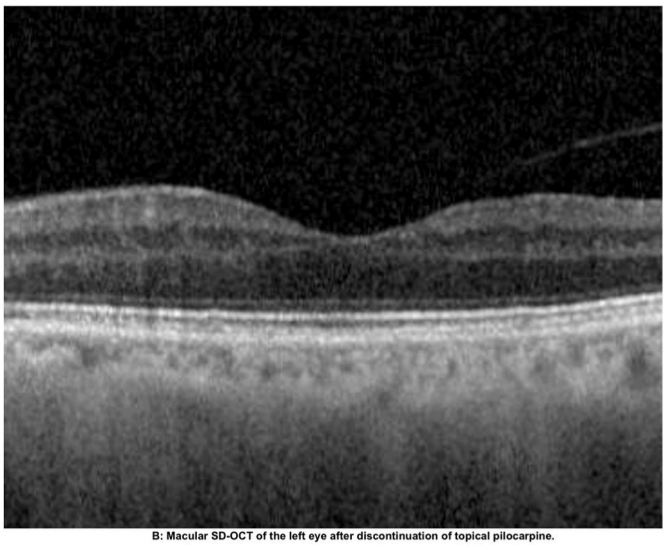

Fig. 3b. Macular SD-OCT of the left eye after discontinuation of topical pilocarpine.

(Vuity™, Allergan). In the advent of these new formulations, our case raises the concern of VTS as a serious potential sequela of long-term topical pilocarpine use. Further studies are needed to assess whether these new pilocarpine formulations will affect the incidence of VTS or other posterior segment pathologies. Although performing follow-up macular OCT imaging in this patient after the initiation of pilocarpine was coincidental, it raises concern about whether it should be required for monitoring in all patients started on this medication. Due to our patient's experience and the reported cases of retinal detachments,[5] we propose that a baseline posterior segment examination, including macular SD-OCT, should be done prior to initiation of pilocarpine for any indication. Moreover, in patients without a complete posterior vitreous detachment, these should be repeated periodically to monitor the development of retinal detachments or vitreomacular traction syndrome. The prescription of pilocarpine for any reason should be limited to ophthalmologists and should be followed by periodic posterior segment examinations.

Patient consent

Informed consent was obtained from the patient for publication of this case report and any accompanying images.

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Authorship

All authors attest that they meet the current ICMJE criteria for authorship.

Intellectual property

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Research ethics

Written consent to publish potentially identifying information, such as details or the case and photographs, was obtained from the patient(s) or their legal guardian(s).

Authorship

All listed authors meet the ICMJE criteria.
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Declaration of competing interest

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None.

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