Retinal vascular occlusive disease and tilt-table inversion

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Abstract

PK is a 58-year-old female with an unremarkable past medical history other than hanging inverted 180 degrees in a tilt-table for 1-3 minutes several times in the two weeks before her examination who presented for a routine follow-up eye examination with no visual complaints. On dilated fundoscopic examination, she was found to have a central retinal vein occlusion in her right eye. A retinal consultation determined her vein occlusion was non-ischemic without macular edema and no further treatment was required. While most cases of central retinal vein occlusion can be attributed to common systemic factors, in cases where no risk factors are present it is important to ask patients whether they are regularly performing activities where they are inverting themselves 180 degrees or any activities causing rapid fluctuations in intraocular pressure and blood pressure within the central retinal artery.

Keywords: retina, retinal vein, retinal vein occlusion

Introduction

A central retinal vein occlusion (CRVO) is a vascular disease that can lead to severe visual loss. The major risk factors for CRVO are hypertension, age, glaucoma, diabetes and increased blood viscosity [1]. However, we are presenting a case where none of these common risk factors were present. We are extrapolating upon rare reports of a CRVO following Sirsasana, a type of headstand commonly done during yoga classes where the body is completely inverted [2]. There is one other case report noted in literature from over 30 years ago, where a patient had a branch retinal vein occlusion (RVO) after inverting himself for more than 10 minutes with inversion boots from a pull-up bar [3]. However, our case demonstrates inversion for even shorter amounts of time (1-3 minutes) provides a risk of RVO. Additionally, it is crucial to continue to remind the ophthalmology community of rare risk factors for pathology.

Case

We present a case of an unusual risk factor to consider when evaluating a patient with a CRVO. PK is a 58-year-old female with an unremarkable past medical history who presented for a routine follow-up eye examination with no visual complaints. PK is followed as a glaucoma suspect due to presumed physiological optic nerve asymmetry (cup/disc ratio .60 OD, .30 OS) with a normal visual field and optic nerve OCT in each eye. The intraocular pressure maximum is 20 mmHg in the right eye and 22 mmHg in the left eye with a central
Corneal thickness of 580 µm in the right eye and 585 µm in the left eye. The examination showed visual acuity of 20/20 in each eye. There was no afferent pupillary defect and a normal anterior segment examination bilaterally. The dilated fundus exam showed a central retinal vein occlusion in the right eye as demonstrated by dilated, tortuous vessels with retinal hemorrhages both superior and inferior to the horizontal raphe. There was no disc edema, macular edema or cotton wool spots (Figure 1). Therefore, this was non-ischemic CRVO due to vision >20/200, lack of cotton wool spots, no afferent-pupillary defect or macular edema on OCT. The left fundus was unremarkable. The patient was referred for retinal consultation and medical consultation which was negative for hypertension, diabetes or blood dyscrasias. The patient had a normal coagulation profile and erythrocyte sedimentation rate. The patient’s hypercoagulable disease work-up was negative as well, but the primary care physician deemed a serum homocysteine level unnecessary. However, the patient volunteered that she was using a tilt-table in the full 180-degree position to treat musculoskeletal pain several times for one to three minutes in the two weeks before presenting with the CRVO.

Figure 1. This a fundoscopic image of the right eye demonstrating dilated retinal veins with retinal hemorrhage both superior and inferior to the horizontal raphe.

Discussion
The exact pathophysiologic mechanism responsible for RVO remains unknown, but it is likely due to a thrombotic event [1]. Glaucoma is a well-known risk factor for RVO possibly due to glaucoma induced deformation of the lamina cribrosa that may distort the central retinal vein [1]. There are rare instances of RVO following Sirsasana, a type of headstand commonly done during yoga where the body is completely inverted [2]. In Sirsasana, about 400-500 mL of blood from the legs is diverted towards the head. Normally, cerebral autoregulation prevents damage to cerebral blood vessels in normotensive individuals. However, headstands are contraindicated in hypertensive patients because the pressure within the cerebral blood vessels is not regulated normally by autoregulation. This position also causes a rise in intraocular pressure (IOP) and can be a factor in the progression of glaucoma as well [4,5]. Additionally, due to the sudden change in IOP, there is a decompressive effect on the eye that is similar to post-operative glaucoma surgery changes that can cause a decompression retinopathy [6]. Therefore, tilt-table usage most likely has the same risks as headstands because of similar acute hemodynamic changes. Although other cases of RVO following inversion have been seen with patients with other risk factors such as hypertension and concurrent anticoagulation use, inversion is an additional risk factor increasing the likelihood of a vein occlusion occurring in predisposed patients [3,7]. In addition, case reports of patients with RVO following inversion with additional predisposing risk factors have often been ischemic RVO. In our case, non-ischemic RVO was an incidental finding indicating the possibility of sub-clinical RVO occurring in individuals performing inversion exercises without ever being diagnosed. We hypothesize that the increased blood pressure in the central retinal artery combined with the increased IOP during tilt-table inversion use causes temporary compression of the central retinal vein. This causes temporary stasis of blood outflow and in rare instances, such as in this case, venous thrombosis. We advise patients to avoid activities where they are inverted due the possible, albeit rare incidence of RVO. However, if patients require exercises such as tilt-table inversion for improvement of back pain we recommend they are cautious while performing these exercises and limit the amount of time inverted. Additionally, they should receive routine eye exams and see their ophthalmologist immediately if they note any changes in vision.
Conclusion
Patients presenting with a CRVO, especially those without known risk factors, should be screened for activities where they are inverted or undergoing any activities causing large fluctuations in IOP and blood pressure within the central retinal artery. Identifying these risk factors in this particular patient population will play an important role in preventing progression, future complications and recurrence.

Conflict of interest
The authors have no conflict of interest.

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References