Optociliary shunt vessels in diabetes mellitus

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ABSTRACT

Introduction: Optociliary shunt vessels is classically described to be associated with optic nerve sheath meningioma, with the triad symptoms of optociliary veins, disc pallor and visual loss(1-4). These shunt vessels are also associated with central retinal vein occlusion(5,6), papilloedema(7), optic nerve glioma(8), optic disc drusen(9), arachnoid cyst of the optic nerve(10), phakomatosis(11) and chronic glaucoma(12). Congenital optociliary shunt vessels have also been reported(12). Most recently, optociliary shunts have been reported following radial optic neurotomy, a surgical procedure for central retinal vein occlusion(13). We report an interesting case series of three patients with diabetes mellitus presenting with optociliary shunts.

Methods: Patients who underwent diabetic retinopathy screening were referred to the eye clinic for abnormal findings. Between 2000 and 2001, out of a total of 3,360 patients, three diabetic patients with optociliary shunt vessels were found (0.1 percent). Optociliary shunt vessels were documented with fundus photography and fundal fluorescein angiography.

Results: All three patients had bilateral mild non-proliferative diabetic retinopathy with one having, in addition, bilateral diabetic maculopathy. Fluorescein angiography showed classical features of acquired optociliary shunts with no leakage. Systemic review did not show any secondary cause of the optociliary shunts.

Conclusion: Our case series showed that optociliary veins can be associated with diabetes mellitus. The authors postulate that it may be due to venous insufficiency secondary to the process of diabetic microangiopathy and venous stasis.

Keywords: diabetes mellitus, diabetic retinopathy, fluorescein angiography, optociliary shunts

INTRODUCTION

Optociliary shunt vessels present with uncommon but distinctive clinical features. They represent a communication between the central retinal vein and the peripapillary choroidal veins in the prelaminar region of the optic nerve. It is classically described to be associated with optic nerve sheath meningioma as well as sphenoorbital meningiomas, with the triad symptoms of optociliary veins, disc pallor and visual loss(1-4). These shunt vessels are also associated with central retinal vein occlusion(5,6), papilloedema(7), optic nerve glioma(8), optic disc drusen(9), arachnoid cyst of the optic nerve(10), phakomatosis(11) and chronic glaucoma(12). Congenital optociliary shunt vessels have also been reported(12). Most recently, optociliary shunts have been reported following radial optic neurotomy, a surgical procedure for central retinal vein occlusion(13). We present a case series of three diabetic patients with optociliary shunt vessels. This association has not been previously reported.
of more than 10 years duration was followed-up in the eye department for bilateral diabetic maculopathy since 1995. Best corrected visual acuity at that time was 6/9 in both eyes. Fundal examination showed bilateral diabetic maculopathy. Both optic discs were normal. Focal laser was performed for both eyes. She defaulted follow-up in 1996. In 2001, she presented again to the eye department with progressive blurring of vision of the left eye. Visual acuity was 6/12 on the right and 6/60 on the left. Moderate nuclear sclerotic cataracts were noted in both eyes. There was no relative afferent pupillary defect. The left optic disc was noted to have optociliary shunt vessels which was previously absent. Fundal examination and fluorescein angiography showed bilateral clinically-significant macular oedema with mild non-proliferative diabetic retinopathy (Fig. 2). There was no leakage seen in the left optic disc vessels. Focal and grid laser were performed for both eyes. Her current visual acuity improved to 6/9 on the right and 6/15 on the left.

Case 3
A 50-year-old Malay man was referred to the eye clinic for decreased visual acuity in both eyes in 1995. He had diabetic mellitus for 12 years. Visual acuity of both eyes were 6/12. Ocular examination showed bilateral posterior subcapsular cataracts. Fundal examination was normal in both eyes and both optic discs were normal. He underwent uneventful right and left cataract surgery in 1994 and 1995, respectively. Post-operatively, he had best corrected visual acuity of 6/7.5 in both eyes. On subsequent follow-up in 2000, fundal examination and fluorescein angiography showed optociliary shunt vessels of the right eye (Fig. 3). There was mild non-proliferative diabetic retinopathy of both eyes. No relative afferent pupillary defect was noted, and both optic discs were otherwise normal. Both Humphrey visual field and computed tomography of the brain and anterior visual pathway were also normal. Best corrected visual acuity remained at 6/7.5 in both eyes.

DISCUSSION
Optociliary shunt vessels can be classified as congenital or acquired\(^{6,7}\). The congenital optociliary vein is a vascular malformation that connects the choroidal venous circulation to the retinal venous circulation. Clinically, it is light red in colour due to higher flow with higher oxygen content. The shunt vessel is less tortuous in the absence of any other ocular condition. Fluorescein angiography shows that the blood flow originates from the central retinal artery. The blood flow originates from the central retinal artery. The blood flow originates from the central retinal artery. The blood flow originates from the central retinal artery. The blood flow originates from the central retinal artery. The blood flow originates from the central retinal artery.

Fig. 1 Fluorescein angiography shows left optociliary shunt vessels of the optic disc.

Fig. 2 Fluorescein angiography shows optociliary shunt vessels of the optic disc after previous laser treatment for diabetic maculopathy.

The blood flow originates from the central retinal artery.

Fig. 3 Fluorescein angiography shows right optociliary shunt vessels. The blood flow originates from the central retinal artery.
Acquired optociliary veins occur in conditions where venous return is compromised in the prelaminar region of the optic disc. It is secondary to gradual dilatation and enlargement of pre-existing anastomotic capillary channels when there is an obstruction of the central retinal venous circulation. The occurrence of optociliary veins in diabetes mellitus as reported in these three patients suggests that the retinal venous circulation in diabetes mellitus is also compromised as part of the process of microangiopathy, resulting in venous stasis. Similarly, venous loops and reduplications secondary to diabetic retinopathy are postulated to be shunt vessels formed to bypass a non-thrombotic occlusion of a larger retinal vein. The clinical significance of optociliary veins in diabetic patients would be to differentiate them from disc neovascularisation in proliferative diabetic retinopathy. Clinically, neovascularisation of the disc is smaller, more ill-defined and would leak on fluorescein angiography. In comparison, optociliary veins are larger in calibre and generally do not leak.

Ophthalmologists occasionally encounter the problem of determining the significance of optociliary veins in clinical practice. The list of differential diagnosis is shown in Table I. The clinical approach would be to rule out tumour as it is potentially sight-threatening, and even life-threatening. Clinically, a triad of optociliary veins, disc pallor and visual loss is characteristic of sphenoorbital meningioma. Fluorescein angiography is also useful in differentiating optociliary shunts from optic nerve sheath meningiomas to those due to central retinal vein occlusions. In summary, our case series show that optociliary veins can be associated with diabetes mellitus. It is probably secondary to the process of microangiopathy and venous stasis, hence compromising venous flow in the central retinal vein circulation.

**REFERENCES**