Optociliary shunt vessels in diabetes mellitus

J J Lee, E Y Yap

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. Other clinical settings include retinal vein occlusion, chronic glaucoma, meningioma, and rarely as a congenital form. 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 fluoresein 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, fluoresein angiography, optociliary shunts

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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 spheno-orbital 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[6]. Congenital optociliary shunt vessels have also been reported[6,12]. 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.

METHODS

Between 2000 to 2001, out of a total of 3,360 patients screened for diabetic retinopathy, three diabetic patients (0.1%) were noted to have optociliary shunt vessels at our eye department. Optociliary shunt vessels were documented with fundus photography and fundal fluoresein angiography. Systemic review did not show any secondary cause of the optociliary shunts.

Case 1

A 54-year-old Chinese man with a known history of diabetes mellitus, hypertension and ischaemic heart disease of five years duration was referred to the eye department for diabetic eye screening. The ocular examination showed a best corrected visual acuity of 6/12 in both eyes, with mild nuclear sclerotic cataract in both eyes. There was no relative afferent pupillary defect. Fundal examination and fluorescein angiography showed left optociliary shunt vessels of the optic disc. (Fig. 1) No leakage was seen over the abnormal vessels. Both optic discs were pink. There was bilateral mild non-proliferative diabetic retinopathy. Computed tomography of the brain and anterior visual pathway was normal.

Case 2

A 61-year-old Malay woman with a chronic history of diabetes mellitus, ischaemic heart disease and hypertension

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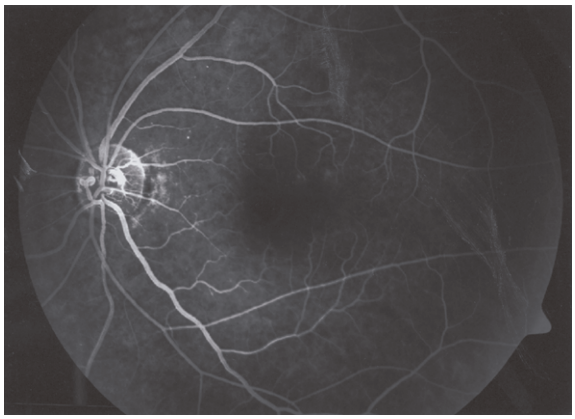

Fig. 1 Fluorescein angiography shows left optociliary shunt vessels of the optic disc.

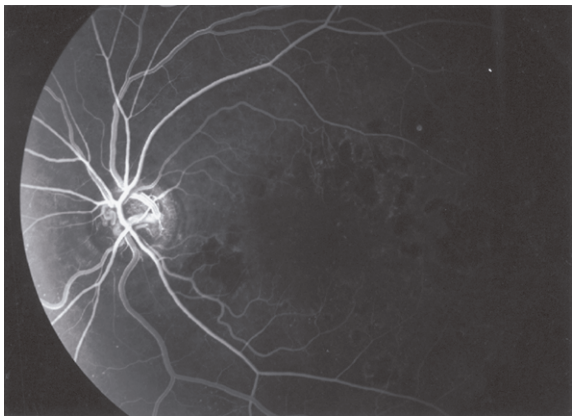

Fig. 2 Fluorescein angiography shows optociliary shunt vessels of the optic disc after previous laser treatment for diabetic maculopathy.

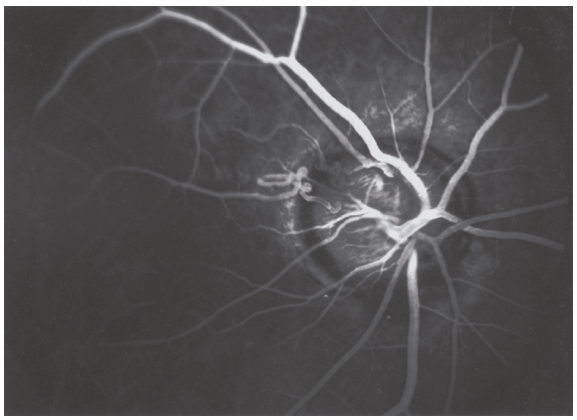

Fig. 3 Fluorescein angiography shows right optociliary shunt vessels. The blood flow originates from the central retinal artery.

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 is from the choroid into the central retinal vein. Its occurrence is extremely rare and has been reported to occur with phakomatoses[10]. Acquired optociliary shunt vessels are more common. These vessels are more tortuous and ectatic clinically, with darker colouration. Fluorescein angiography suggests that the flow is from the retinal circulation to the choroidal circulation, in contrast to congenital optociliary shunt veins. This was similarly documented in the above three patients.

Table I. Differential diagnosis of optociliary veins in clinical practice.

A)	**Acquired**
	Common:
	optic nerve sheath meningioma
	central retinal vein occlusion
	chronic glaucoma
	Less common:
	papilloedema
	optic nerve glioma
	optic disc drusen
	arachnoid cyst of the optic nerve
	phakomatosis
	diabetic retinopathy
B)	**Congenital**
	congenital optociliary shunt vessels

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[7]. 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[15,16]. 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 poor vision would strongly indicate an underlying tumour[2]. Additional useful signs would be proptosis of the same eye with relative afferent pupillary defect. Optociliary veins secondary to central retinal vein occlusion is a relatively-common cause. The presence of these disc collaterals may be the best clue when central retinal vein occlusion does not occur in a florid "blood-and-thunder" presentation. The visual prognosis of these patients is usually better. Shunt vessels secondary to chronic glaucoma is infrequently seen in clinical practice. It is probably a result of compromised venous flow secondary to chronic raised intraocular pressure, resulting in distortion of the laminar cribrosa. Its occurrence in chronic glaucoma can be easily differentiated from other causes due to glaucomatous disc cupping, raised intraocular pressure and a visual field defect.

In this series, we suggest that the presence of optociliary shunt vessels in diabetes mellitus may not need to be over-investigated if there is good vision, and a healthy optic disc rim with no relative afferent defect. A cost-effective approach would be to perform a visual field test first. Neuroimaging of the orbit and anterior visual pathway should be considered when there is poor vision with relative pupillary defect. Fluorescein angiography is certainly a useful investigation if the examiner is uncertain if the vessels over the optic disc in diabetic patients are secondary to neovascularisation. Fluorescein angiography is also useful in differentiating optociliary shunts from optic nerve sheath meningiomas to those due to central retinal vein occlusions[14]. 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.

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