This case underscores the fact that in this patient population, lymphoma may have atypical clinical or radiographic features. NHL should be considered in the differential diagnosis of any patient with AIDS who presents with unilateral orbital signs, such as proptosis or motility disturbances. With improvements in diagnosis and treatment of this disease, short and long term prognosis may improve.

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Ocular pulse measurements to assess pulsatile blood flow in carotid artery disease

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Patients with carotid artery stenosis frequently present with symptoms associated with embolic episodes or, more rarely, with chronic ocular ischaemia, the varied signs of which include hypotensive retinopathy, uveitis, rubeosis, corneal decompensation, and cataract.[1] Carotid Doppler ultrasound scanning is the preferred test to detect those patients with severe stenosis who might benefit from vascular surgery and, in the postoperative period, to monitor increased carotid perfusion.[2] Assessment of ocular perfusion is not routinely performed. We report non-invasive measurement of pulsatile ocular blood flow (POBF) using the Langham pneumotonometer[3,4] in two patients undergoing carotid artery surgery.

Case reports

CASE 1

A 72-year-old man presented with a 4 month history of left sided amaurosis fugax relieved by stooping. He had intermittent claudication and took oxpentifylline. His acuity was 6/9 in the right eye and counting fingers in the left. The right eye was normal apart from a low central retinal artery perfusion pressure revealed by digital compression of the globe. The left eye showed low grade anterior uveitis with rubeosis, an unreactive dilated pupil, widespread peripheral fundal haemorrhages, and a very low central retinal artery perfusion pressure, pulsating with the slightest pressure on the globe. After intravenous acetazolamide the left vision improved to 6/18. There were bilateral carotid bruits, and absent pulses in the right arm and distal to both femoral arteries.

Fluorescein angiography of the left eye confirmed slow flow retinopathy, with a prolonged arm to retina time of 19 seconds (normal <15 seconds) and delayed arteriovenous transit, some retinal veins never filling completely. Doppler ultrasound demonstrated reduced flow velocity in the right common, external, and internal carotids; no flow in the left carotid system; reverse flow in the right vertebral; and increased velocity in the left vertebral.

Digital subtraction angiography (DSA) was consistent with these findings demonstrating an occlusion of the right innominate and left common carotid arteries at their origins. Intracranial flow was solely from the left vertebral artery. Surgery revealed a tight atheromatous stenosis in the left internal carotid artery extending from the bifurcation. Following left subclavian to right common and internal carotid Dacron grafting there were no further episodes of amaurosis fugax though the clinical signs were unchanged.

Ocular pulse measurements and systemic blood pressure were recorded before, and 5 days after surgery, in the supine position (Fig 1). The POBF increased in the postoperative period by more than four times in the right eye and rose from being unrecordable to almost 200 μl/min in the left eye (Table 1).

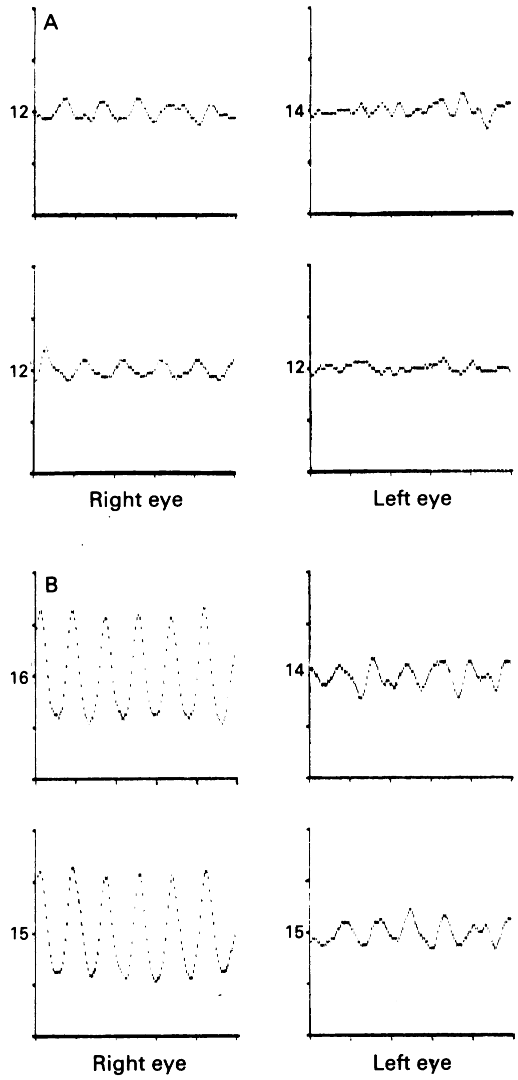

Figure 1 Langham pneumotonometer intraocular pressure pulse recordings (A) before and (B) 5 days after surgery in case 1.

CASE 2

A 55-year-old man presented with a history of light induced amaurosis fugax followed, just before admission, with complete loss of the lower visual field in the right eye. Visual acuity was 6/5 in both eyes, anterior segment examination was normal but funduscopy revealed a right sided swollen disc with peripheral haemorrhages and cotton wool spots. Digital compression of both globes showed a low central retinal artery perfusion pressure. There were bilateral carotid bruits and a cardiac murmur suggestive of aortic regurgitation. Anterior ischaemic optic neuropathy with slow flow retinopathy was diagnosed and the patient was started on acetazolamide and topical timolol. Fluorescein angiography showed slow filling of the choroidal circulation with a delay in retinal filling, the venous circulation was still unfilled at 24 seconds. DSA was consistent with carotid Doppler studies and demonstrated tight stenosis of the left internal carotid near its origin, almost total occlusion of the left external carotid and on the right, total occlusion of the internal carotid and stenosis of the external carotid arteries.

After left carotid endarterectomy, there were no further episodes of amaurosis fugax. Although the peripheral haemorrhages and cotton wool spots disappeared, the right optic nerve became atrophic and the right inferior hemianopia persisted. However, fluorescein angiography indicated improved retinal filling, the entire circulation filling within 24 seconds. Subsequently right carotid endarterectomy was performed and postoperative DSA showed the arteries to be functioning well.

Ocular pulse measurements were taken both before and after surgery on the left side, during which time the systemic and topical medications were unchanged (Table 1). There was a bilateral increase in POBF.

Table 1 Changes in intraocular pressure (IOP), pulse amplitude (PA), pulsatile ocular blood flow (POBF), heart rate (HR) and mean systemic blood pressure (BP), before and after carotid surgery

	Case 1				*Case 2*			
	Right eye		*Left eye*		*Right eye*		*Left eye*	
	Pre-op	*Post-op*	*Pre-op*	*Post-op*	*Pre-op*	*Post-op*	*Pre-op*	*Post-op*
IOP (mm Hg)	12·0	15·7	12·5	14·5	16·0	14·4	16·5	19·8
PA (mm Hg)	0·4	2·2	–	0·7	1·6	2·7	1·6	4·3
POBF (μl/min)	118	547	–	173	285	520	280	758
HR (beats/min)	67	72			54	52		
BP (mm Hg)	89	85			90	92		

In case 1 the PA and POBF were unrecordable in the left eye preoperatively.

Comment

Both cases showed a dramatic increase in ocular pulse amplitude and the derived value for POBF after carotid artery surgery. Ocular perfusion, and therefore pulse amplitude and POBF, depends on the difference between mean ophthalmic artery pressure and IOP, so that an increase in the ophthalmic artery pressure or a fall in IOP will result in an increase in these parameters. There was in fact an increase in IOP without marked increase in blood pressure, following surgery on the ipsilateral side, implying a true increase in the ophthalmic artery pressure and therefore ocular blood flow following surgery. The bilateral increase in the ocular blood flow after unilateral surgery implies vascular patency within the circle of Willis.

The postural and light induced characteristics of the episodes of visual loss in the respective patients, suggests an aetiology secondary to critical hypoperfusion rather than embolism. The absence of amaurosis fugax postoperatively provides clinical evidence for increased ocular perfusion. Despite this, chronic hypotensive retinopathy often has a poor prognosis, owing to irreversible retinal ischaemia.[5]

Pneumotonometry is a convenient method for monitoring pulsatile ocular blood flow. A review of non-invasive techniques for assessing flow in carotid disease showed that the Langham pneumotonometer used in conjunction with a scleral cup, had a sensitivity of 93% and specificity of 89% in determining carotid stenosis of more than 75%,[6] and compared favourably with suction oculoplethysmography and orbital Doppler ultrasonography. Further data are required to determine whether derived values for POBF can predict the degree of carotid stenosis in a given case of ocular ischaemia.

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