THE AUTHOR'S REPLY

Pain in Optic Perineuritis: Author Response

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Dr. Wu addresses an important clinical point on the association between pain and inflammation of the optic nerve. Importantly, the optic nerve has no nociceptive afferents. Consequently, all pain perceived by a patient suffering from inflammation of the optic nerve is defined as referred pain. To answer Dr. Wu's question, we have therefore summarised the nociceptive afferents of the anatomical structures adjacent to the optic nerve (Figure 1). As first observed by Whitnall,¹ the closest anatomical relationship between the optic nerve sheath, which contains pain fibres of trigeminal origin, is with the superior and medial recti. The optic nerve sheath adheres to these muscles in the orbital apex. Whitnall's hypothesis was therefore that traction of the optic nerve sheath explains worsening of pain with eye movements.¹ This lead Lepore to prospectively test Whitnall's hypothesis.² As a rule of thumb, magnetic resonance imaging (MRI) confirmed that localisation of retrobulbar neuritis to the posterior orbital apex most frequently led to pain.² Pain was absent with more anteriorly localised lesions, with the exception of ischaemic pain. Likewise, pain can be absent with inflammation of the intracranial portion of the optic nerve after parting with the optic nerve sheath.

It is therefore not surprising to note absence of pain in a number of other published cases with optic perineuritis.^{3–7} To set the record right, in our case very mild pain, reported as "discomfort," was present.³ We do, however, suggest that the presence of such mild pain not worsening on eye movements did not conclusively permit distinguishing the optic perineuritis from the coexisting sinusitis in our case.

Historically, Uhthoff was first to systematically use the term perineuritis, which he found in various degrees affecting all portions of the optic nerve, from the lamina cribrosa to the chiasma in a postmortem case series of 16 from 100 patients suffering from neurosyphilis.⁴ Uhthoff had already pointed out the difference between inflammation originating in the optic nerve, optic neuritis, and inflammation adjacent to the optic nerve, perineuritis. Figure 2 shows a cross section (left) and longitudinal section (right) through the optic nerve from a patient with prominent optic perineuritis (Uhthoff's Case 3). These histological slides clearly illustrate inflammation of the outer sections of the optic nerve, likely to be responsible for the loss of vision. If as in our case those axons that project from the macula through the outer inferior nasal portion of the optic nerve are affected, central vision will be affected.

There is one exception where surgical treatment will be required, namely, compression. Sergott *et al.* demonstrated compression of the optic nerve by an inflammatory exudate in two patients with acute retinal necrosis.⁸ After optic nerve fenestration, they described "a large gush of serosanguinous CSF [cerebrospinal fluid]" in one patient in whom visual acuity improved subsequently.⁸ We therefore agree with Dr. Wu that surgical treatment might be considered in selected cases.

Taken together, the presence of mild pain (discomfort), the radiologically documented relapsing episodes involving both eyes, notably without proptosis and ocular motility restrictions, and the histologically documented inflammation of the mucosa in absence of tumour tissue all argue against a compressive optic neuropathy and for an optic perineuritis.

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FIGURE 1. Orbital anatomy.

FIGURE 2. Cross section (left) and longitudinal section (right) of the optic nerve in a case of syphilitic optic neuritis (Uththoff).

Declaration of interest: The authors reports no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Note: Figure 3 of this article is available in colour online at www.informahealthcare.com/oph.

REFERENCES

- [1] Whitnall SE. The Anatomy of the Human Orbit and Accessory Organs of Vision. London: Henry Frowde and Hodder and Stoughton; 1921:262.
- [2] Lepore FE. The origin of pain in optic neuritis. Determinants of pain in 101 eyes with optic neuritis. *Arch Neurol* 1991;48:748–749.
- [3] Coppens S, Petzold A, de Graaf P, de Vries-Knoppert WAEJ. Recurrent optic perineuritis after intranasal cocaine abuse. *Neuro-ophthalmology* 2014;38: 91–95.
- [4] Uththoff W. Untersuchungen über die bei der Syphilis des Centralnervensystems vorkommenden Augenstörungen. *Graefes Arch Clin Exp Ophthalmol* 1893;39:1–182.
- [5] Nakamura M, Hara R, Kimura R, Ohgiya N, Yamamoto N, Morino I, Yamamoto M. Optic perineuritis not associated with syphilitic infection. *Neuro-ophthalmology* 1999;21: 135–145.
- [6] Shibata K, Otuka K, Yamane K, Shirata A. Rapid recovery of visual evoked potentials in optic perineuritis. *Neuro-Ophthalmology* 2009;33:253–256.
- [7] Shunmugam M, Morley AMS, Graham E, D'Cruz D, O'Sullivan E, Malhotra R. Primary Wegener's granulomatosis of the orbital apex with initial optic nerve infiltration. *Orbit* 2011;30:24–26.
- [8] Sergott RC, Belmont JB, Saino PJ, Fischer DH, Bosley TM, Schatz NJ. Optic nerve involvement in the acute retinal necrosis syndrome. *Arch Ophthalmol* 1985;103: 1160–1162.