CASE REPORT

Optical coherence tomography imaging of the optic nerve head pre optic and post optic nerve sheath fenestration

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SUMMARY

Idiopathic intracranial hypertension (IIH) is a disorder of unknown aetiology, and causes elevated intracranial pressures. This is often associated with papilloedema with subsequent degrees of optic atrophy if the intracranial pressures are not controlled in a timely manner. Optical coherence tomography imaging is widely recognised for its use in the monitoring of optic nerves in glaucoma, and this report is the first to describe its use to monitor the optic nerve head pre optic and post optic nerve sheath fenestration.

BACKGROUND

The use of optical coherence tomography (OCT) in idiopathic intracranial hypertension (IIH) has been well documented¹ and, more recently, its ability to measure the degree of papilloedema in IIH has been shown to be comparable with that of MRI.² This is the first case in the literature, however, to report the benefits of serial OCT imaging of the optic nerve in the management of patients following optic nerve sheath fenestration (ONSF). Such imaging facilities are now widely available in most ophthalmic units and can provide quantifiable disc volume measurements as an indicator of success following surgery.

CASE PRESENTATION

A 40-year-old Caucasian man presented with a 1 week history of blurry vision in his left eye and left-sided pressure sensations around his head on waking, with associated retro-orbital pain for the previous 2 months. There were no other symptoms typically associated with IIH, such as tinnitus, and the patient was not obese. He had a history of depression and inflammatory bowel disease, for which he was taking citalopram and mesalazine for some years prior to this diagnosis. He had no other relevant social or family history.

Initial examination revealed best corrected visual acuity 6/6 right and 6/9 left, asymmetrical peripheral field defects (Humphrey perimeter with right enlarged blind spot and peripheral visual field constriction in the left eye; note the high false negatives of 18% for the left eye; [figure 1A, B](#)) and optic nerve oedema (left>right; [figure 2A](#)) with no signs of retinal vasculitis/uveitis. There was no relative afferent pupillary defect, and colour vision, intraocular pressure, cranial nerves 1 and 3–12, and extraocular movements and peripheral neurological examination were all normal.

INVESTIGATIONS

An MRI of the head revealed slightly dilated optic nerve sheaths. CT, MR venograms and MRI of the spine were normal.

Lumbar puncture opening pressure was 34 cm of water, and cerebrospinal fluid analysis was unremarkable. Inflammatory markers, serum ACE levels, and Lymes' and syphilis serology, were not raised.

A diagnosis of IIH was made via exclusion of other potential aetiologies.

TREATMENT

The patient was started on oral acetazolamide 250 mg once daily (3.5 mg/kg/day) with the view to increase dosing over subsequent visits, and he was monitored closely. Owing to the association of mesalazine and IIH in the literature,^{3 4} this was also withdrawn following consultation with the gastroenterologists as was citalopram (as a precautionary measure), with no improvement in symptoms or signs. On future consultations (on a weekly basis over a month), ophthalmic and OCT examination showed no evidence of progression in the right eye. Left visual acuity remained stable (6/9 corrected), with a deterioration in colour vision (Ishihara 11/17). There was, however, enlargement of the patient's blind spot and peripheral visual field defects in his left eye, despite increasing daily doses of acetazolamide (up to 250 mg four times per day; 14.2 mg/kg/day; which was increased gradually over a month). Serial MRI (2 scans over the 1 month period) continued to show a dilated left optic nerve sheath, in keeping with his persistent papilloedema. There was no subsequent improvement on OCT in the left optic nerve head on increasing doses of acetazolamide or withdrawing mesalazine. In view of the resistance to medical management and continuing deterioration in optic nerve function on clinical examination, it was decided to proceed with left optic ONSF with the patient's consent. Serial fundus photographs and OCT imaging of the optic disc before and after surgery were performed.

OUTCOME AND FOLLOW-UP

The patient was last seen 5 months postsurgically, with a significant reduction in his left optic disc oedema both on funduscopy and OCT when comparing pre-ONSF and post-ONSF findings ([figure 2A, B](#) and [figure 3](#)). There was no further deterioration in the left visual acuity (6/9 corrected) or

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A CENTRAL 24-2 THRESHOLD TEST

FIXATION MONITOR: BLIND SPOT
FIXATION TARGET: CENTRAL
FIXATION LOSSES: 0/12
FALSE POS ERRORS: 0 %
FALSE NEG ERRORS: 4 %
TEST DURATION: 04:24

FOVEA: OFF

STIMULUS: III, WHITE
BACKGROUND: 31.5 ASB
STRATEGY: SITRA-FAST

PUPIL DIAMETER:
VISUAL ACUITY:
RX: DS DC X

DATE: 21-01-2013
TIME: 15:13
AGE: 39

B CENTRAL 24-2 THRESHOLD TEST

FIXATION MONITOR: BLIND SPOT
FIXATION TARGET: CENTRAL
FIXATION LOSSES: 0/13
FALSE POS ERRORS: 1 %
FALSE NEG ERRORS: 18 %
TEST DURATION: 05:28

FOVEA: OFF

STIMULUS: III, WHITE
BACKGROUND: 31.5 ASB
STRATEGY: SITRA-FAST

PUPIL DIAMETER:
VISUAL ACUITY:
RX: DS DC X

DATE: 21-01-2013
TIME: 15:18
AGE: 39

Figure 1 Humphrey visual field assessment of the right (A) and left (B) eye on presentation.

Figure 2 Left and right fundal photographs on presentation showing marked disc oedema left>right (A) and reduced disc swelling 5 months postsurgery (B).

Figure 3 Optical coherence tomography imaging of the left optic disc on presentation with a significant reduction in oedema 5 months postoperatively.

visual field. There was an improvement in the left colour vision to 16/17 (Ishihara plates) and there was resolution of the retro-orbital pain.

Learning points

- ▶ Optic disc volume and height are used to determine the extent of papilloedema on optical coherence tomography (OCT) and can therefore be used to follow patients after optic nerve sheath fenestration (ONSF).
- ▶ OCT technology is now widely available in most ophthalmic units and could be considered a useful adjunct to the traditional objective indicators of success (colour vision, visual acuity and field assessment) when reviewing/monitoring patients following ONSF.
- ▶ Mesalazine (commonly used in patients with inflammatory bowel disease) has a known association with idiopathic intracranial hypertension (IIH) in the literature and should therefore be withheld in cases of suspected IIH when noted on review of the patient's drug history.

DISCUSSION

The degree of papilloedema has been shown to be reflective of the severity of loss of visual function in cases of IIH.^{5 6} The optic disc volume and height (from the retina) can be accurately measured with OCT. This imaging technique is widely used for monitoring optic nerves in glaucoma and IIH. The present report is the first in the literature to highlight the benefit of using OCT in cases of IIH after ONSF. Undoubtedly, it is important to highlight that a decrease in optic nerve swelling may be as a consequence of optic nerve atrophy following IIH and that it is therefore most useful in conjunction with assessment of the colour vision, visual acuity and field assessment to assess/monitor patients to help determine if surgery is required or indeed has been successful.⁷

Contributors HRC was responsible for planning, conducting and reporting of the article. SR was involved in conducting and reporting of the article. DH was responsible for planning and conducting the work for the article. PB was involved in planning and conducting the work for the article.

Competing interests None declared.

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