CASE REPORT

Chronic Invasive Fungal Sinusitis Presenting as Inferior Altitudinal Visual Field Defect

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ABSTRACT

A young male with acute blurring of vision (6/9) complained of an inferior altitudinal field defect in right eye. Clinical ophthalmological examination was normal. Magnetic resonance imaging (MRI) of the brain revealed the expansion and mucosal thickening of right posterior ethmoid and sphenoid sinuses and opacified right maxillary sinus. Surgical intervention (transethmoidal sphenoidotomy) and histopathological examination revealed chronic invasive granulomatous fungal sinusitis. Anti-fungal therapy led to resolution of visual complaints and restoration of visual field defects.

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Visual loss with altitudinal field defect is usually associated with anterior ischaemic optic neuropathy, and less commonly with other optic nerve disorders such as optic neuritis and optic disc drusen.^{1–3} Headache, cerebral metastasis, and suprasellar meningioma may be rarely associated with an altitudinal field defect.^{4–7} Sino-orbital aspergillosis has been rarely known to mimic a non-specific optic neuritis.^{8,9} We report a case of chronic invasive fungal sinusitis presenting with an inferior altitudinal field defect.

Visual disturbance is the commonest presenting symptom (in the form of decreased visual acuity or diplopia) of invasive (acute or chronic) fungal sinusitis of sphenoid sinus due to optic nerve involvement.¹⁰ However, altitudinal field defect has not been reported so far.

Case report

A 25-year-old male presented with painless blurring of vision in his right eye for 15 days with headache. He had history of nasal obstruction and post-nasal drip for 5 years and was using nasal decongestants for the same. The patient had been

taking treatment from a primary physician off and on, details of which are unknown.

His best-corrected visual acuity (BCVA) was 6/9 in the right eye and 6/6 in the left eye. The intraocular pressure was 13 and 15 mm Hg in the right and left eyes, respectively. The right eye had a relative afferent pupillary defect (RAPD) but normal fundus with no abnormality of the optic nerve head. Humphrey visual field testing revealed an inferior altitudinal field defect in right eye (Figure 1). The left eye examination and visual field were unremarkable. Optical coherence tomography of peripapillary retinal nerve fibre layer was normal with no thickening. Magnetic resonance imaging (MRI) of the brain revealed the expansion and mucosal thickening of right posterior ethmoid and sphenoid sinuses and opacified right maxillary sinus (Figure 2). Non-contrast computed tomography (NCCT) of the nose and paranasal sinuses showed a soft tissue density in the region of right posterior ethmoid and sphenoid sinuses in the area of right optic nerve. He underwent endoscopic septoplasty and transethmoidal sphenoidotomy 2 weeks later. Intraoperatively, gritty, cheesy, pale tissue was found that was sent

Figure 1. Humphrey's visual fields at presentation showing normal visual field in left eye and inferior altitudinal field defect in right eye.

Figure 2. T1-weighted (a) axial and (b) coronal contrast-enhanced and fat-suppressed images showing mucosal thickening expanding the right posterior ethmoid sinuses. The soft tissue swelling in the sinuses is seen in close proximity to the right optic nerve.

for histopathological examination. It revealed collection of foreign body giant cells containing negative shadows of fungal hyphae in a background of fibrosis, and lymphoplasmacytic infiltrate, confirming chronic invasive granulomatous fungal sinusitis (Figure 3). He received oral voriconazole 200 mg twice a day with antibiotics. One week following surgical débridement, his right eye examination revealed BCVA of 6/6 with no RAPD and normal visual field (Figure 4). A repeat MRI revealed significant reduction in inflammation and soft tissue collection from paranasal

sinuses (Figure 5). The patient continued anti-fungal therapy till 6 months of follow-up, and BCVA was 6/6 in both eyes with normal ocular findings.

Discussion

Among various other causes of altitudinal field defects, reversibility of visual field defects has been reported with migraine.^{6,7} In our case, normal optic disc findings ruled out anterior ischaemic optic

Figure 3. Photomicrograph showing collection of foreign body giant cells containing negative shadows of fungal hyphae in a background of fibrosis, and lymphoplasmacytic infiltrate (H&E, $\times 400$).

neuropathy. The patient was referred for neurological consultation for a non-specific unilateral retrobulbar

Figure 5. MRI brain showing significant reduction in inflammation and soft tissue collection from paranasal sinuses.

optic neuritis with defects in visual acuity and field. An infectious aetiology was not considered in his differential diagnosis before neuroimaging, as the patient was immunocompetent. Suspicion of a fungal

Figure 4. Humphrey's visual fields at 5 months of follow-up showing normal visual fields in both eyes.

aetiology on MRI led to otolaryngology consultation, followed by surgical débridement, biopsy, and anti-fungal therapy. However, the lack of microbiological confirmation by culture led to a presumptive diagnosis. Based on our previous experience, the morphology of fungus within giant cells in the form of septate fungal hyphae is highly suggestive of *Aspergillus*, or *Aspergillus*-like fungus. Our previous study has shown *A. flavus* as the predominant aetiological agent in chronic invasive granulomatous fungal rhinosinusitis (FRS).^{11,12} Also, it has been seen that culture may be negative in vast number of chronic invasive granulomatous FRS cases due to extensive background fibrosis and few fungal hyphae within giant cells that are unable to come in contact with culture medium.

Aspergillosis mimicking as optic neuritis has been reported in orbital and sino-orbital diseases.^{8,9} An isolated, non-invasive sphenoid sinus aspergilloma has been reported to cause compressive optic neuropathy in the setting of an RAPD and normal looking optic disc.¹³ However, a heterogenous mass lesion (fungal ball) in the sphenoid sinus differentiated this patient from ours. Close interrelation of orbit, paranasal sinuses, and intracranial cavity provides a potential conduit for transmission of infections. Treatment of isolated sphenoid sinus disease by endoscopic sinus surgery produces favourable results and prevents permanent visual sequelae.¹⁴ Although the exact cause cannot be ascertained in our case, we believe that compressive optic neuropathy arising from the carotico-optic recess led to visual blurring and altitudinal field defect. An ischaemic event was unlikely in view of restoration of visual fields following surgical treatment.

Neuroimaging (CT/MRI) is helpful when there are no obvious clues on clinical examination, a situation that may be an indication of an impending or an early ischaemic/compressive optic neuropathy. Even though no cause may be found in many optic neuritis patients, clinicians should be alert if a patient with optic neuropathy reports visual with associated neuro-ophthalmological symptoms such as visual field defects. An altitudinal field defect as an acute presentation with RAPD usually directs the physician towards primary optic nerve pathology, sometimes triggering systemic corticosteroid therapy. This report highlights the significance of a careful evaluation of a patient presenting with this sign in the setting of a normal fundus examination, to detect underlying

fungal sinus pathology, which altogether has a different treatment and prognosis. Infections should be ruled out before considering steroid therapy, especially fungal infections in an endemic setting like ours. Although invasive fungal sinusitis has been increasingly reported due to increased survival of patients with various states of immunosuppression, it has been well known in immunocompetent individuals also.^{15–18} A high index of suspicion, urgent imaging, and adequate biopsy led to the diagnosis of a well-known cause of visual loss, which is, however, unknown to cause altitudinal field defect. Our case demonstrates the role of an early neuroimaging in a patient with no remarkable history and clinical findings in preventing the visual loss.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

References

- [1] Traustason OI, Feldon SE, Leemaster JE, Weiner JM. Anterior ischemic optic neuropathy: classification of field defects by Octopus automated static perimetry. *Graefes Arch Clin Exp Ophthalmol* 1988;226:206–212.
- [2] Keltner JL, Johnson CA, Spurr JO, Beck RW. Baseline visual field profile of optic neuritis. The experience of optic neuritis treatment trial. Optic Neuritis Study Group. *Arch Ophthalmol* 1993;111:231–234.
- [3] Hoover DL, Robb RM, Peterson RA. Optic disc drusen in children. *J Pediatr Ophthalmol Strabismus* 1988;25:191–195.
- [4] Newsom RSB, Simcock P, Zambarakji H. Cerebral metastasis presenting with altitudinal field defect. *J Neuroophthalmol* 1999;19:10–11.
- [5] Shapely J, Danesh-Meyer HV, Kaye AH. Suprasellar meningioma presenting with altitudinal field defect. *J Clin Neurosci* 2012;19:155–158.
- [6] Razeghinejad MR, Masoumpour M, Bagheri MH. Migrainous prolonged and reversible bilateral inferior altitudinal visual field defect. *Headache* 2009;49:773–776.
- [7] Sethi HS, Lam BL, Romano JG. Reversible prolonged bilateral inferior altitudinal visual field defects associated with migraine. *J Neuroophthalmol* 2012;32:252–255.
- [8] Choi MY, Bae IH, Lee JH, Lee SJ. Aspergillosis presenting as an optic neuritis. *Korean J Ophthalmol* 2002;16:119–123.
- [9] Spoor TC, Hartel WC, Harding S, Kocher G. Aspergillosis presenting as a corticosteroid-responsive optic neuropathy. *J Clin Neuroophthalmol* 1982;2:103–107.

- [10] Lee DH, Yoon TM, Lee JK, Joo YE, Park KH, Lim SC. Invasive fungal sinusitis of the sphenoid sinus. *Clin Exp Otorhinolaryngol* 2014;7:181–187.
- [11] Das A, Bal A, Chakrabarti A, Panda N, Joshi K. Spectrum of fungal rhinosinusitis; histopathologist's perspective. *Histopathology* 2009;54:854–859.
- [12] Chakrabarti A, Rudramurthy SM, Panda N, Das A, Singh A. Epidemiology of chronic fungal rhinosinusitis in rural India. *Mycoses* 2015;58:294–302.
- [13] Wang JK, Lin SY, Lal PC, Jou JR. Compressive optic neuropathy secondary to sphenoid sinus aspergillosis. *Neuro-Ophthalmology* 2005;29:77–80.
- [14] Lee LA, Huang CC, Lee TJ. Prolonged visual disturbance secondary to isolated sphenoid sinus disease. *Laryngoscope* 2004;114:986–990.
- [15] Gupta AK, Bansal S, Rijuneeta, Gupta B. Invasive fungal sinusitis. *Clin Rhinol An Int J* 2010;5:63–71.
- [16] Suryanarayan Rao S, Panda NK, Pragache G, Chakrabarti A, Saravanan K. Sinoorbital mucormycosis due to *Apophysomyces elegans* in immunocompetent individuals: an increasing trend. *Am J Otolaryngol* 2006;27:366–369.
- [17] Chopra H, Dua K, Malhotra V, Gupta RP, Puri H. Invasive fungal sinusitis of isolated sphenoid sinus in immunocompetent subjects. *Mycoses* 2006;49:30–36.
- [18] Makhdoom N, Balkheur K, Foda MA, Fadel MM, Haroon A, Othman H, Al Sheikh S. Fungal sinusitis with intracranial extension in immuno-competent patients: surgical planning according to relation to eloquent neurovascular structures. *J Taibah Univ Med Sci* 2008;3:33–43.