Case Report

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Rhinogenous Optic Neuritis with Drastic Diurnal Variation of Visual Function

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Key Words

Optic neuritis
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Diurnal variation
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Abstract

We report a case of rhinogenous optic neuritis in a 50-year-old man demonstrating drastic diurnal variation in visual function. His left vision was 20/15 in the morning, which gradually decreased to counting fingers at night. Pupillary reaction and visual field showed the same fluctuation as vision. Complete remission of visual symptoms was achieved after endonasal ethmoid [sinu-sotomy](#).

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Introduction

Paranasal sinus disorder is a unique etiology of retro-bulbar optic neuropathy. We describe a rare case of optic neuropathy demonstrating diurnal variation in visual function.

Case Report

A 50-year-old man came to our clinic in February 1992 with a complaint of transient visual disturbance and diurnal variation of vision in his left eye for the past 6 months. His left vision was normal in the morning but worsened in the evening, improving slightly thereafter. Occasionally, he noticed decreased vision in the morning as well. Ocular symptoms became worse when he blew his nose; he had had a sinusitis operation 20 years previously. The patient was admitted and examined every 2 h during waking hours. In the morning, left visual acuity was 20/15, which gradually decreased to counting fingers at night. Central scotoma and an afferent pupillary defect fluctuated in the same manner as visual acuity (fig. 1). The anterior segment and fundus were normal, while an electroretinogram demonstrated deterioration of the B wave. Visually evoked cortical potentials showed normal latency time and decreased amplitude. The serum corticoste-roid level was normal. CT scan showed severe inflammation of the posterior ethmoid sinus (fig. 2), and ultrasonography detected a mass lesion in the supranasal orbital space, present both in the morning and at night in various shapes such as square, ovoid, and gourd-shaped (fig. 3).

Systemic corticosteroid and antibiotics were effective only temporarily for visual symptoms and sinusitis. Complete remission was achieved after endonasal ethmoid sinusotomy.

Intraoperatively, intact bony separation of the optic nerve from the sinus was observed.

Histopathological examination revealed chronic sinusitis without any cyst. Following surgery, the orbital mass disappeared and has not recurred.

Discussion

Rothstein et al. [1] reported that optic nerve damage, including compressive optic neuropathy, direct extension of sinus infection and inflammation to the optic nerve, bacteremia, and chronic allergic optic neuritis may possibly be induced by paranasal sinus disorder. Our case had typical clinical features of rhinogenous optic neuritis: a history of sinusitis surgery, unilateral onset without other pathology, presence of paranasal sinus disorder, and improvement of visual function after the operation.

The mechanism of the diurnal variation in the visual system remains obscure. In our case, diurnal variation was

Fig. 1. Diurnal change of Humphrey automated 30-2 visual field in the left eye. Visual acuity was 20/15 at 8:40 AM (top), 20/30 at 12:15 PM (bottom), and counting fingers at 8:00 PM.

Fig. 2. CT scan showing severe inflammation in the left paranasal sinus.

not associated with posture, hormonal level or a hot bath. Systemic corticosteroid was very effective, but temporarily. Visual disturbance and pupillary abnormality occurred rapidly. We speculate that a circulatory disturbance caused by the postoperative recurrent inflammatory mass in the paranasal sinus could have been a possible cause of the acute visual symptoms. The orbital mass revealed by ultra-sonography, which may have been mucosal edema or an abscess, could have been responsible for the phenomenon. Shimo-oku et al. [2] described a case of rhinogenous optic neuritis presenting fluctuation of the visual field with postural changes, and they suspect that diurnal variation

Fig. 3. Preoperative ultrasonogram showing a mass lesion (asterisk) in the left supranasal orbital space, which disappeared after surgery.

may result from the change in pressure of the inner sinus, disturbing the circulation to the optic nerve. Paranasal mucoepithelium has cyclic changes in thickness, which are associated with central regulation of vascular and secretory function [3]. However, this interesting phenomenon, namely nasal cycle, may not be related to the etiology of our case, since it is a cycle with a duration of about 3 hours [4].

References

- 1 Rothstein J, Maisel RH, Berlinger NT, Wirt-schafter JD: Relationship of optic neuritis to disease of the paranasal sinuses. *Laryngoscope* 1984;94:1501-1508.
- 2 Shimo-oku M, Miyazaki S, Shiraki K, Sugimo-to T, Sotani H: Optic nerve involvement in posterior paranasal sinus diseases. *Neuro-ophthalmology* 1989;9:147-155.

Eccles R: The central rhythm of the nasal cycle. *Acta Otolaryngol* 1978;86:464-468.

Hasegawa M, Kern EB: The human nasal cycle. *Mayo Clin Proc* 1977;52:28-34.

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