Optic neuropathy caused by expanded Onodi cell mucocoele

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DESCRIPTION

A 71-year-old man presented to the ophthalmology clinic with 10 days of gradual visual loss and blurred left eye vision. He was treated for chronic sinusitis 51 years previously. He underwent both Caldwell-Luc and Killian's surgeries. His medical history included diabetes mellitus and hypertension. A visual acuity test showed 20/50 in his left eye and 20/25 in his right eye. A visual field test revealed the expansion of the Mariotte blind spot, while ocular motility and main cranial nerve function were undisturbed. Funduscopic examination was unremarkable. CT revealed a soft tissue density lesion in the left posterior ethmoidal air cell (i.e., Onodi cell) and a bony defect of the optic canal (figure 1A-C). T1 and T2 MRIs demonstrated a low-intensity lesion in the Onodi cell, and enhanced MRI revealed no contrast effect, even in the surrounding tissue (figure 1D-F). His sudden visual loss was caused by an expanded Onodi cell mucocoele. The surrounding tissue, including the optic nerve, exhibited no inflammation. He underwent surgical removal of the lesion by endoscopic sinus surgery 11 days after the onset of symptoms. The left ethmoid sinus was opened, and the left superior nasal concha was removed. The left sphenoid sinus was widely opened from the natural ostium (figure 2A) and the Onodi cell on top of the sphenoid sinus was punctured and the cyst contents were removed (figure 2B). The sinus was opened widely so as not to damage the optic nerve (figure 2C, D). One day after the surgical drainage he experienced dramatic visual recovery.

Figure 1 Axial (A), coronal (B) and sagittal (C) CT findings before the operation. An Onodi cell (white asterisk) was observed on top of the left sphenoid sinus, and a bone defect (yellow arrow) of the optic canal was observed in the Onodi cell. T1-weighted (D), T2-weighted (E) and enhanced T1-weighted (F) MRI findings before the operation. The lesion demonstrated high intensity on all images, and enhanced MRI revealed no contrast effect, including the surrounding tissue. T1-weighted MRI was treated with fat suppression. LSS, left sphenoid sinus; RSS, right sphenoid sinus; ST, superior turbinate.

Figure 2 Operative finding by endoscopic sinus surgery. (A) Left sphenoid sinus was widely opened from the natural ostium after removing the left superior nasal concha. (B) The Onodi cell on top of the sphenoid sinus was punctured to remove the cyst contents. (C) The Onodi cell was widely opened so as not to damage the optic nerve. (D) A bone defect of the optic canal was observed. NS, nasal septum; OC, Onodi cell; ON, optic nerve; SS, sphenoid sinus.

Postoperative findings after 3 months confirmed the removal of the Onodi cell mucocoele (online supplementary file 1).

The Onodi cell is the most posterior ethmoidal cell that pneumatizes laterally and superiorly to the sphenoid sinus.¹ The optic nerve runs close to the small cavity of the Onodi cell. A mucocoele is a cystic lesion limited by the mucosa of the paranasal sinus and occurs secondary to sinus drainage obstruction, resulting in the retention of sinus secretions. Optic neuropathy attributable to the Onodi cell mucocoele occurs secondary to a mass on the optic nerve, ischaemia from compression of the vasa nervorum and inflammation. In our case, the Onodi cell mucocoele resulted from previous sinus surgery. A decompression of the mass on the optic nerve improved visual acuity.

Opening an Onodi cell is difficult due to the relationship between the Onodi cell and sphenoid sinus. Wada reported the sphenoid sinus can be opened safely following preoperative assessment of the anterior wall, the position of the superior turbinate, and ostium of the sphenoid sinus.² Widely opening the sphenoid sinus from the ostium and removing the superior nasal concha confirmed the location of the Onodi cell and opened it without damaging the optic nerve.

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Primary treatment for Onodi cell-associated optic neuropathy is urgent surgical decompression. Endoscopic sinus surgery is frequently used due to its lower complication rate, less invasive nature and earlier patient recovery.³ Onodi cell mucocoeles should be considered in the differential diagnosis of unilateral visual loss.

Learning points

- ▶ Onodi cell mucocoeles should be considered in the differential diagnosis of unilateral visual loss.
- ▶ CT and MRI were used to effectively diagnose the Onodi cell mucocoele and determine the location of the sphenoid sinus and optic nerve.
- ▶ Urgent surgical decompression of the Onodi cell mucocoele led to improved visual acuity.

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