

Case Report

Pneumosinus Dilatans Causing Field of Vision Deviation: A Case Report

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Abstract

Pneumosinus dilatans (PSD) is a rare condition which may cause visual impairment. Here we present the case of a 15-year-old boy with PSD. The vision was 10/10 and the intraocular pressure was in normal range for both eyes. Other eye examinations were normal except for a slight discoloration of the optic nerve. Optical coherence tomography showed a decrease in the thickness of the nerve fiber layer and the patient's primary field of vision had a mean deviation of -3.44 and -6.39 in the right and left eyes, respectively. Magnetic resonance imaging revealed the diagnosis of pneumosinus dilatans of sphenoid sinuses. Due to deterioration of the field of vision in subsequent exams to a mean deviation of -6.36 and -9.54 in the right and left eyes respectively, functional endoscopic sinus surgery (FESS) was performed for the patient. FESS resulted in the mean field of vision deviation improving to -5.01 and -7.33 in the right and left eyes, respectively two months after surgery. In conclusion altered field of vision without vision loss can be caused by PSD of the sphenoid sinuses and should be considered as a differential diagnosis after ruling out more common causes of field of vision loss. Surgical treatment is suggested in cases of PSD with worsening visual impairment before severe visual disorder and optic atrophy.

Keywords: Pneumosinus Dilatans; Sphenoid Sinus; Eye; Field of Vision; Surgery.

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Introduction

Abnormal hyperpneumatization and expansion of the paranasal sinuses without bony erosion referred to as pneumosinus dilatans (PSD), is a very rare condition¹. This condition was first described by Meyes in 1898 and was called PSD by Benjamins in 1918^{2,3}. In patients with PSD the expansion of the paranasal bony walls of paranasal sinuses lined with normal mucosa and filled with air causes facial changes and intracranial, orbital, or ethmoidal encroachment^{3,4}. Although this rare disease might be asymptomatic, nasal obstruction, facial deformities, pain at altitude, headache, exophthalmos or visual changes usually happen during the course of the disease^{3,5}. PSD most commonly affects the frontal sinuses but the sphenoid sinus involvement is what usually causes visual damage because of its close proximity with the optic nerve in the optic canal^{5,6}. Here we report a case of altered field of vision without vision loss caused by PSD of sphenoid sinuses, its surgical treatment and treatment results.

Case Report

This case report was approved by the ethics committee of Basir Eye Health Research Center, Tehran, Iran and written consent was obtained from patient's parents before reporting the case. The patient was a 15-year-old boy who was referred to the eye clinic of Imam Hossein Medical Center, Tehran, Iran without any special complaint. The patient's birth and developmental history were normal, with no signs or symptoms suggesting a neurological, ophthalmological, or endocrinal disorder. The vision was 10/10 and the intraocular pressure was in normal range for both eyes. In eye examination a slight discoloration of the optic nerve was observed and in the initial

peripapillary optical coherence tomography (OCT), a decrease in the thickness of the nerve fiber layer was evident. Also the patient's primary field of vision had a mean deviation of -3.44 and -6.39 in the right and left eyes, respectively. Magnetic resonance imaging (MRI) revealed the diagnosis of pneumosinus dilatans of sphenoid sinuses confirmed by a neuro ophthalmologist (Figure 1). Surgical treatment was suggested by the neuro ophthalmologist in the form of a functional endoscopic sinus surgery (FESS), but it was decided to postpone the surgery due to 10/10 vision. After 6 months the patient's field of vision changed to the mean deviation of -6.36 and -9.54 in the right and left eyes, respectively indicating the progression of the disease and deterioration of the field of vision. At this point FESS was performed, which resulted in the mean field of vision deviation improving to -5.01 and -7.33 in the right and left eyes, respectively two months after surgery.

Discussion

PSD is a rare phenomenon that should be considered in patients presenting with unexplained visual loss⁶. The mechanism of PSD formation is unknown, but it has been suggested that PSD might be caused by an inflammatory process within the sinus causing sinus outflow obstruction which leads to air trapping⁷. It most commonly involves the frontal sinuses followed by the sphenoid sinuses which are usually responsible for visual loss because of their close proximity with the optic nerve in the optic canal^{6,8}. PSD might be diagnosed using standard radiography, CT scan or magnetic resonance imaging (MRI)⁹. Several previous studies have reported the visual effects of the PSD of sphenoid sinuses^{5-7,10}. In most cases the visual effect

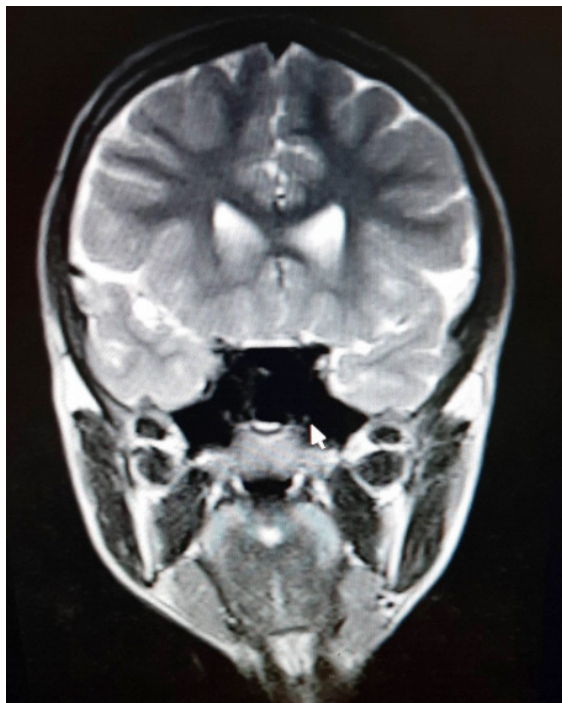


Figure 1: Magnetic resonance imaging (MRI) revealed the diagnosis of pneumosinus dilatans of sphenoid sinuses

of PSD is reported as a gradual visual loss^{5-7,10}, but a reduction in field of vision without visual loss similar to our case has also been reported⁶. For example in their report of three cases with sphenoidal PSD, Skolnick et al.,⁶ have described a 26-year old Hispanic woman with rhinitis complaining about immediate loss of the upper field of vision in the left eye.

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There was some recovery of visual field after an hour, leaving a permanent nasal scotoma⁶. The patients' visual acuity was 20/25 OD and 20/15 OS, with no relative afferent pupillary defect⁶.

Surgical treatment of PSD in cases of gradual vision loss has been suggested as the primary treatment among these patients^{5,10}. In our case, because of the progression of the disease and deterioration of the field of vision, FESS surgical treatment was performed, which resulted in the field of vision improvement in both eyes two months after surgery.

Conclusion

Altered field of vision without vision loss can be caused by PSD of the sphenoid sinuses and should be considered as a differential diagnosis after ruling out more common causes of field of vision loss. Surgical treatment is suggested in cases of PSD with worsening visual impairment before severe visual disorder and optic atrophy.

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Footnotes and Financial Disclosures

Conflict of interest:

The authors have no conflict of interest with the subject matter of the present study.