

Optic Neuritis Secondary to Paranasal Sinusitis: A Case Report

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Abstract

Background: Coexistence of optic neuritis (ON) and sinus disorder, particularly the concurrent presentation of both diseases, is a rare and unique condition. In this report, we describe a case of optic neuritis, which was accompanied by posterior ethmoid sinusitis.

Case Presentation: Presented with right-sided acute progressive loss of vision in a 61-year-old female due to the direct spread of infection from ethmoid sinus to the optic nerve through dehiscence of optic canal.

Conclusions: A combination of medical therapy, prior to surgery, with broad spectrum antibiotics and corticosteroids together with right-sided ethmoidectomy and sphenoidectomy led to a complete recovery of vision. She was successfully treated and at follow up of first month, she presented the normal vision acuity.

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Introduction

Optic neuritis (ON) is defined as an acute inflammatory optic neuropathy, clinically represented with acute visual loss, periorbital pain and color perception defects, mostly seen in young females (1). A wide range of disease can lead to ON, but the simultaneous incidence of ON and paranasal sinusitis is a rare condition (2). Different physiopathological mechanisms have been declared to develop ON secondary to paranasal sinusitis (3).

In this report, we describe a case of ON caused by the direct extension of sinus infection through dehiscence to the optic nerve.

Case presentation

A 61-year-old female was referred to our hospital with a three-day history of acute visual deterioration in the right eye. She had a history of common cold associated with right-sided facial pain, and pain behind her eyes with headache one week ago. There was not

any evidence of fever, vomiting, vertigo, ophthalmalgia or diplopia. Neurological symptoms such as motor deficit or gait disorder were also negative. The patient did not have any previous experience of visual impairment or color desaturation. At the time of admission, a body temperature of 37°C, blood pressure of 120/80mm Hg, heartbeat of 88 beats per minute and respiratory rate of 19 breaths per minute were detected. Head and neck examination was unremarkable. Vision was limited to around two meters in the right, without any limitation in eye movement. Visual acuity was reported 8/10 in the left eye and 20 cm in right side, with normal pupil reaction. Ophthalmoscopy was normal on both sides. On paranasal spiral computed tomography (CT) scan of orbit, without contrast, mucosal thickening in both maxillary sinuses and mucocoele of posterior ethmoid on

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the right, measuring 24x19x14mm, without any evidence of extending into right orbit were noticed. Pus collecting had caused the obstruction of right sphenoid sinus, representing air-fluid levels and destruction of the superomedial wall of the right orbit more posteriorly, near to the apex. Nasal septum deviation to the left in association with bony spur at the same side was detected (Figure1). Both globes and optic nerves seemed normal. Chest radiography and spiral CT scan of brain were unremarkable. Laboratory examination revealed a CPK of 401 U/L (normal range 24-170) and a CRP of 36 mg/L (normal range of up to 6). Broad-spectrum antibiotics and corticosteroids were started and functional endoscopic sinus surgery (FESS) was planned. During the surgery, concha bolusa was

resected, ostiom of sphenoid sinus was opened then pus egressed and sphenoidectomy and ethmoidectomy were performed.

Culture of pus was positive for coagulase-negative staphylococci. Histological study of the sinuses content was of “fibrinous and mucoid material admixed with mixed inflammatory cells predominantly eosinophils”. Postoperatively, the patient recovered satisfactorily and represented significant visual improvement. The day after surgery, the visual acuity improved to 130cm and 9/10 for right and left eye respectively. On the first month of follow up, the examination of right eye showed complete recovery of sight, normal ophthalmologic examination, with a visual acuity of 10/10. Optic disc and retina were normal.

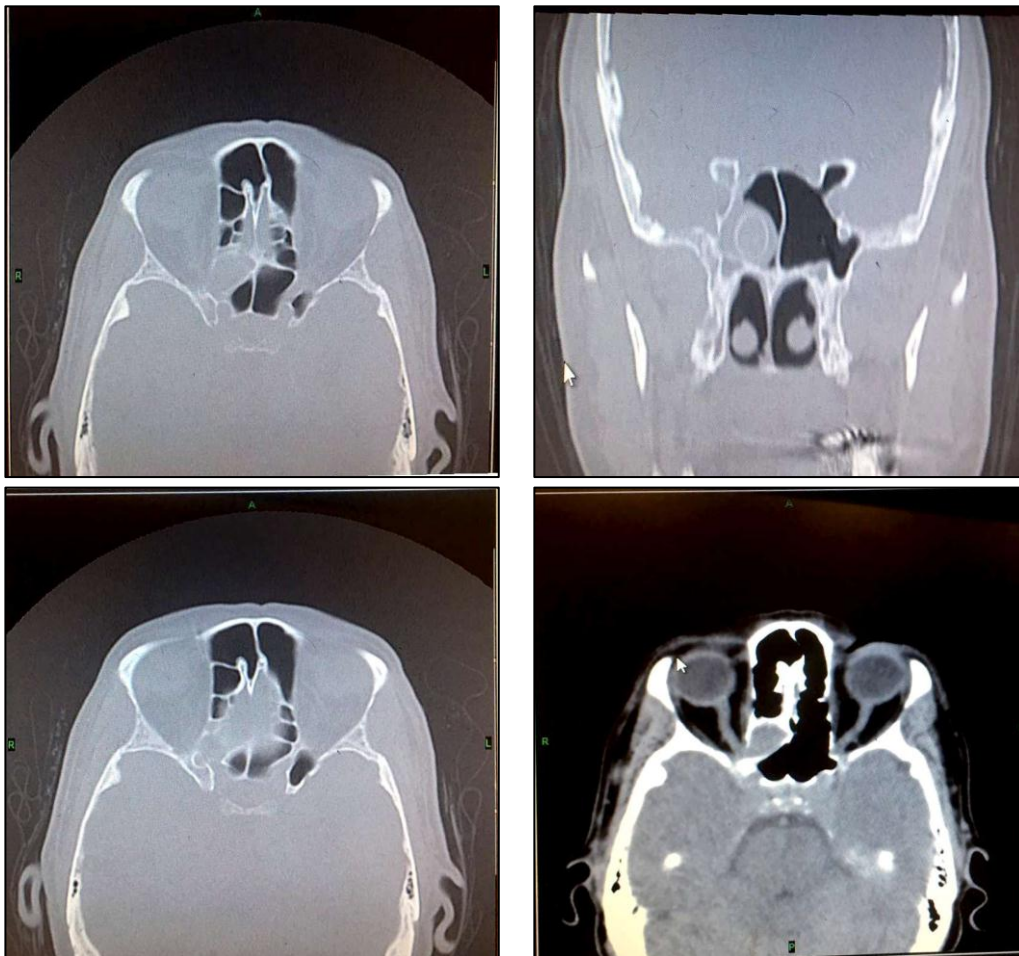


Figure 1. A CT scan of paranasal sinus. Opacity of posterior ethmoid and sphenoid sinuses on the right, and destruction of the superomedial of the right orbit wall.

Discussion

A wide range of disease can cause the inflammation, degeneration or demyelination of optic nerve, which is defined as ON and characterized by a temporary, but severe loss of vision (3). It may only present with hyperaemia of the optic disc and large veins distension in early stages (2). Patients who are affected by ON are usually between 20-50 years old, with a slight female predilection (3, 2).

Multiple sclerosis (MS) is still the most common cause of unilateral ON (3). In patients who are affected by ON, the MS can develop at the time of ON diagnosis or in later stages, representing in 33% and 25% of cases, respectively (2).

There are several physiopathologic mechanisms through which paranasal sinusitis leads to ON. 1) The most common way is the direct extension of suppuration from sinus to optic nerve, via nearby osteomyelitic sinus wall or through the dehiscence of the posterior sinus wall (3, 2). Two different studies were undertaken in 1908 and 1909, by Onodi and Loebi, respectively, which confirmed the possibility of direct spread of infection from sinuses to the optic nerve by evaluation of the anatomical connection between the optic channel and posterior sinuses (sphenoid and posterior ethmoid) (4,5). 2) Compressive optic neuropathy due to ethmoid and/or sphenoid mucocoeles and/or pyocoeles. 3) Bacteremia secondary to infection invasion through the sinus mucosa. 4) Vasculitis with thromboangitis of optic nerve (3), 5) Chronic allergic ON due to the immunologic reaction to the intradermal injection of central myelin in juvenile guinea pigs (2). Based on imaging and examination findings and our observation during the operation, in our case, the problem was due to the direct spread of inflammation and infection from dehiscence lamina papyrascea of ethmoid sinus.

On x-ray study, the most common findings include the air fluid levels, thickened mucous membranes and cysts, which are represented in 10-20% of cases (2).

Although more studies are needed to investigate the accurate association between paranasal sinusitis and ON, but it's well-known that ON can be considered as a rare complication of paranasal sinus disease (6). A study by Shimo-oku et al. Showed that among 18 patients with ON and posterior paranasal sinus disease, 9 cases were suffered from sinusitis and 9 patients had mucocoele or pyocoeles (7).

It is well documented that a timely surgery, the same as our patient, can be concluded to the complete recovery of vision and prevents the irreversible optic damage and permanent blindness (6). This configuration should be always sought out so that ophthalmologic symptoms can be connected to the correct diagnosis in order to find the best treatment (8).

Conclusions

A combination of medical therapy, prior to surgery, with broad spectrum antibiotics and corticosteroids together with right-sided ethmoidectomy and sphenoidectomy led to a complete recovery of vision. She was successfully treated and at follow up of first month, she presented the normal vision acuity.

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Conflicts of Interest

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