Unilateral blindness secondary to acute sphenoid sinusitis

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Abstract. Unilateral blindness secondary to acute sphenoid sinusitis. Objectives: To highlight a rare scenario where a delay in diagnosis caused unilateral blindness.

Case report: A 45-year-old Aboriginal woman with a history of non-Hodgkin’s lymphoma presented with a severe left-sided headache, pyrexia and positive blood cultures. Following admission, the patient rapidly developed unilateral blindness, but did not inform her physician until 21 hours after onset. High-resolution CT scanning of the sinuses showed erosion of the bony covering of the optic nerve. Sinus surgery was performed.

Results: Despite the discovery of pus under considerable pressure, and clearing the sphenoid sinus of pus and debris, vision was not restored, even at 2-month follow-up.

Conclusions: Two pathological processes are postulated here: that erosion of the bony optic canal allowed the optic nerve to be exposed, allowing the ensuing sinusitis to cause irreversible nerve ischemia, and immunosuppression meant the patient’s immune response was inadequate to cope with the sinusitis, with devastating effects.

Introduction

Acute sinusitis is a common condition but serious complications are rare. Recognised complications include orbital cellulitis and orbital abscess, osteomyelitis of frontal bone (also known as Pott’s puffy tumour), extradural abscess, subdural abscess, frontal lobe abscess, meningitis and cavernous sinus thrombosis. These complications may be explained by the anatomical considerations of the venous drainage of the paranasal sinuses and the proximity of the sinuses to the orbit and the frontal lobe. The optic nerve is closely related anatomically to the lateral wall of the sphenoid sinuses as it courses in a posterior direction. There have been reports of blindness and optic nerve damage secondary to orbital abscess caused by sphenoid sinusitis but infection causing blindness by erosion of the bony covering of optic nerve, on the lateral wall of the sphenoid sinus, has not been reported. We present a case of unilateral blindness caused by sphenoid sinusitis by direct erosion of the optic canal within the lateral wall of the sphenoid sinus.

Case report

A 45-year-old Aboriginal woman undergoing chemotherapy for Hodgkin’s lymphoma presented to the Emergency Department with a two-day history of severe left-sided headache extending from the left frontal region to the temporal and parietal regions. She admitted to mild symptoms of nasal obstruction and rhinorrhoea. No photophobia, visual disturbance or vomiting was reported. She had a pyrexia at 37.5 degrees Celsius but there were no signs of meningism, and a full neurological examination was unremarkable. There was no eyelid oedema, proptosis or ophthalmoplegia and visual acuity was normal. She was admitted by the physicians for further investigation. Initial differential diagnoses included left-sided migraine, acute sinusitis and temporal arteritis. In view of her immunocompromised state secondary to the chemotherapy, a diagnosis of meningitis was also postulated. Laboratory tests revealed a raised erythrocyte sedimentation rate (68 mm/hr), neutropenia, anaemia, thrombocytopenia (secondary to the chemotherapy for Hodgkin’s lymphoma), and a positive blood culture that grew Gram-negative bacilli. Lumbar puncture for cerebrospinal fluid (CSF) evaluation did not show any features of bacterial or viral meningitis. A computerised tomographic (CT) scan of her
head was performed and a space occupying intracranial lesion was excluded, but cuts traversing the sphenoid sinus showed evidence of disease within the left sphenoid sinus.

She was started on intravenous ceftazidime and gentamicin antimicrobial therapy, but there was no improvement in the headache after 48 hours of treatment. On routine questioning on Day 2, she admitted to sudden and complete loss of vision in the left eye twenty-one hours earlier. On examination, the left pupil was dilated and unresponsive to light. Unfortunately, she did not realise the importance of immediately informing the medical staff of her left-sided visual loss, and this led to a significant delay in diagnosis. An urgent high-resolution CT scan of the paranasal sinuses was performed, which confirmed an exposed left optic nerve within a diseased sphenoid sinus (Figure 1). There was no evidence of orbital cellulitis or abscess. She was referred to the otolaryngologists who informed her that, in view of the delay in diagnosis, her unilateral blindness was likely to be permanent, but that prompt endoscopic clearance of the sinuses was needed.

At surgery a left middle meatal antrostomy was fashioned and anterior ethmoidectomy performed. There was congestion and mucosal thickening of the anterior ethmoids and the antra but no pus was found. The sphenoid ostium was difficult to locate via the trans-ethmoidal approach because of mucosal congestion and so the sphenoid sinus was entered 1 cm above the posterior choana close to the midline. Considerable pus under pressure was encountered and, when the sphenoidotomy was enlarged, a large amount of infected debris was found within the sinus, which was cleared and sent for microbiological evaluation. Both blood cultures and pus from the sphenoid sinus grew Pseudomonas aeruginosa, which was sensitive to gentamicin. No fungal growth was found. Post-operatively, the left-sided headache had resolved but she failed to regain any vision in the left eye and remained blind on this side at 2-month follow-up.

**Discussion**

Acute sinusitis is a common condition that usually follows an upper respiratory tract infection, and commonly has a viral aetiology. Presenting symptoms include nasal obstruction, facial pain, headache, rhinorrhea and postnasal drip. Most cases are successfully managed conservatively by the family doctor with analgesia, topical decongestion and occasionally antibiotics if...
bacterial super-infection is suspected. Hospital admission for intravenous antibiotic therapy and surgical intervention is occasionally necessary for severe cases. On rare occasions, patients present with serious orbital or intracranial complications with significant morbidity and mortality. Reports of blindness secondary to orbital complications of sinusitis such as orbital cellulitis and orbital abscess are well documented in the medical literature. The ophthalmic complications of isolated sphenoid sinusitis are also documented. Permanent blindness secondary to erosion of the bony lateral wall of the sphenoid sinus with subsequent optic nerve inflammation, however, has not been previously reported.

In our patient, two possible pathological processes may explain the mechanism of her optic nerve damage. Firstly, the optic canal may have been congenitally dehiscent, with the ensuing inflammation therefore leading directly to ischemia of the nerve. However, the history of pain is suggestive of an erosive process involving the bony covering of the optic canal within the lateral wall of the sphenoid sinus. Secondly, the immunocompromised status of this patient secondary to the chemotherapy probably contributed to the severity of the infection and inflammation. Thrombosis of transosseous veins within the wall of the sphenoid sinus was initially entertained as a possible cause of the patient’s blindness. However, based on the CT finding of an exposed optic nerve lying within a diseased sphenoid sinus, it was finally concluded that the blindness was caused by optic nerve ischemia secondary to direct inflammation from surrounding infection.

This case illustrates that acute sinusitis, in particular sphenoid sinusitis, may mimic other conditions such as migraine and temporal arteritis and hence diagnosis may be delayed. Once other causes have been excluded, a high-resolution CT scan of the paranasal sinuses should be considered early in the management of patients presenting with headache and facial pain associated with systemic upset. Early diagnosis can facilitate prompt surgical intervention and the possible avoidance of serious complications. Visual acuity should be assessed in all patients with severe sphenoid sinusitis and, if any deterioration is noted, urgent surgical intervention is essential as permanent blindness may ensue within one to two hours.

Despite appropriate antibiotic therapy with gentamicin, as guided by subsequent microbiological cultures, this patient showed no response and progressed to a serious complication. Systemic antibiotic penetration of infected sinus mucosa and associated pus-filled sinus cavities is poor and, therefore, surgical intervention should be considered if there is no response to medical treatment within twenty-four hours. In particular, surgery should not be delayed in immunocompromised patients as they are more likely to develop complications.

Conclusion

Blindness secondary to acute erosion of the bony optic canal is a rare but serious complication of sphenoid sinusitis. Though preventable, thorough history-taking to include visual symptoms, early imaging of the sinuses and a high index of suspicion, especially in the immunocompromised, are needed if serious consequences are to be avoided.

References


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