CASE REPORT

Isolated acute sphenoid sinusitis presenting with hemicranial headache and ipsilateral abducens nerve palsy

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SUMMARY

Isolated sphenoid sinusitis is a rare disorder and may present with complications due to its anatomical location and proximity to the intracranial and orbital contents. It is frequently misdiagnosed, because the sphenoid sinus is not visualised adequately with routine sinus radiographs and is not accessible to direct clinical examination. We report a case who presented with hemicranial headache and ipsilateral abducens nerve palsy as the presenting feature of sphenoid sinusitis. The symptoms disappeared within a week of conservative treatment. Sphenoid sinusitis should be kept in the differential diagnosis of isolated sixth cranial nerve palsy, especially in the presence of headache, and all patients should be investigated with CT/MRI brain. Prompt diagnosis and management before intracranial extension can prevent devastating complications.

BACKGROUND

Sphenoid sinusitis is an uncommon infection that accounts for approximately 3% of all cases of acute sinusitis.¹ It is usually accompanied by pansinusitis, but, rarely, occurs alone. The sphenoid sinus is in close proximity to the cortical venous system, cranial nerves and meninges, so the infection may spread to these structures and the patient may present with complications. These include intractable headache, mono-ocular visual impairment and other cranial nerve disturbances, such as III, IV, VI, V1 and V2 involvement.²

There are few reports of ipsilateral or contralateral abducens nerve palsy as the presenting symptom of sphenoid sinusitis.^{3–5} Headache in frontal, temporal, retro-orbital radiating to occipital region or trigeminal distribution has been described in the literature.¹ Hemicranial headache together with sixth cranial nerve palsy in a patient of sphenoid sinusitis have not been reported. The present report highlights the importance of considering sphenoid sinusitis in the differential diagnosis of hemicranial headache, especially in the presence of red flag signs (fever and sixth cranial nerve palsy, in our case), so that early diagnosis and treatment can prevent intracranial complications.

CASE PRESENTATION

A 42-year-old man presented with a 4-month history of on and off moderate grade fever associated with chills, which would subside after taking oral antibiotics, and reappear after stopping antibiotic use. The patient also had a severely intense

left hemicranial throbbing headache, accompanied by redness and lacrimation from the left eye, for the past month. It was associated with nausea; there was no photophobia, phonophobia, vomiting, blurring of vision, prodromal symptoms and aura. The headache would remain the same intensity with intermittent fluctuations, and was not relieved by oral pain-killers.

After 20 days of onset of the headache (10 days before hospitalisation at our university hospital), the patient began noticing horizontal diplopia on left gaze at distant objects, which disappeared after closing one eye.

On examination, the patient was conscious and fully oriented. Cranial nerve examination showed left VI cranial nerve palsy; the rest of the neurological examination was normal, including fundus and visual acuity bilaterally. Although signs of meningeal irritation were absent, chronic meningitis, such as tuberculous meningitis, was first suspected, as this infection is endemic in our country, and cerebrospinal fluid (CSF) examination and brain MRI were planned.

INVESTIGATIONS

On investigation, haemoglobin was 14.5 g/dL, white cell count was 10 400/mm³ and platelet count was 2 25 000/mm³. Liver and kidney function tests were within normal limits. Random blood sugar was 88 mg/dL and HIV test was negative. CSF examination showed 5 cells/mm³ (all lymphocytes), protein 34 mg% and sugar 64 mg% (simultaneous blood sugar was 88 mg/dL). Gram stain, acid-fast bacilli stain and India ink preparation of CSF were negative.

The brain MRI showed mucosal thickening and enlargement of left sphenoid sinus (figure 1A) with intense enhancement of adjacent dura mater of middle cranial fossa on postcontrast image (figure 1B). Thickening and enhancement of dura mater along dorsal clivus was also present (figure 1C, D). An ear, nose and throat consultation was carried out. CT scan of paranasal sinus showed complete opacification of left sphenoid sinus with its enlargement (figure 2A).

We retained our provisional diagnosis of hemicranial headache with sixth nerve palsy secondary to sphenoid sinusitis and adjacent pachymeningitis.

DIFFERENTIAL DIAGNOSIS

Our patient presented with a 4-month history of on and off moderate grade fever, headache, nausea, diplopia and abducens nerve palsy, so a possibility

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Figure 1 Sphenoid sinusitis with pachymeningitis. T2-weighted axial section of MRI of the brain showing thickening of wall of sphenoid sinus on the left side with its enlargement (A), which enhances intensely on contrast (B, postcontrast spoiled gradient recalled acquisition (SPGR)-coronal section). The enhancement extends along the dorsal clivus (C white arrow and D white arrow in postcontrast SPGR axial and sagittal section, respectively), the site where sixth cranial nerve ascends to enter Dorello's canal.

of tuberculous meningitis was considered, however, the absence of signs of meningeal irritation, vomiting and normal CSF examination were against the diagnosis. As the patient was immunocompetent and HIV negative, fungal meningitis and other opportunistic infections were not considered. Imaging of the brain confirmed the diagnosis of isolated left-sided sphenoid sinusitis.

TREATMENT

Transnasal endoscopy showed congested ostium of left sphenoid sinus. A soft cotton pack soaked in decongestant was applied at the left sphenoid ostium. It drained mucopurulent discharge

under pressure, which was sent for culture and found to be sterile. Multiple antibiotic courses were the probable explanation for the sterile culture from mucopurulent discharge from sphenoid sinus. The patient was treated with oral amoxicillin-clavulanic acid and nasal decongestants.

OUTCOME AND FOLLOW-UP

Two days after the procedure, the patient had dramatic improvement in his diplopia and restriction of the gaze of the left eye. There was complete recovery of sixth cranial nerve palsy and headache within days. Repeat CT paranasal sinus also became normal after 7 days ([figure 2B](#)).

Figure 2 CT of paranasal sinus before treatment shows enlargement and complete opacity of left sphenoid sinus (2A), which recovered after treatment (2B).

DISCUSSION

Isolated sphenoid sinus involvement is relatively uncommon and may occur due to inflammatory, neoplastic, fibro-osseous, traumatic or developmental disorders.⁶ Among infections, bacteria (Gram-positive cocci) are the most common organisms in acute situations. There are many structures in close relation to sphenoid sinus that may be involved in complications secondary to sphenoid sinus disease. They include second through sixth cranial nerve, cavernous sinus, internal carotid artery, pituitary gland, sphenopalatine artery, adjacent dura mater, etc.⁷

The presenting features of sphenoid sinusitis described are headache, visual disturbances and cranial neuropathy. Headache is the most common symptom and located in frontal, temporal, retro-orbital, occipital region or trigeminal distribution or both.¹ Hemicranial headache secondary to sphenoid sinusitis has been reported infrequently.⁸ Our patient was a case of hemicranial headache secondary to sphenoid sinusitis.

Among the cranial nerves, the sixth cranial nerve is the most commonly involved nerve, seen in 6% of inflammatory and 50% of neoplastic cases.⁶ The possible explanation of its involvement are: spread of sphenoid sinus inflammation to nerve sheath; mechanical compression of the nerve in cavernous sinus, as the sixth cranial nerve is the medial-most nerve in relation to cavernous sinus and ischaemic infarction of the nerve due to cavernous sinus or dorsal clival artery thrombosis.^{9 10} The sixth cranial nerve emerges at the pontomedullary junction and ascends in the prepontine cistern to pierce the dura on the posterior aspect of clivus. It runs a long extradural course before piercing the dura. After that, it enters the Dorello's canal

at the petrous apex where it is vulnerable to inflammation and compression injury.¹¹ Pachymeningitis secondary to sphenoid sinusitis causing sixth cranial neuropathy has been uncommonly reported.³ In our patient, the soft tissue dura mass on the posterior aspect of the clivus on the left side, which enhanced intensely on contrast (pachymeningitis), was the probable cause of left sixth cranial nerve palsy (figure 1C, D).

In the previous literature, isolated sixth cranial neuropathy secondary to sphenoid sinusitis and adjacent pachymeningitis has been reported. Hemicranial headache is also reported in sphenoid sinusitis, but not with sixth cranial neuropathy. Our case report is unique in that the patient presented with both hemicranial headache and unilateral sixth cranial neuropathy secondary to sphenoid sinusitis.

Contributors RG participated in conception and design and drafting the article. RS was involved in revising the article critically for important intellectual content. AM and AP took part in analysis and interpretation of data.

Competing interests None declared.

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REFERENCES

- 1 Lew D, Southwick FS, Montgomery WW, Weber AL, Baker AS. Sphenoid sinusitis. A review of 30 cases. *N Engl J Med* 1983;309:1149–54.
- 2 Marmura MJ, Silberstein SD. Headaches caused by nasal and paranasal sinus disease. *Neurol Clin* 2014;32:507–23.
- 3 Nemzek W, Postma G, Poirier V, Hecht S. MR features of pachymeningitis presenting with sixth-nerve palsy secondary to sphenoid sinusitis. *AJNR Am J Neuroradiol* 1995;16(4 Suppl):960–3.
- 4 Muneer A, Jones NS. Unilateral abducens nerve palsy: a presenting sign of sphenoid sinus mucocoeles. *J Laryngol Otol* 1997;111:644–6.
- 5 Ada M, Kaytaz A, Tuskan K, Guvenc MG, Selcuk H. Isolated sphenoid sinusitis presenting with unilateral Vth nerve palsy. *Int J Pediatr Otorhinolaryngol* 2004;68:507–10.
- 6 Lawson W, Reino AJ. Isolated sphenoid sinus disease: an analysis of 132 cases. *Laryngoscope* 1997;107:1590–5.
- 7 Fujii K, Chambers SM, Rhoton AL Jr. Neurovascular relationships of the sphenoid sinus. A microsurgical study. *J Neurosurg* 1979;50:31–9.
- 8 Meckling SK, Becker WJ. Sphenoid sinusitis presenting as indomethacin responsive "hemicrania continua": case report. *Cephalalgia* 1997;17:303.
- 9 Krisht A, Barnett DW, Barrow DL, Bonner G. The blood supply of the intracavernous cranial nerves: an anatomic study. *Neurosurgery* 1994;34:275–9; discussion 279.
- 10 Patt BS, Manning SC. Blindness resulting from orbital complications of sinusitis. *Otolaryngol Head Neck Surg* 1991;104:789–95.
- 11 Umansky F, Valarezo A, Elidan J. The microsurgical anatomy of the abducens nerve in its intracranial course. *Laryngoscope* 1992;102:1285–92.

Learning points

- A differential diagnosis of sphenoid sinusitis should be retained for a patient presenting with hemicranial headache, especially in the presence of red flag signs (fever or cranial neuropathy).
- Early identification and treatment can prevent intracranial complications of sphenoid sinusitis.
- Imaging of the brain should be performed in all cases of hemicranial headache, to rule out secondary causes.

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