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Case Report

Chronic migraine unmasking invasive sinonasal aspergillosis: a delayed diagnosis with skull-base and cavernous sinus extension: a case report

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ABSTRACT

Invasive aspergillosis (IA) is rare infection, primarily affecting immunocompromised hosts. We report a rare case of IA in an apparently immunocompetent 54-year-old woman, initially misdiagnosed and treated as migraine due to headache and diplopia. We reviewed the patient's clinical presentation, imaging studies (Computed tomography [CT] and Magnetic resonanace imaging [MRI]), surgical intervention, antifungal therapy, and postoperative course. Diagnostic criteria included radiologic evidence of sinus mass with bone erosion and histopathologic confirmation following functional endoscopic sinus surgery (FESS). Treatment complications were monitored through serial laboratory tests and clinical assessments. CT demonstrated bone erosion of the left maxillary sinus; MRI showed a T1-hyperintense, T2-hypointense lesion with peripheral rim enhancement. The patient underwent FESS with complete debridement. Postoperatively, voriconazole was administered according to standard dosing protocols. The patient developed syndrome of inappropriate antidiuretic hormone secretion (SIADH), which was promptly recognized and managed with fluid restriction and salt supplementation. Full remission was achieved, with resolution of neurological symptoms and normalization of sodium levels. This case underscores that IA can occur in patients without overt immunosuppression and may mimic benign neurologic conditions. Early consideration of fungal etiologies in refractory "sinus-related" neurological presentations, combined with targeted imaging and prompt surgical and antifungal therapy, can lead to favourable outcomes.

Keywords: Migraine, Invasive aspergillosis, Sinonasal infection, Intracranial complications, Case report

INTRODUCTION

Invasive aspergillosis (IA) is one of the most frequent invasive mold infections, especially among immunocompromised individuals. Aspergillus fumigatus causes over 90% of infections in humans. Other *Aspergillus* species, including *A. flavus, A. terreus*, and *A. niger*, were more typically found in immunocompetent patients.[1] Invasive fungal illness can often undermine the skull base or spread to adjacent orbits, leading to devastating outcomes.[2] It primarily affects the nose and sinuses. Secondary ocular involvement may worsen the prognosis as it increases the chance of intracranial dissemination.[3] Paranasal sinus aspergillosis is classified as invasive (acute fulminant, chronic invasive, and granulomatous invasive) or non-invasive (fungus ball and allergic fungal rhinosinusitis) based on mucosal invasion and bone damage. Any type of paranasal aspergillosis can proceed to more aggressive disease, emphasizing the necessity of early detection of this increasingly encountered disease.[4] This report highlights the diagnostic challenges in a patient misdiagnosed with chronic migraine, whose actual underlying condition was an invasive sinonasal aspergillosis, resulting in life-threatening intracranial complications. Although IA is classically associated with immunocompromised states, it

may rarely occur in apparently immunocompetent patients and may present with nonspecific symptoms such as headache, facial pain, diplopia, or nasal obstruction. Because early clinical features overlap with benign neurological and sinonasal disorders, diagnosis is often delayed until advanced local invasion has occurred.

CASE REPORT

A 54-year-old immunocompetent female (no history of immunosuppression; HIV negative, HbA1c normal) presented with a 5-year history of recurrent frontal headaches initially diagnosed as migraine without photophobia. Her symptoms were partially controlled with naproxen and triptans, but efficacy progressively declined. Three years into her illness, she developed binocular diplopia which was initially associated with headache, later persisting independently. Ophthalmologic evaluation revealed normal visual acuity, unremarkable fundoscopy, and a normal Hess chart test (to evaluate the extra ocular muscle function and help diagnose the ocular motility disorders). Autoantibody screening ruled out myasthenia gravis. Two years prior to definitive diagnosis, she sought ENT consultation for persistent headache and diplopia. Empirical nasal sprays (e.g., fluticasone propionate or mometasone furoate) provided transient relief, with diplopia resolving spontaneously over 4-6 months. Headaches recurred intermittently, hence a trial of centrally acting calcium channel blockers (verapamil) alongside NSAIDs/triptans was started that yielded only brief symptomatic improvement.

One year later, a non-contrast brain CT revealed an aggressive 7.3 cm destructive mass centered in the left maxillary sinus. The lesion extended into the ethmoid, frontal, and sphenoid sinuses, eroding the sella and clivus, with intracranial invasion of the middle cranial fossa and cavernous sinus (Figure 1).

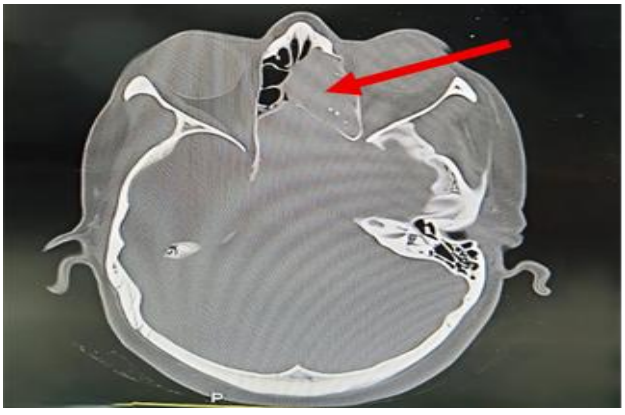

Figure 1: Axial non-contrast CT scan showing destructive mass (7.3 cm) in left maxillary sinus with bone erosion and intracranial extension (arrow).

Differential diagnoses included sinonasal carcinoma and neuroblastoma. Shortly after imaging, the patient incidentally expelled black necrotic nasal debris; whose biopsy attempt gave misdiagnosis of "necrotic round blue cell tumor". This misinterpretation was likely due to inadequate sampling of nonrepresentative tissue dominated by necrosis. Repeat CT demonstrated interval progression (7.4 cm mass) with orbital compromise, cribriform plate destruction, and extension into the prepontine cistern. Subsequent contrast MRI showed a lobulated T1-hyperintense, T2-hypointense lesion with rim enhancement and no diffusion restriction, suggesting fungal etiology. Mass obliterated the left optic canal, invaded bilateral cavernous sinuses, and extended extra-durally into middle cranial fossae but spared brain parenchyma (Figure 2 and 3). The combination of destructive sinonasal disease, bony erosion, T1 hyperintensity, T2 hypointensity, and rim enhancement on MRI was highly suggestive of fungal infection and helped narrow the differential diagnosis before definitive histopathology. FESS was done that exposed a pinkish mass extending to the skull base, yielding copious necrotic material which was sent for histopathology ultimately confirming invasive Aspergillus flavus sinusitis on fungal culture, contradicting the initial misdiagnosis of a "necrotic round blue cell tumor."

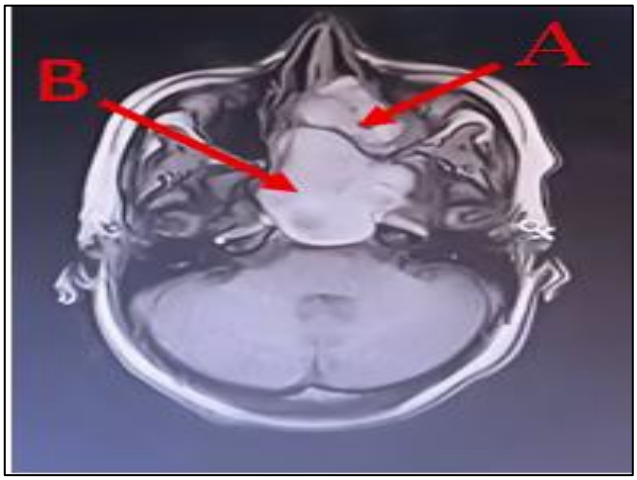

Figure 2: Axial MRI of sinonasal aspergillosis. (A) Obliteration of left optic canal (arrow). (B) Invasion of bilateral cavernous sinuses (arrow).

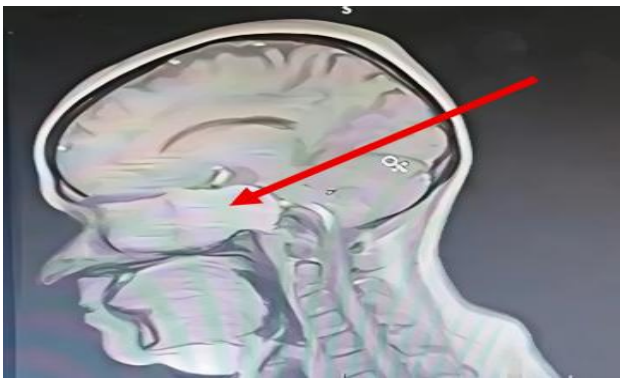

Figure 3: Sagittal MRI showing extra-dural extension into middle cranial fossae with preserved brain parenchyma (arrow indicates lesion boundary).

Voriconazole (200 mg twice daily) was initiated postoperatively. On postoperative day five, the patient developed tonic-clonic seizures, prompting immediate discontinuation of voriconazole. Laboratory evaluation revealed severe hyponatremia (serum sodium: 107 mmol/L) without alternative etiology. Postoperatively, the patient developed severe hyponatremia with laboratory features consistent with syndrome of inappropriate antidiuretic hormone secretion. Other common causes of hyponatremia were excluded, and the condition improved with fluid restriction, cautious sodium correction, and close monitoring. The cause of SIADH was deemed idiopathic; however, given literature associations with either FESS complications or voriconazole adverse effects, both were considered potential contributors. Hyponatremia was corrected cautiously via slow intravenous saline infusion over 72 hours. After one week of sodium normalization and seizure resolution, voriconazole was restarted at 200 mg twice daily with therapeutic drug monitoring. Headache and diplopia resolved completely within weeks. Follow-up MRI demonstrated total mass regression without recurrence (Figure 4) and the patient reported significant relief after years of misdiagnosis.

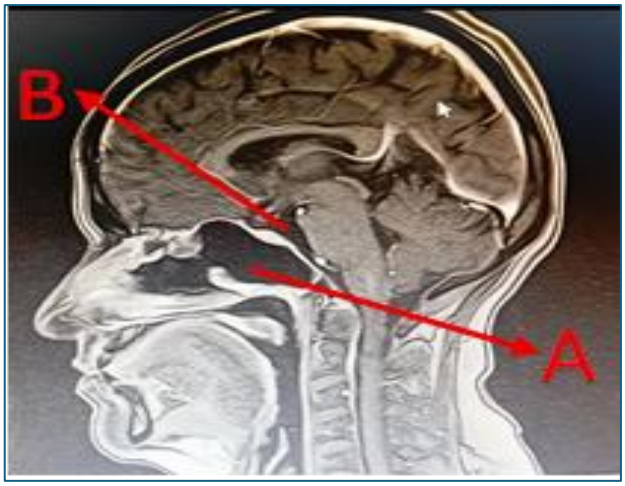

Figure 4: Follow-up MRI confirming resolution. (A) Absence of sinonasal mass in left maxillary sinus (arrow). (B) Normal cavernous sinus architecture (arrow).

A summarised timeline of the patient's symptoms, investigations and interventions is presented in (Table 1).

Table 1: Timeline of diagnostic findings and therapeutic interventions from symptoms onset to follow up in a patient ultimately diagnosed diagnosed with invasive fungal sinusitis.

Time since symptom onset	Clinical event or investigation	Management and outcome
0 years	Onset of recurrent frontal headaches, initially without photophobia. Diagnosed as migraine.	Naproxen and triptans provided partial, declining relief.
+3 years	Development of binocular diplopia; normal ophthalmologic findings; ruled out myasthenia gravis.	Empirical nasal sprays and calcium channel blockers tried. Diplopia resolved temporarily.
+5 years	Non-contrast CT: 7.3 cm destructive mass Expulsion of black necrotic debris MRI: Fungal features suspected	FESS performed and histopathologic confirmation of *Aspergillus flavus*
Post-op day 0	Initiation of oral voriconazole (200 mg BID).	Antifungal therapy started.
Post-op day 5	Onset of tonic-clonic seizures. Lab: severe hyponatremia (Na^+ 107 mmol/L).	Voriconazole discontinued. Managed as SIADH with fluid restriction and slow saline infusion.
1 week post-hyponatremia resolution	Sodium normalization and seizure resolution.	Voriconazole reinitiated with therapeutic drug monitoring.
Within weeks	Resolution of headache and diplopia.	Maintained on voriconazole.
+6 months	MRI: total regression of mass; no recurrence.	Antifungal therapy completed.

DISCUSSION

Fungal rhinosinusitis is classified into invasive and non-invasive types. The non-invasive forms include aspergilloma and allergic sinusitis, while invasive types may be fulminant (acute) or chronic/indolent (restricted).[5]

Primary headache syndromes (PHS), including migraines, cluster headaches, Sluder's neuralgia, and hemicrania continua, can cause symptoms similar to rhinosinusitis, such as nasal congestion, rhinorrhea, conjunctival injection, lacrimation, eyelid edema, and pain in the temporal or periorbital area.[6]

Immunocompromised (neutropenia) people are more likely to develop invasive forms of the disease with intracranial dissemination. However, there have been cases of cerebral aspergillosis in immunocompetent persons exist.[7] The infection spreads quickly within the cranial cavity due to the sinuses' close contact. It is a dreaded complication because it is usually lethal if not treated immediately. Orbital involvement can also result from the disease spreading from the paranasal sinuses, bone erosion caused by polyps, or fungal tissue invasion. It is thought to worsen the prognosis for sinonasal aspergillosis. Furthermore, the superior orbital fissure and optic canal enter directly into the middle cranial fossa,

providing potential paths for infection to spread intracranially.[4] In this case report, the patient developed an extensive *A. flavus* infection with black necrotic tissue centered in the maxillary sinus, spreading to nasal cavity and cavernous sinus, eroding the Sella turcica and clivus.

Invasive sphenoid sinus aspergillosis causes a variety of neuropathic symptoms, including invasion of the skull base. Infections of the ocular nerves, orbital apex, and cavernous sinus can cause oculomotor nerve damage, palsy, abducens nerve palsy, and vision impairment.[8] Fungal sinusitis can cause severe orbital apex syndrome due to the close proximity of the paranasal sinuses to the orbit. Fungal sinusitis can induce painful visual loss and ophthalmoplegia through multiple mechanisms, including compression, ischaemia, inflammation, and direct poisoning.[9] In our patient, optic canal obliteration caused compressive optic neuropathy, presenting as diplopia, without direct invasion into orbital contents. Invasion of neurovascular structures can cause thrombosis and ischemia, leading to spread beyond the sinuses into surrounding soft tissue and bone structures.[10] Thus, differentiating invasive from non-invasive forms is essential for effective management and prognosis. The rarity of fungal infections poses a diagnostic challenge, especially for clinicians unfamiliar with their presentation.

Imaging is critical for evaluating the degree of the disease, which aids in early treatment planning and appropriate action. In sinonasal fungal illness, a CT scan can reveal variable degrees of mucosal thickening, hyperdense contents, fluid collections, and opacification of the affected paranasal sinuses. MRI provides a more accurate assessment of intracranial extension and surrounding soft tissue involvement, as well as skull base invasion, perineural dissemination, and vascular occlusion. On MRI, the normal mucosa appears smooth, with a homogeneous hyperintense signal on T2-weighted imaging. On T1-weighted images (T1WI), fungi-infected mucosa can appear iso- to hypointense, but on T2-weighted images (T2WI), the signal varies, as observed in our patient too.[11]

Only positive histologic findings (distinctive septate hyphae and invasive growth in the tissue) can provide definitive evidence of an invasive fungal sinusitis. In addition to demonstrating mucosal invasion, a biopsy and subsequent fungal culture are crucial for differentiating Aspergillus infections from those of other species.[12] In our case, histopathology confirmed invasive *A. flavus* infection.

Voriconazole is recommended by all guidelines as the primary treatment for IA due to its high level of evidence.[13] It offers better efficacy as compared to amphotericin B.[14] Our patient initiated voriconazole 200 mg twice daily 3-6 days postoperatively but developed severe hyponatremia on day 5, prompting a diagnosis of SIADH after other causes were ruled out. This association is supported by significant literature evidence linking voriconazole to SIADH. Voriconazole has been linked to inappropriate antidiuretic hormone syndrome.[15] FESS may also lead to SIADH as in previous study by Cezar.[16] The hyponatremia is treated by slow saline infusion IV with complete symptom resolution and biopsy clearance too. This case is clinically important because it demonstrates that progressive headache and diplopia should not be assumed to represent migraine when symptoms become refractory to standard therapy or are accompanied by red flags such as cranial neuropathy, orbital signs, or sinonasal symptoms. Prompt endoscopic evaluation, tissue sampling, and cross-sectional imaging are essential because superficial or nonrepresentative biopsy specimens may be misleading when necrosis dominates the lesion.

Limitations

A limitation of this report is that the diagnosis of SIADH was supported primarily by the clinical course and temporal association; however, complete biochemical confirmation should be documented when available.

CONCLUSION

IA presenting in previously healthy people with migraine like pain and diplopia results in delayed detection of diagnosis. By identifying chronic symptoms unresponsive to specified treatment and using imaging (CT scan bone for erosions or MRI for rim enhancing lesion) early targeted treatment with surgery and medication (voriconazole) can be effective. For correction of unprecedented events and enhancing patient recovery, a coordinated interdisciplinary strategy and close monitoring should be implemented to ensure better outcomes. This case highlights the need to consider invasive sinonasal aspergillosis in patients with chronic unilateral headache, diplopia, and progressive sinonasal disease, even when they appear immunocompetent. Early imaging, timely tissue diagnosis, complete surgical debridement, and antifungal therapy can prevent further skull-base progression and lead to favourable outcomes.

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REFERENCES

1. Taha MS, Haddad MI, Almomen AA, Abdulkader MM, Alhazmi RA. Invasive aspergillosis of the central nervous system in immunocompetent patients in Saudi Arabia: Case series and review of the literature. Neurosciences. 2021;26(4):379-84.
2. Baeesa S, Bokhari R, Alghamdi K, Alem H, Al-Maghrabi J, Madani T, Invasive aspergillus sinusitis with orbitocranial extension. Asian J Neurosurg. 2017;12(02):172-9.
3. Rafizadeh SM, Mousavi A, Rajabi MT, Aghajani A, Nozarian Z, Zand A. Invasive bony destructive orbital aspergillosis in an immunocompetent child: a case report. J Ophthalmic Inflamm Infect. 2025;15(1):30.

4. Bhandari S, Shubhangi G, Shruti B, Sunil S, Shashank NS, Bharat BS, et al. COVID Associated Invasive Aspergillosis. Indian J Otolaryngol Head Neck Surg. 2023;75(2):557-62.
5. Beyki A, Zardast M, Nasrollahi Z. Maxillary sinus aspergillosis: a case report of the timely failure to treatment. Iran J Microbiol. 2019;11(4):345-8.
6. Sharbel DD, Owen HC, Yelverton JC, Li M, Holmes T, Kountakis SE. Symptoms and Clinical Findings in Primary Headache Syndrome Versus Chronic Rhinosinusitis. Am J Rhinol Allergy. 2021;35(3):308-14.
7. Mencinger M, Matos T, Popović KS. Invasive sinus aspergillosis with mycotic aneurysm of the vertebral artery and subarachnoid hemorrhage-Case report. Radiol Case Rep. 2021;16(9):2651-7.
8. Fujimoto T, Yoichi M, Takeshi H, Koichi Y, Koichi I, Takeshi W, et al. A Case of Invasive Sphenoid Sinus Aspergillosis Presenting as Oculomotor Nerve Palsy in a Healthy Patient. NMC Case Rep J. 2021;8(1):343-7.
9. Coutel M, Duprez T, Huart C, Wacheul E, Boschi A. Invasive Fungal Sinusitis with Ophthalmological Complications: Case Series and Review of the Literature. Neuro-Ophthalmol. 2021;45(3):193-204.
10. Chen A, James P, Stephen B, WengOnn C, Alkis JP, Dinesh S, et al. Imaging Features of Invasive Fungal Rhinosinusitis: A Systematic Review. Can Assoc Radiol J. 2024;75(3):601-8.
11. Chettiar AB, Rajesh M, Radha S, Ankur P, Jitendra S, Aman K, Abhinav CB, et al. Imaging spectrum of acute invasive sinonasal mucormycosis in patients with COVID-19: A pictorial review. Future Health. 2024;2(1):35-43.
12. Stevens Da, Kan VL, Judson MA, Morrison VA, Dummer S, Denning DW, et al. Practice Guidelines for Diseases Caused by Aspergillus. Clin Infect Dis. 2000;30(4):696-709.
13. Wang J, Sun J, Yang DW, Wang HS, Meng W, Li HY. Appraisal of guidelines and variations in recommendations on drug therapy for invasive aspergillosis prevention and treatment. Front Pharmacol. 2025;16:1443487.
14. Cheng J, Han H, Kang W, Cai Z, Zhan P, Lv T. Comparison of antifungal drugs in the treatment of invasive pulmonary aspergillosis: a systematic review and network meta-analysis. Front Microbiol. 2024;15:1504826.
15. Apaydin Rollas AE, Ceren O, Inkaya AC, Gulmez D, Arikan-Akdagli S, et al. A Case of Relapsing Hyponatremia Associated with Fungal Sinusitis. Case Rep Nephrol Dial. 2024;14(1):178-84.
16. Morosanu CO, Lee KS, Keshtkar F, Langton-Hewer C. Syndrome of inappropriate antidiuretic hormone secretion after functional endoscopic sinus surgery. J Surg Case Rep. 2022;1:rjab603.

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