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Invasive Aspergillosis Mimicking Pituitary Adenoma in an Immunocompetent Patient: A Management Dilemma

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Abstract

Background: Sellar-suprasellar lesions are commonly pituitary adenomas (PitNET(Pituitary neuroendocrine tumor) as per new WHO(World Health Organization) 5TH EDITION classification). However, rare infectious causes such as invasive aspergillosis (IA) may present with similar features, particularly in chronic fungal sinusitis cases, often leading to diagnostic challenges.

Case Summary: We report the case of a 35-year-old immunocompetent male who presented with a two-month history of holocranial headache, visual dimness, and right-sided ptosis. Examination revealed partial left third cranial nerve palsy. Hormonal evaluation indicated hyperprolactinemia. CEMRI(contrast enhanced magnetic resonance imaging) of the brain demonstrated a 19×39×21 mm sellar-suprasellar mass with parasellar invasion and bony erosion with diffuse enhancing mucosal thickening in paranasal sinuses. Positive serum Aspergillus antigen and elevated 1,3-β-D-glucan levels suggested fungal etiology. Antifungal therapy with intravenous voriconazole followed by oral medication for six weeks resulted in significant symptomatic and radiological improvement. Follow-up imaging revealed a reduced lesion size (4.5×11×10 mm), with full symptom resolution.

Conclusion: IA can rarely present as a sellar mass in immunocompetent individuals, mimicking pituitary neoplasms. This case underscores the importance of including fungal infections in the differential diagnosis of atypical pituitary region masses. Early diagnosis through imaging and fungal biomarkers enables effective antifungal management, potentially avoiding unnecessary surgical intervention.

KEYWORDS: Sella, Aspergilloses, Fungal, Pituitary, Biomarkers, Cranial Nerve

Key Message:

Invasive aspergillosis, though rare in immunocompetent individuals, can mimic pituitary adenomas in the sellar region. Recognition of atypical imaging features and use of fungal biomarkers are crucial for early diagnosis, enabling effective antifungal therapy and avoiding unnecessary surgical intervention.

Introduction

Fungal infections involving the hypothalamic-pituitary region are extremely rare and can present as sellar or suprasellar masses, frequently mimicking pituitary adenomas or other neoplastic lesions [1]. These infections are more commonly reported in immunocompromised patients, although cases in immunocompetent individuals have also been described [2]. Clinical manifestations often arise from

compression of adjacent structures and may include headache, visual disturbances, ophthalmoplegia, and varying degrees of hypopituitarism [1,3]. Radiologically, fungal lesions in the sellar region may resemble other suprasellar pathologies, making preoperative diagnosis challenging [3,4]. Therefore, a high index of suspicion along with histopathological confirmation is essential for accurate diagnosis and appropriate management.

Fungal involvement of the sellar and parasellar region usually occurs through direct extension from adjacent paranasal sinuses, particularly the sphenoid sinus, although hematogenous spread has also been reported [2,4]. Among fungal pathogens, Aspergillus species are the most frequently implicated organisms due to their angioinvasive properties, which allow them to invade surrounding bone, vascular structures, and neural tissue. This angioinvasion may lead to thrombosis, tissue necrosis, and rapid local spread into critical structures such as the cavernous sinus, optic apparatus, and pituitary gland [2,3]. Involvement of the cavernous sinus may further manifest as cranial nerve deficits, particularly affecting the third, fourth, fifth, and sixth cranial nerves, resulting in ophthalmoplegia and facial sensory disturbances.

The clinical presentation is often nonspecific and overlaps significantly with that of pituitary adenomas or other sellar lesions. Patients may present with persistent headache, progressive visual impairment due to optic chiasmal compression, and endocrine dysfunction ranging from isolated hormonal abnormalities to partial or complete hypopituitarism [1,3]. Hyperprolactinemia may occasionally occur due to pituitary stalk compression, which disrupts dopaminergic inhibition of prolactin secretion. Because of these overlapping features, fungal infections are frequently misdiagnosed as pituitary tumors preoperatively.

Neuroimaging findings are often inconclusive. Magnetic resonance imaging (MRI) may demonstrate a sellar or suprasellar mass with heterogeneous enhancement, sometimes associated with invasion of the cavernous sinus or sphenoid sinus involvement. Certain radiological features, such as hypointensity on T2-weighted images or adjacent sinus disease, may raise suspicion for a fungal etiology, but these findings are not always specific [3,4]. Consequently, the definitive diagnosis is usually established only after surgical exploration and histopathological examination, which demonstrates fungal hyphae consistent with Aspergillus species.

Management typically involves a combination of surgical decompression and antifungal therapy. Surgical intervention helps relieve mass effect on the optic apparatus and surrounding neural structures while also providing tissue for definitive diagnosis. Postoperatively, systemic antifungal therapy-commonly with agents such as voriconazole or amphotericin B-is required to eradicate residual infection and prevent disease progression [2,4]. Early recognition and prompt treatment are crucial, as delayed diagnosis may lead to significant neurological morbidity or even mortality due to the aggressive nature of invasive fungal infections.

We report a rare case of invasive aspergillosis involving the sellar-suprasellar region in an immunocompetent individual, clinically and radiologically mimicking a pituitary adenoma. This case highlights the diagnostic challenges associated with such presentations and underscores the importance of considering fungal infections in the differential diagnosis of atypical sellar masses, particularly in the presence of adjacent sinus disease or unusual radiological features.

Case Presentation

A 35 years aged gentleman presented to neurosurgery opd GIPMER with mild to moderate intensity holocranial headache, dimness of vision and ptosis of right eye for 2 months and admitted and being

managed in neurosurgery ward GIPMER NEW DELHI .On examination visual acuity was 6/9,6/6,partial,normal fundus (FIG *1*);

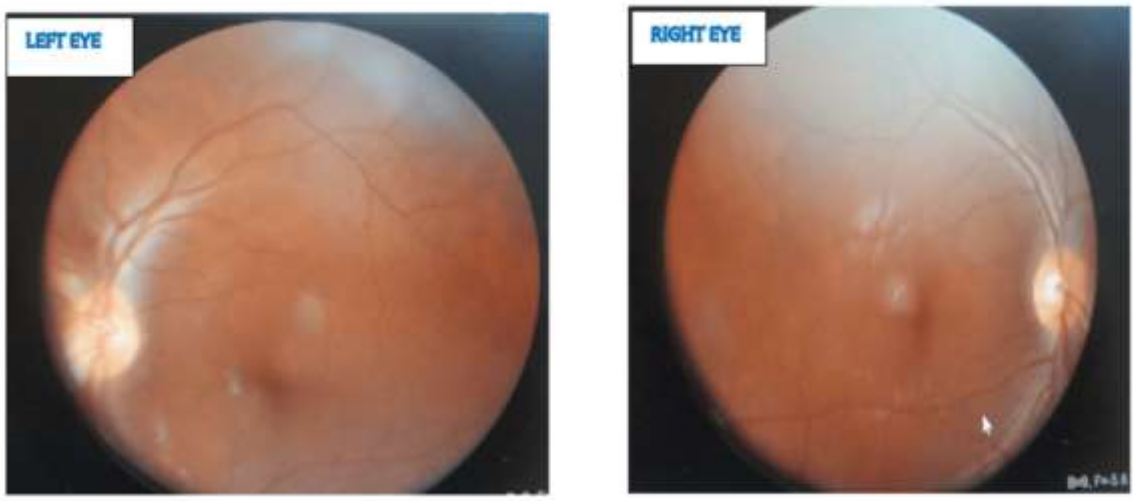

Figure 1: SHOWING NORMAL FUNDUS PICTURE OF THE PATIENT ON ADMISSION

Original clinical image from the 35-year-old patient described in this report, demonstrating the presenting ocular findings. Written informed consent for publication was obtained from the patient.
ptosis on right eye, with pupillary dilatation on right side-3rd cranial nerve palsy, no motor deficit, serum hormone profile depicted hyperprolactinemia (prl-803ng/ml, cortisol 20.7 microgram/dl,tft(thyroid function test)-normal)(table *1*).

Laboratory Parameter	Patient Value	Reference Range	Interpretation
Prolactin	**803 ng/mL**	4 – 23 ng/mL	**Markedly elevated**
Serum Cortisol (8 AM)	**20.7 µg/dL**	5 – 25 µg/dL	**Normal**
TSH	2.1 mIU/L	0.4 – 4.5 mIU/L	Normal
Free T4	1.2 ng/dL	0.8 – 1.8 ng/dL	Normal
LH	4.5 IU/L	1.7 – 8.6 IU/L (male)	Normal
FSH	5.2 IU/L	1.5 – 12.4 IU/L (male)	Normal
Growth Hormone (GH)	1.8 ng/mL	< 5 ng/mL (random)	Normal
ACTH	32 pg/mL	10 – 60 pg/mL	Normal
1,3-β-D-Glucan	**180 pg/mL**	< 60 pg/mL	**Elevated**

Table 1: Baseline Pituitary Hormonal Profile and Fungal Biomarker Levels

Cemri brain- sellar suprasellar mass of size 19x39x21mm invading parasellar structures with bony erosion, serum aspergillus antigen and 1,3-beta d glucan level tested highly positive (done after # days after mri)(fig *2*).

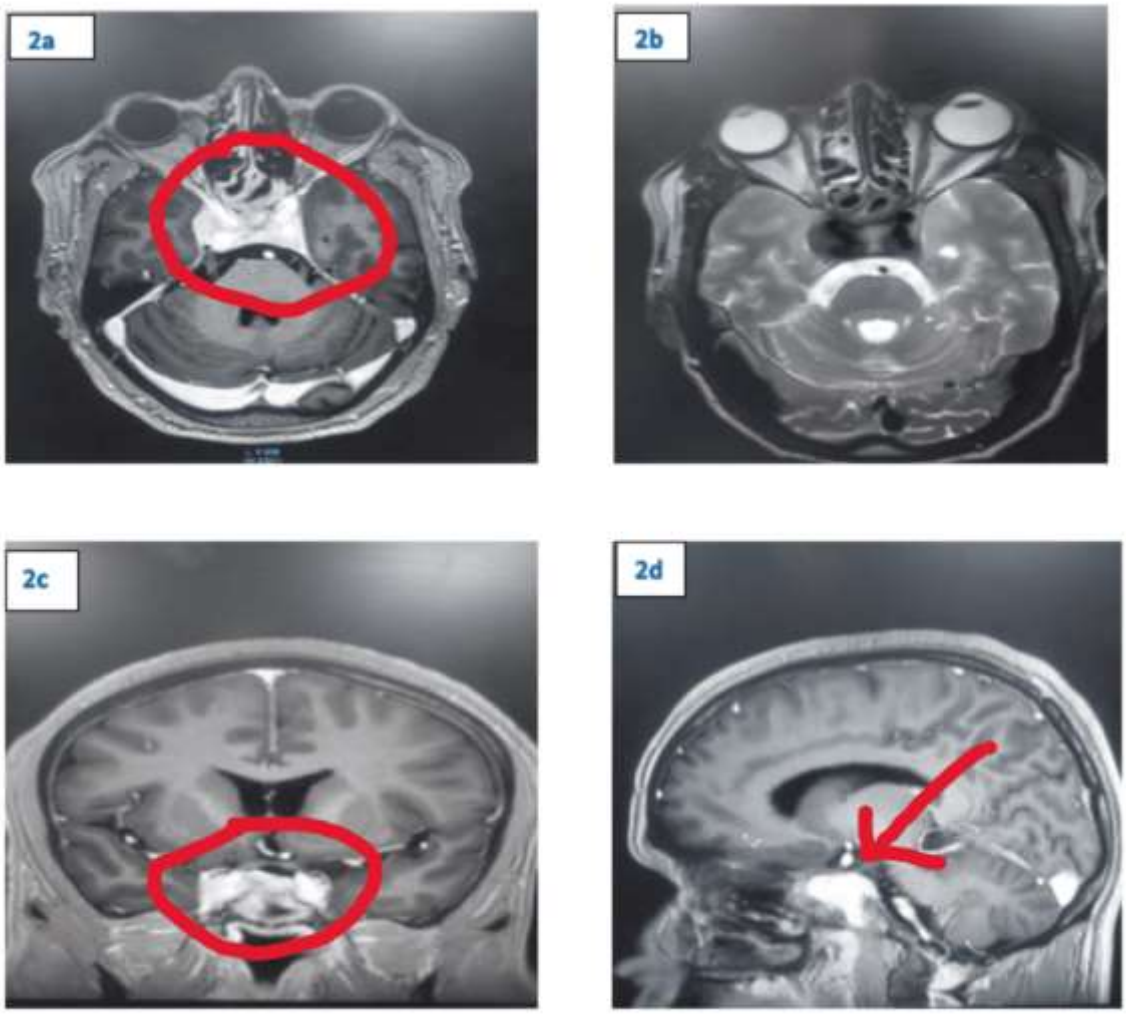

Figure 2: CEMRI BRAIN showing sellar suprasellar mass of size 19x39x21mm invading parasellar structures involving cavdernous sinus with lateral bulging -isointense in T1,hypointense on T2, moderate homogenous contrast enhancement, encasing b/l ica ,extending gto suprasellar cistern, upto orbital apex anterolaterally, with diffuse mucosal thickening in sphenoid and paranasal sinuses
2a-T1 contrast axial,2b- T2 axial,2c-T1 contrast coronal,2d-T1 contrast sagittal
Original clinical image from the same 35-year-old patient, showing radiological correlation of the lesion. Written informed consent for publication was obtained from the patient.
Based on imaging characteristic, antigen test positivity fungal invasion suspected and started on injectable voriconazole followed tab voriconazole for 5-6 weeks. Ptosis resolved within 2 weeks. On repeat scan after 6 monthCEMRI brain -4.5mmx11x10 mm sellar suprasellar invasive lesion e/o significant decrease in size of lesion with complete resolution of symptoms(fig *3*).

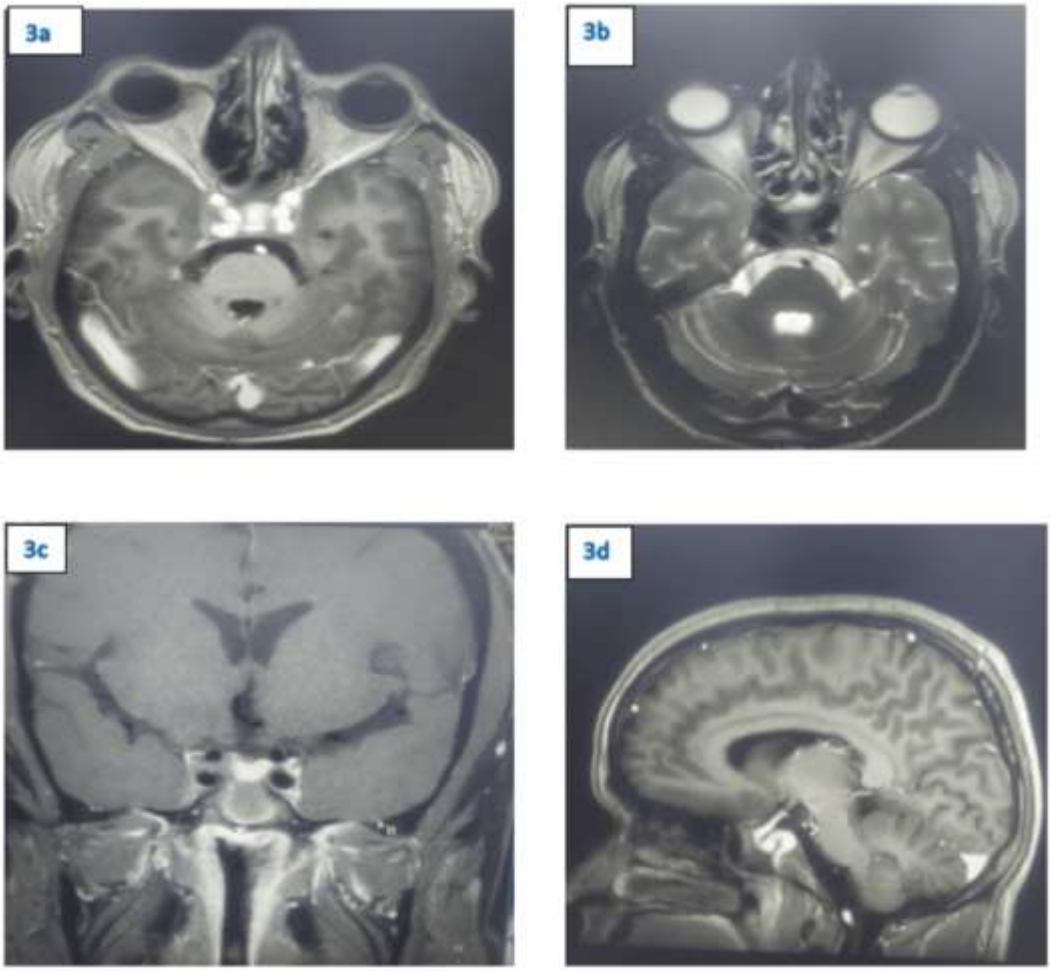

Figure 3: CEMRI brain showing 4.5mmx11x10 mm sellar suprasellar invasive lesion along the right cavernous sinus showing isointense signal intensity on T1, mild contrast enhancement and hypo intense on T2 -significant decrease in size noted as per previous scan 6 months back

3a- T1 CONTRAST AXIAL, 3b-T2 ,3c- T1 CONTRAST CORONAL AND 3d- T1 CONTRAST SAGITTAL

Original clinical image from the same 35-year-old patient, showing radiological correlation of the lesion. Written informed consent for publication was obtained from the patient.

No e/o immune-comprimised state was found. Patient is still being followed up with 6 monthly cemri brain.

Discussion

Fungal infections of the pituitary gland are uncommon but clinically significant because they often mimic pituitary tumors both clinically and radiologically, leading to diagnostic delays [1,3]. The infection may reach the sellar region through direct extension from adjacent paranasal sinus fungal disease or through hematogenous spread [3].

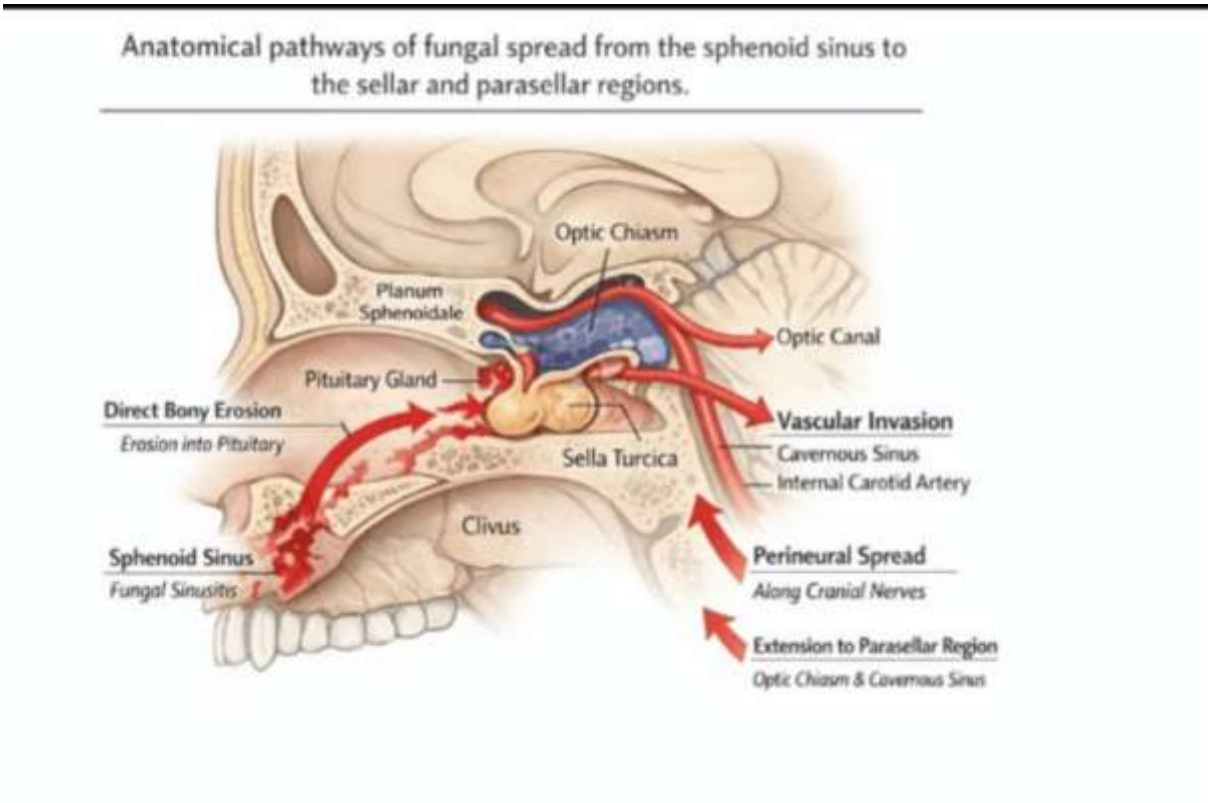

Figure 4: fungal spread pathways

Fig obtained using BIORENDER software

Aspergillus species are among the most frequently reported pathogens in such cases [2,5]. Imaging findings are often nonspecific, and definitive diagnosis is usually established through histopathological examination demonstrating fungal elements [3,5].

Management typically involves a combination of surgical intervention and systemic antifungal therapy. Surgical decompression helps relieve mass effect and allows for tissue diagnosis, while antifungal medications such as voriconazole or amphotericin B are essential for eradication of the infection [2,5]. In certain cases where the diagnosis is established early, patients have shown good response to antifungal therapy alone without extensive surgical procedures [5]. Early recognition and appropriate treatment are important to prevent complications such as persistent endocrine dysfunction, visual loss, or intracranial spread of infection.

Study Limitations

This report is limited by its single-case nature, which restricts the generalizability of the findings and prevents broader conclusions about disease patterns or treatment outcomes. Furthermore, the absence of histopathological confirmation represents a significant limitation, as tissue-based diagnosis remains the gold standard for establishing definitive evidence of fungal infection. Reliance on clinical and radiological features alone, while informative, cannot fully exclude alternative etiologies. These constraints highlight the need for cautious interpretation of the present findings and underscore the importance of larger, histopathologically validated studies to strengthen diagnostic accuracy and clinical applicability.

Conclusions

Fungal infections involving the pituitary region are rare but important differential diagnoses for sellar and suprasellar masses. Because their clinical and radiological features often mimic pituitary tumors, these infections can easily be misdiagnosed, particularly in immunocompromised patients. Symptoms usually arise from mass effect on surrounding structures and may include headache, visual impairment, ophthalmoplegia, and varying degrees of hypopituitarism. Accurate diagnosis relies on a high index of suspicion supported by imaging findings and definitive histopathological confirmation. Early recognition is crucial, as management differs significantly from neoplastic lesions and typically involves antifungal therapy with or without surgical intervention for decompression or drainage. In selected cases, patients have shown favorable outcomes with antifungal therapy alone once the correct diagnosis is established.

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