

Research Article

Radiating Petals: A Case of Planum Sphenoidale Meningioma Presenting with Seizures and Anosmia, Resected via Suprabrow Keyhole Craniotomy

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ABSTRACT

Background: Planum sphenoidale meningiomas are uncommon anterior skull-base tumors that classically present with anosmia, seizures, and behavioral change once they reach sufficient size to compress adjacent neurovascular structures.

Case Presentation: We report a 44-year-old woman who presented with seizures, progressive anosmia, and behavioral change that progressed to altered sensorium refractory to anticonvulsant therapy (Glasgow Coma Scale 6/15). Contrast-enhanced magnetic resonance imaging (MRI) demonstrated a large extra-axial anterior cranial fossa mass (6.2 × 5.9 × 4.5 cm) involving the cribriform plate, nasal cavities, olfactory groove, orbital roof, sella, and clinoidal triangle. The patient underwent a suprabrow keyhole craniotomy through a 4 × 1 cm bone window, with complete microsurgical excision of the tumor. Histopathology confirmed a WHO Grade 1 meningioma, and the patient had an uneventful recovery with a favorable cosmetic outcome.

Conclusion: Multi-structural extension of planum sphenoidale meningiomas can produce a combination of seizures, anosmia, and behavioral disturbance. The suprabrow keyhole craniotomy is a safe, effective, and cosmetically favorable alternative to conventional transcranial approaches for complete excision of these tumors.

Keywords: Planum Sphenoidale Meningioma, Anosmia, Seizure, Suprabrow Keyhole Craniotomy, Anterior Skull Base, Minimally Invasive Neurosurgery.

INTRODUCTION

Meningiomas are the most common primary intracranial neoplasms, arising from arachnoid cap cells and accounting for the majority of non-malignant brain and central nervous system tumors¹. The fifth edition of the World Health Organization Classification of Tumors of the Central Nervous System (WHO CNS5) treats meningioma as a single tumor type, graded 1 to 3 on histological and molecular criteria, with most lesions behaving as WHO Grade 1².

Planum sphenoidale meningiomas are uncommon, accounting for approximately 2% of intracranial tumors, and arise from the dura overlying the planum sphenoidale between the tuberculum sellae and the limbus sphenoidale^{3,4}. Owing to their midline location, these tumors may extend into the sella, olfactory groove, orbital roof, and clinoidal triangle, and the resulting clinical picture depends heavily on the direction and extent of this growth^{4,5}.

Common presenting features include seizures, anosmia, personality and behavioral change, and headache; visual disturbance and cognitive decline become more prominent as the tumor

enlarges and compresses the optic apparatus and frontal lobes^{4,5}. On imaging, these tumors typically appear as homogeneously enhancing, dural-based extra-axial masses, often with a "spoke-wheel" or sunburst pattern of radiating feeding vessels and an associated dural tail^{5,6}.

Because early manifestations can be nonspecific—dominated by memory difficulty, mood change, or personality alteration—patients are occasionally misdiagnosed with a primary psychiatric or dementing illness before imaging identifies the underlying mass⁷.

Surgical resection remains the mainstay of treatment³. Conventional transcranial routes such as bifrontal, pterional, or orbitozygomatic craniotomy provide wide exposure but require extensive scalp and bone dissection, greater brain retraction, and a longer recovery. The suprabrow (supraorbital) keyhole craniotomy, performed through a small eyebrow incision, has emerged as a minimally invasive alternative for anterior skull-base and parasellar lesions, offering resection rates comparable to open craniotomy with reduced morbidity and superior cosmesis^{8,9}. We describe a patient with a large planum sphenoidale meningioma

presenting with seizures, anosmia, and altered sensorium, successfully treated by suprabrow keyhole craniotomy.

Case Report

A 44-year-old woman presented with a several-month history of seizures, progressive anosmia, and behavioral change. She subsequently developed altered sensorium refractory to anticonvulsant medication, prompting hospital admission. On examination, she had bilateral loss of smell, early papilledema, and a Glasgow Coma Scale (GCS) score of 6/15.

Contrast-enhanced MRI of the brain revealed a large extra-axial mass measuring $6.2 \times 5.9 \times 4.5$ cm arising from the anterior cranial fossa,

involving the cribriform plate, nasal cavities, olfactory groove, orbital roof, sella, and clinoidal triangle (Figure 1).

Given the mass effect and depressed sensorium, the patient underwent a suprabrow keyhole craniotomy through a bone window measuring approximately 4×1 cm (Figure 2), with complete microsurgical excision of the tumor (Figure 3). Histopathological examination confirmed a WHO Grade 1 meningioma. Postoperative CT of the brain showed no residual tumor or hemorrhage (Figure 4), and the patient made an uneventful recovery with a favorable cosmetic outcome (Figure 5).



Figure 1a. Preoperative sagittal contrast-enhanced MRI showing a large anterior cranial fossa mass.

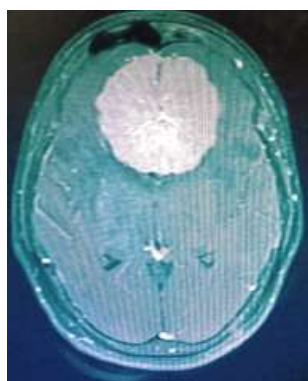


Figure 1b. Preoperative axial contrast-enhanced MRI showing the extra-axial mass with mass effect on the frontal lobes.

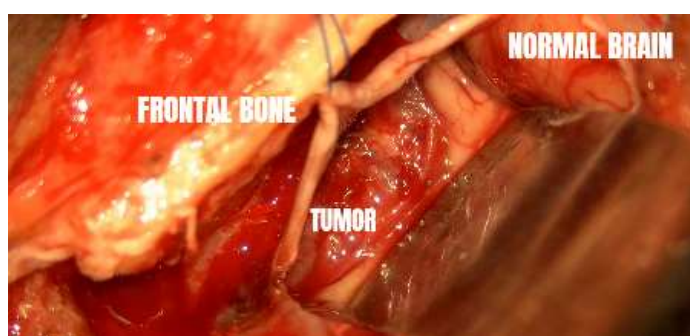


Figure 2. Intraoperative view following suprabrow keyhole craniotomy, showing the tumor, frontal bone, and adjacent normal brain.



Figure 3. The suprabrow keyhole bone flap, measuring approximately 4 × 1 cm.

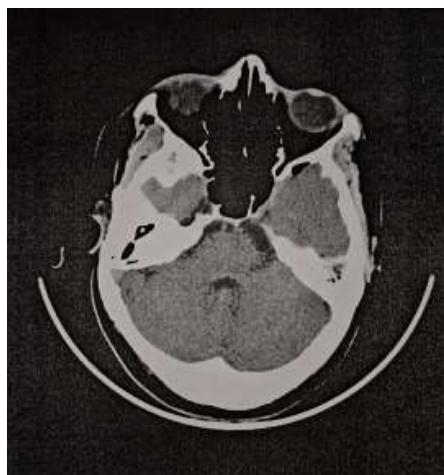


Figure 4. Postoperative axial CT of the brain showing no residual tumor or hemorrhage.



Figure 5. Postoperative clinical photograph demonstrating a favorable cosmetic outcome through the eyebrow incision.

DISCUSSION

Planum sphenoidale and olfactory groove meningiomas share overlapping anatomy and clinical behavior and are often grouped together as anterior midline skull-base meningiomas^{4,10}. Owing to their slow growth, these tumors frequently reach a considerable size before becoming symptomatic, and when

behavioral or cognitive change predominates, patients may first be evaluated for a primary psychiatric or dementing illness before the underlying mass is identified⁷.

In the present case, extension of the tumor into the cribriform plate, olfactory groove, orbital roof, sella, and clinoid triangle accounts for the combination of anosmia, seizures, and

behavioral disturbance, and mirrors the pattern reported in larger surgical series of suprasellar and planum sphenoidale meningiomas, in which seizure, headache, and anosmia are among the most frequent non-visual presenting complaints⁴.

Early surgical resection remains the cornerstone of management and is generally associated with excellent outcomes for WHO Grade 1 lesions³. Conventional transcranial approaches provide wide surgical corridors but require extensive exposure, greater brain retraction, and longer recovery. The suprabrow keyhole craniotomy, performed through an eyebrow incision and a small bone window—4 × 1 cm in the present case—achieves resection rates for anterior skull-base meningiomas comparable to open craniotomy while minimizing brain retraction, operative morbidity, and hospital stay, with a markedly superior cosmetic result^{8,9,10}. Series of the supraorbital eyebrow approach for anterior cranial base and parasellar pathology report favorable clinical outcomes in the majority of patients, and gross-total resection rates for skull-base meningiomas exceeding 85%–95% have been reported in experienced hands^{8,9}.

The keyhole corridor does restrict the surgical field relative to an open craniotomy and can increase blind spots at the tumor periphery, so careful case selection based on tumor size, vascular encasement, and surgeon experience remains essential to achieving safe, complete resection⁹.

CONCLUSION

Planum sphenoidale meningiomas with multi-structural extension can present with a combination of seizures, anosmia, and behavioral change. The suprabrow keyhole craniotomy is an effective, safe, and cosmetically favorable approach for complete excision of these tumors, and early surgical management with meticulous microsurgical technique ensures excellent neurological and functional recovery.

Conflicts of Interest and Consent

The authors declare no conflicts of interest. Written informed consent was obtained from the patient for publication of this case report and the accompanying clinical images.

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