

Giant Recurrent Fronto-temporal Meningioma Presenting with Proptosis in Patient with Skull Defect. A Case Report

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Abstract

Giant asymptomatic meningiomas are rare since these patients usually present with symptoms of increased intracranial pressure and focal signs. We report a case of a giant recurrent asymptomatic meningioma in a patient with a skull defect.

Case Description: A 56-year-old woman visited an ophthalmologist due to a protruding right eye. The patient had a skull defect following meningioma resection 20 years earlier. An MRI revealed a giant recurrent fronto-temporal meningioma extending into the orbit and temporal fossa. The patient had a 10 x 12 cm parietofrontal bone defect. She underwent gross tumor resection through an orbitozygomatic approach. Following tumor removal, cranioplasty was performed using methyl acrylate hydroxyapatite to reconstruct the vault and posterior orbital wall. The patient recovered without any neurological deficits.

Conclusion: Giant meningiomas in non-eloquent brain areas typically manifest with intracranial hypertension. In cases involving a preexisting skull defect, the recurrence of a tumor may go unnoticed. This case underscores the importance of regular long-term follow-up for low-grade meningiomas.

Keywords: Meningioma, Cranioplasty, Brain Tumor, Intracranial Pressure, Orbital Tumor

Abbreviations

GTR- Gross total Resection

MRI- Magnetic Resonance Imaging

Introduction

Meningiomas are a group of extra axial tumors that arise from arachnoid cap cells in the arachnoid layer of the brain and spinal cord [1].

Most meningiomas are thought to be benign, and frequently discovered incidentally, with an annual incidence of 7.86 cases per 100,000 individuals [2].

In comparison to North America or Europe, Africa has a higher prevalence of meningiomas [1].

Meningiomas are graded from 1 (low grade) to 3 (highgrade/anaplastic). While safe gross total resection (GTR) is the goal of surgical treatment, adjuvant radiation therapy is recommended

for grade III meningiomas, not typically recommended for grade II meningiomas, and not indicated for grade I meningiomas following GTR or subtotal resection [3].

Even after GTR, there is still a 24 to 32 percent probability of recurrence in patients with a high Simpson grade, young age, perifocal edema, atypical and anaplastic subtypes, and skull base location. Recurrence develops in the same location in about 95% of recurrences.

Meningioma symptoms location-dependent i.e., meningiomas in non-eloquent brain (e.g., anterior fossa meningiomas) are usually diagnosed incidentally or when they grow large enough to cause increased intracranial pressure before causing focal symptoms, in keeping with the Monroe-Kellie doctrine. In contrast, small meningiomas in an eloquent zone can be symptomatic.

We present a case of a 56-year-old woman with a frontotemporal skull defect and a large asymptomatic recurrent meningioma.

Case Description

A 56-year-old woman, presented to the ophthalmology clinic with slowly progressive proptosis with no other signs and symptoms. On ophthalmology assessment no other abnormalities were noted. She had a 10x12cm frontotemporal skull defect (fig. 1). She had previously undergone craniectomy for meningioma resection 20 years prior with no cranioplasty. There were no signs of increased intracranial pressure on examination.

MRI performed on admission showed a large extra-axial tumor in the region of the previous craniectomy, with extension into the right orbit anteriorly and temporal fossa inferiorly. The right eyeball was compressed posteroinferiorly. The optic nerve was free from tumor invasion (fig. 1).

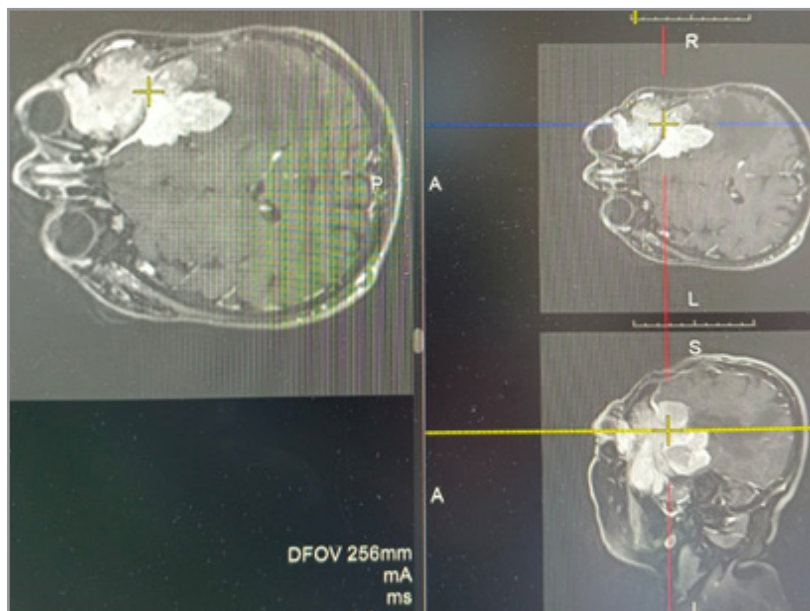


Figure 1: Preoperative MRI Showing a frontotemporal tumor invading into the right orbit and infratemporal fossa. The patient also had a frontotemporal skull defect.

The patient underwent surgery on day 3 of admission. The skin was opened along the previous scar to expose the craniectomy defect.

The Dura invaded by the tumor was clearly visualized and opened. The craniectomy window was extended into an orbito-zygomatic craniotomy to reach the tumor in the orbit and temporal fossa (fig. 2A).

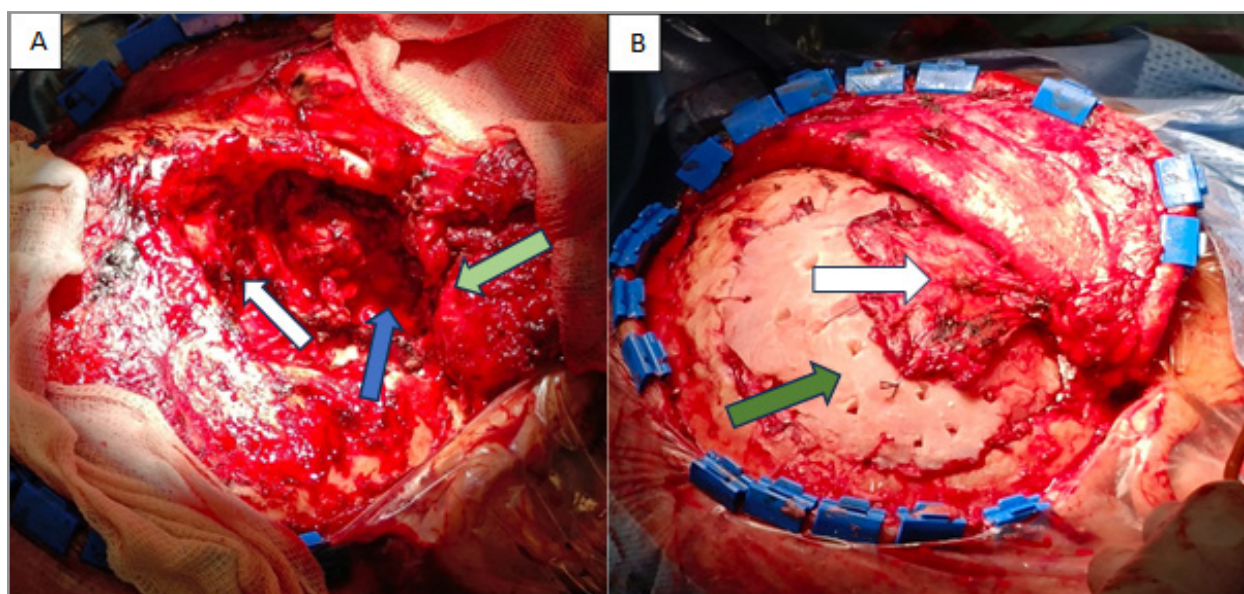


Figure 2: Intraoperative images: during tumor removal showing the temporal muscle (green arrow), tumor in the temporal fossa (blue arrow), and the orbit (white arrow). B – Cranioplasty using methyl acrylate hydroxyapatite (green arrow). The temporalis muscle is sutured to the methyl acrylate (white arrow)

Gross total resection was achieved and duroplasty was performed using synthetic dura. Cranioplasty was performed using methyl acrylate hydroxyapatite (fig. 2B).

The patient recovered with no neurological deficit and no worsening of vision in the affected eye. Postoperative CT and MRI were non-remarkable. Histology showed grade 1 psammomatous meningioma and adjuvant radiotherapy was not needed.

Discussion

Meningioma symptoms vary depending on the location and mechanism involved. These mechanisms include irritation of the underlying cortex, compression of the cranial nerves and blood vessels, spreading to the underlying tissues. Meningiomas have been reported to increase in size during pregnancy due to the presence of progesterone receptors [4, 5].

Depending on the location, symptoms may include behavioral change for subfrontal meningiomas, Kennedy-Foster syndrome (anosmia, ipsilateral optic atrophy, and contralateral papilledema) for olfactory groove, and multiple palsies (cranial nerves II, III, IV, V, and VI) [6].

Meningiomas can be classified as small i.e., <3cm and large when >3cm. Meningiomas are referred to as giant when >5cm [7]. Tumors growing in non-eloquent cortex tend to be asymptomatic until there is a significant increase in intracranial pressure causing compression or herniation. However, even small tumors growing on eloquent cortex may present with neurological deficit early hence rarely reach large or giant size.

Other than compression, the steal phenomenon may also cause neurological deterioration. Despite being over the primary motor cortex, our patient did not present with neurological deficits due to the absence of increase in ICP [8]. The patient had a large frontoparietotemporal cranial defect from a meningioma resection 20 years prior. Cranioplasty was not performed during that surgery. The tumor recurrence was not diagnosed early due to lack of neurological deficits.

Despite living with a cranial defect, the patient did not report any symptoms related to syndrome of the trephined (dizziness, excessive fatigability, vague discomfort at the defect site, a sense of unease and insecurity, mental depression, or vibration sensitivity) [9]. These symptoms usually resolve with cranioplasty. The patient did not present to the hospital until the tumor had invaded the orbit causing proptosis.

The patient was not followed up after the first surgery considering it was a grade 1 meningioma. According to the Simpson grading system, only grade III and IV resections have been associated with an elevated risk of tumor recurrence. The drawbacks of the Simpson classification are most obvious in grade IV resections, even though it is still the most well-established technique for estimating the extent of resection without using imaging.

Since the results from Simpson strongly imply that the amount of tumor tissue removed after surgery affects the likelihood of

a recurrence, it is crucial to classify both little tissue remains and significant residuals following tumor debulking as grade IV resections [10]. Considering that recurrence occurring as long as 20 years post GTR, regardless of Simpson grade resection, these patients would benefit from regularly very long-term follow-up.

Conclusion

Giant meningiomas in non-eloquent brain areas typically manifest with intracranial hypertension. In cases involving a preexisting skull defect, the recurrence of a tumor may go unnoticed. This case underscores the importance of regular long-term follow-up for low-grade meningiomas.

Key Takeaways

1. In the presence of skull defect, a meningioma in an eloquent zone maybe asymptomatic due to the absence of compression.
2. Recurrence of meningiomas can occur as long as 20 years post gross total resection.
3. Long term scheduled radiological follow-up is necessary to identify recurrence early.

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Conflicts of Interest

None

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Ethics Approval and Informed Consent

Informed consent was obtained from the patient.

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