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Giant Olfactory Meningioma Complicated by Postoperative Brain Abscess: A Rare Case Report

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Abstract— Background: Olfactory meningiomas are rare tumors originating from olfactory groove dura cells, accounting for a small percentage of intracranial meningiomas. They present with visual disturbances, olfactory dysfunction, and severe headaches. Diagnosis is made using MRI, showing well-defined masses with specific enhancement patterns. Multidisciplinary management involves surgical resection while preserving neurological function. We present a case of a giant olfactory meningioma complicated by a postoperative brain abscess, emphasizing the significance of timely recognition and treatment of infectious complications. Case Presentation: A 58-year-old male with worsening symptoms of severe headaches, visual and olfactory disturbances, and declining visual acuity was diagnosed with a giant olfactory meningioma. MRI revealed a large tumor in the olfactory groove, compressing surrounding structures. A multidisciplinary team planned a bifrontal craniotomy for maximal safe resection. Postoperatively, the patient developed fever, headaches, and confusion. Imaging confirmed a brain abscess at the surgical site, likely due to infection. Empiric antibiotics were initiated, and a stereotactic aspiration was performed, yielding Staphylococcus aureus growth. Antibiotics were adjusted accordingly, leading to gradual improvement in the patient's condition. Intravenous antibiotics were continued for two weeks, and close monitoring for treatment response and residual deficits was conducted. Conclusion: Giant olfactory meningiomas require a multidisciplinary approach and consideration of complications. Our case highlighted a rare postoperative brain abscess as an infection. Prompt recognition, accurate diagnosis, and targeted antibiotics are crucial. Preventive measures during surgery should minimize infectious risks

Keywords— Olfactory, Meningioma

1. Introduction

Background

Olfactory meningiomas are rare tumors that originate from the meningoepithelial cells of the olfactory groove dura. They represent a small proportion of intracranial meningiomas, typically accounting for 1-5% of cases [3,6]. These tumors are predominantly located in the anterior cranial fossa, centered on the olfactory groove, and can exert mass effect on surrounding structures such as the optic chiasm and olfactory bulbs [5]. Olfactory meningiomas present with a progressive and insidious clinical course, often characterized by visual disturbances, olfactory dysfunction, and severe headaches [6]. Magnetic resonance imaging (MRI) is the imaging modality of choice for diagnosis, revealing well-circumscribed masses with characteristic enhancement on T1-weighted images and hyperintensity on T2-weighted images.

The management of olfactory meningiomas requires a multidisciplinary approach involving neurosurgeons, neurologists, and radiologists. Surgical resection is typically the primary treatment modality, aiming to achieve maximal safe resection while preserving neurological function [5]. The choice of surgical approach, such as craniotomy or endoscopic endonasal techniques, depends on tumor characteristics and surgeon expertise. However, despite the generally favorable prognosis, rare complications can arise. In this case report, we present the case of a giant olfactory meningioma complicated by a postoperative brain abscess, highlighting the importance of prompt recognition and

management of infectious complications.

Case Presentation

A 58-year-old male presented to the neurology clinic with a six-month history of progressively worsening symptoms. He complained of severe headaches, visual disturbances, and olfactory disturbances. The patient reported a gradual decline in visual acuity, accompanied by intermittent diplopia. Additionally, he experienced difficulty in identifying odors and noticed a persistent foul smell.

The patient had a history of well-controlled hypertension treated with antihypertensive medications. There were no significant previous head traumas or neurological disorders.

Upon physical examination, the patient appeared alert and oriented, with normal vital signs. Neurological examination did not reveal any focal motor or sensory deficits. However, bilateral visual field defects were observed during confrontation testing. Cranial nerve examination indicated anosmia, particularly for unpleasant odors.

Magnetic Resonance Imaging (MRI) of the brain was performed to assess the underlying pathology. The T1-weighted MRI revealed a large, well-circumscribed, enhancing mass in the anterior cranial fossa, centered on the olfactory groove. The T2-weighted MRI showed the mass to be hyperintense, exerting mass effect on surrounding structures, including compression of the optic chiasm and bilateral olfactory bulbs (Figure 1).

Based on the clinical history and imaging findings, a working diagnosis of a giant olfactory meningioma was established. Olfactory meningiomas are rare tumors that originate from the meningoepithelial cells of the olfactory groove dura.

Considering the size and location of the meningioma, the patient was referred to the neurosurgical department for further evaluation and management. A multidisciplinary team comprising neurosurgeons, neurologists, and anesthesiologists reviewed the case and planned the surgical intervention.

Given the giant size of the meningioma and its proximity to critical structures, a multidisciplinary approach was deemed necessary. The team decided on a bifrontal craniotomy.

The primary goal was to achieve maximal safe resection while preserving neurological function.

Following the surgical resection, the patient was admitted to the neurosurgical intensive care unit (ICU) for close monitoring. He received prophylactic antibiotics, analgesics, and antiepileptic drugs. Regular neurological assessments, including visual acuity, cranial nerve examination, and assessment of olfactory function, were performed.

The excised tumor was sent for histopathological examination. The histopathology report confirmed the diagnosis of an olfactory meningioma. The tumor displayed characteristic features, including whorls of meningothelial cells, psammoma bodies, and immunoreactivity for epithelial membrane antigen (EMA) and vimentin.

Two weeks after the surgery, the patient presented with new-onset symptoms, including fever, worsening headaches, and confusion. A thorough clinical evaluation was conducted to determine the cause of these postoperative complications.

The patient exhibited signs of systemic infection, including an elevated body temperature of 38.5°C (101.3°F). Neurological examination revealed altered mental status and cognitive impairment. The patient complained of severe, throbbing headaches that were refractory to analgesics. No focal motor or sensory deficits were detected during the examination.

Repeat Magnetic Resonance Imaging (MRI) of the brain revealed a new ring-enhancing lesion with surrounding edema in the region of the surgical site. Based on the clinical presentation and imaging findings, the working diagnosis was a postoperative brain abscess, likely secondary to infection at the surgical site (Figure 2).

The patient was immediately started on empiric intravenous antibiotics, targeting common pathogens associated with brain abscesses. The antibiotic regimen included broad-spectrum coverage against Gram-positive, Gram-negative, and anaerobic organisms. Neurosurgical consultation was obtained to consider surgical intervention, such as drainage or aspiration of the abscess.

After discussion with the neurosurgical team, a decision was made to perform a stereotactic aspiration of the brain abscess. The procedure was performed under image guidance, and a sample of the abscess fluid was sent for culture and sensitivity testing.
The culture results demonstrated the growth of Staphylococcus aureus, indicating a bacterial etiology of the brain abscess. The antibiotic regimen was adjusted based on the susceptibility profile of the isolated organism.
Following the surgical intervention and initiation of targeted antibiotic therapy, the patient showed gradual improvement in his clinical condition. The fever subsided, and the headaches gradually resolved. The patient continued to receive intravenous antibiotics for two weeks. Close monitoring for any signs of treatment response failure or recurrence was emphasized. Additionally, the patient received supportive care to address any residual neurological deficits and to optimize his overall recovery.

Discussion:
Giant olfactory meningiomas are rare tumors that pose unique challenges due to their size and proximity to critical structures. In this case, we presented a 58-year-old male with a giant olfactory meningioma who developed a postoperative brain abscess. The clinical presentation of our patient included severe headache, visual disturbances, and olfactory disturbances. These symptoms are consistent with previous reports of olfactory meningiomas, which often manifest as a progressive decline in visual acuity, visual field defects, and olfactory dysfunction [2]. The presence of bilateral visual field defects and anosmia, particularly for unpleasant odors, were key findings during neurological examination, indicating the involvement of critical structures such as olfactory bulbs.

Imaging studies, including MRI, played a crucial role in diagnosing and characterizing the tumor. The MRI findings revealed a large, well-circumscribed mass in the anterior cranial fossa, centered on the olfactory groove, with compression of surrounding structures. These imaging characteristics are consistent with those described in previous studies on olfactory meningiomas. The presence of enhancement on T1-weighted images and hyperintensity on T2-weighted images is typical for meningiomas and helps differentiate them from other intracranial masses [8].

The treatment of giant olfactory meningiomas requires a multidisciplinary approach involving neurosurgeons, neurologists, and anesthesiologists [6]. In our case, a bifrontal craniotomy was chosen to achieve maximal safe resection while preserving neurological function. This approach has been widely reported in the literature and allows for adequate exposure and resection of tumors in the anterior cranial fossa. However, despite meticulous surgical techniques, our patient developed a postoperative brain abscess, highlighting the potential infectious complications associated with surgical interventions in the proximity of the nasal cavity and skull base.

The development of a brain abscess following meningioma surgery is a rare but serious complication [1]. In our case, the patient presented with fever, worsening headaches, and altered mental status, indicating systemic infection. Repeat MRI showed a new ring-enhancing lesion with surrounding edema at the surgical site, consistent with a brain abscess. Prompt initiation of empiric intravenous antibiotics targeting common pathogens associated with brain abscesses was crucial in managing this infectious complication. The decision to perform stereotactic aspiration of the abscess allowed for diagnostic sampling and identification of the causative organism, which was Staphylococcus aureus in our case. Adjusting the antibiotic regimen based on the susceptibility profile of the isolated organism facilitated targeted therapy and subsequent clinical improvement.
Comparing our case with the existing literature, there have been limited reports of postoperative brain abscesses following meningioma surgery. However, infectious complications, including abscess formation, are known complications in other surgical procedures involving the skull base and nasal cavity [4]. The development of brain abscesses in these cases is thought to be related to the disruption of

the nasal mucosa and the introduction of pathogens from the nasal cavity [1]. Proper preoperative and intraoperative measures, such as prophylactic antibiotics, meticulous surgical techniques, and nasal cavity irrigation, have been proposed to reduce the risk of infectious complications [4].

3. Conclusion

In conclusion, the management of giant olfactory meningiomas requires a multidisciplinary approach and careful consideration of potential complications. Our case highlighted the occurrence of a postoperative brain abscess as a rare infectious complication following meningioma surgery. Prompt recognition, appropriate diagnostic evaluation, and targeted antibiotic therapy are essential in the management of such complications. Comparisons with the existing literature emphasize the importance of preventive measures during surgery to minimize the risk of infectious complications. Further studies and accumulation of cases are warranted to develop standardized protocols and guidelines for the management of giant olfactory meningiomas and associated infectious complications.

4. References

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Tables and Figures legends :

Figure 1: Pre-operative MRI

Figure 2: Post-operative MRI

Figure 1: Pre operative MRI

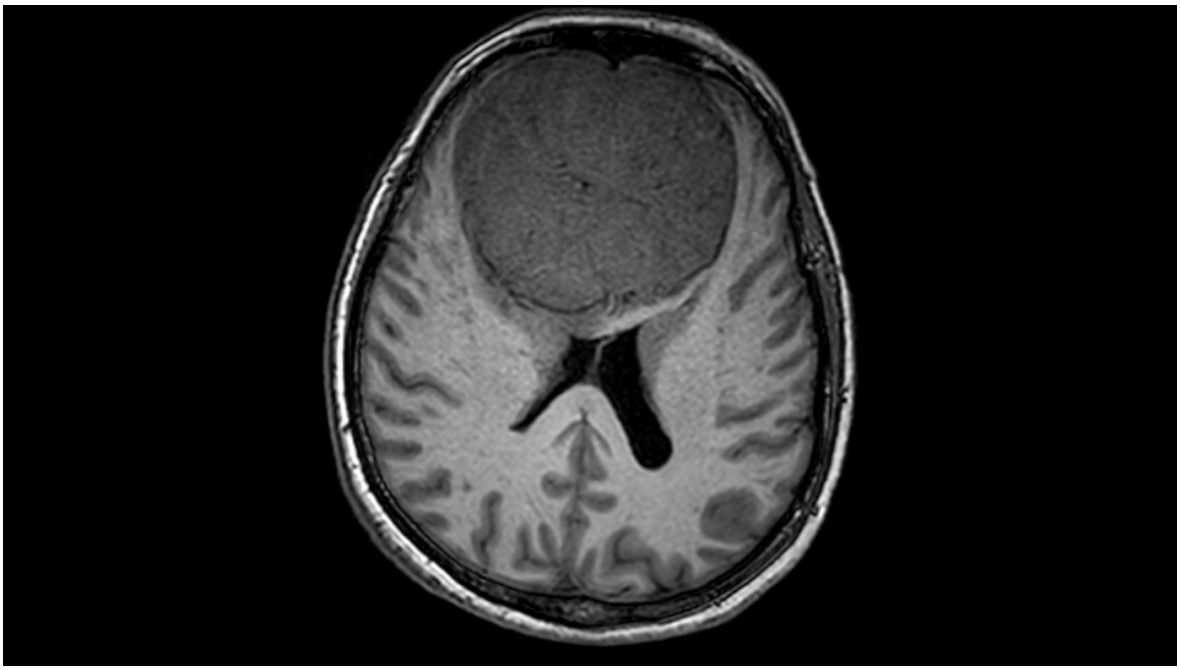

Figure 2: Post operative MRI