

A Case Report of Speech Arrest Following Meningioma Resection in Elderly Patients

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ABSTRACT

Meningiomas, benign tumors arising from the meninges, present unique challenges in treatment due to their varied clinical behaviors and potential for complications. This case report documents the surgical management and early postoperative complications in a 75-year-old male patient with a large meningioma affecting speech production due to its proximity to Broca's area. Despite meticulous surgical technique and postoperative care, the patient experienced prolonged speech arrest, which persisted beyond initial expectations. This case emphasizes the complexities in managing meningiomas, especially in elderly patients with comorbidities, and highlights the critical considerations in surgical decision-making and postoperative monitoring.

Keywords: Meningioma, Surgical resection, Elderly patients, Speech arrest, Complications, Postoperative care.

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INTRODUCTION

Meningiomas are often benign tumors arising from the meninges, the protective membranes surrounding the brain and spinal cord. The surgical excision of meningiomas aims to remove the tumor while preserving the surrounding healthy brain tissue. Meningioma excision is specifically used to treat these tumors, which develop from arachnoid cells located between the brain and the cranium, in the ventricles, and down the spinal canal. Meningiomas are slow-growing tumors of the central nervous system that are well demarcated from surrounding tissues. They are typically non-infiltrative neoplasms with benign characteristics, though a small percentage (1.7%) are histologically classified as malignant and can exhibit rapid growth similar to malignant tumors.¹

The etiology of meningiomas involves multiple factors, including ionizing radiation, head trauma, hormones, genetic predisposition, and environmental influences. Studies have shown that even low levels of ionizing radiation are a significant risk factor for meningioma.^{2,3} Genomic aberrations are common in meningiomas, with the most prevalent being the functional loss of the neurofibromatosis type 2 gene, which encodes Merlin,

seen in 40 to 60% of cases. This loss is often due to chromosome 22 deletion.⁴

Additionally, the development of meningiomas has been linked to hormonal factors, head trauma, and genetic influences.^{2,3} Certain microRNAs and epigenetic changes also contribute to the tumor's development, progression, and recurrence.⁵ Meningiomas result from a complex interplay of molecular, environmental, and genetic factors. The World Health Organization classifies meningiomas into three grades based on their histological features and clinical behavior.⁶

Grade 1 meningiomas are the most common and are low-grade tumors, meaning they grow slowly. Grade 2, or atypical meningiomas, have a higher likelihood of recurrence after removal. Chordoid and clear cell meningiomas are examples of grade 2 tumors. Grade 3 anaplastic meningiomas are malignant and grow rapidly, with papillary and rhabdoid meningiomas being subtypes of grade 3 tumors.⁴

The treatment plan for meningiomas depends on the tumor's grade, location, and the patient's overall health. Surgical resection, aiming to remove the entire tumor or as much as possible, is the most common treatment. Surgery can be performed using open or minimally invasive techniques, such as stereotactic radiosurgery or endoscopic surgery.⁷

Several factors influence the decision and timing of surgical intervention, including the patient's age, medical comorbidities, tumor size, presence of edema, and mass effect on surrounding



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brain tissue.⁸ However, complications can arise during treatment. For example, in this case, the patient experienced loss of speech due to damage to Broca's area during surgery.

CASE PRESENTATION

A 75-year-old male patient was admitted to the hospital with the primary complaint of a growing tumor on his head. He reported experiencing headaches and discomfort at the tumor site, which had been present for a year but had significantly increased in size over the past two months. Initially the size of a pea, the tumor had grown to cover a substantial portion of his head. Swelling on the left temporal region, 6 months progression not showing any growth. Film shows 5 × 1.5 × 6 cm lump fixed to the left temporal region. There was no history of smoking, however, the patient had some lung-related ailments. The patient did not take any prescribed medications for his condition, relying instead on over-the-counter pain relievers.

The patient had a history of tuberculosis and had completed a six-month course of tuberculosis medication. Given his active cough, the physician ordered a CT scan, blood work, and a tuberculosis test. The diagnosis was meningioma, a noncancerous tumor arising from the meninges surrounding the brain and spinal cord. Surgery was recommended as there is no medical treatment for this condition.

Preoperative medications included a tetanus toxoid injection (0.5 mL) and Xylocaine 2% injection. During surgery, the patient received general anesthesia and required a blood transfusion due to blood loss. The day after surgery, the patient was conscious and well-oriented but complained of a cough with expectoration, though without hemoptysis.

Vials and Biochemical Parameters

Parameter	Result	Reference Values
Blood pressure	140/78 mm Hg	120/80 mm Hg
Respiratory rate	14/min	12-18/min
Pulse rate	78/min	60-100/min
Saturation of peripheral oxygen	95%	99%
Blood glucose level	91 mg/dL	70-100 mg/dL

The patient received the following medications: Piptaz (4 g) administered intravenously twice daily, Cipro (200 mg) administered intravenously twice daily, Pan (40 mg) administered intravenously once daily, Mannitol (100 mg) administered intravenously once daily, Eptoin (75 mg) administered intravenously twice daily, Dynapar (75 mg)

administered intravenously twice daily, and normal saline (100 mL) administered intravenously per hour.

The patient's vitals were monitored regularly post-surgery. However, he was unable to speak immediately after the operation. Doctors estimated that speech would return within 1-2 days, but after seven days, he remained unable to speak. It was later determined that complications had arisen during surgery. The tumor was located in the frontal portion of the brain near Broca's area, responsible for speech production. Pressure applied to this area during surgery likely caused the patient's inability to produce or respond to speech.

DISCUSSION

Although meningiomas typically behave like benign tumors, they are associated with significant morbidity and mortality. Meningiomas are the most common primary intracranial tumors in adults and elderly patients.⁸ While surgery is the primary treatment for young patients, its application in elderly patients, especially those with pre-existing comorbidities, remains a topic of ongoing debate. Over recent decades, numerous studies have examined the risks of meningioma surgery in elderly patients.

Postoperative complications are particularly significant in neurosurgery, where early postsurgical complications not only increase healthcare costs but also are associated with higher morbidity and mortality compared to other surgical specialties. Morbidity rates after meningioma surgery for elderly patients have been reported at 7-69.6%, while for younger patients, the rates range from 8.8-57.5%.⁹

This case report focuses on the early complications following intracranial meningioma surgery. Previous studies have aimed to determine the severity of these complications and the need for surgical or intensive care management. In our case, the patient was unable to speak post-surgery; doctors initially estimated a recovery time of 1-2 days for speech to return, but the patient remained unable to speak for a prolonged period.^{10,11}

Speech arrest, a sudden interruption of the motor or language mechanisms of vocalization, should be distinguished from epileptic aphasia or aphasic fits. It is caused by stimulation or suppression of the supplementary motor area, likely due to a lesion in either the dominant or nondominant hemisphere.^{10,11} Studies have shown no correlation between the size and localization of a tumor and the different values of meningioma cells.¹

Postoperative complications such as bleeding, palsy, speech disorders, pneumonia, and renal insufficiency are more common in elderly patients. Cranial nerve disorder is one of the most frequently reported surgery-related complications.^{12,13} Boviatis *et al.* reported that postoperative bleeding, infections, and deep

vein thromboses were the three most common complications in elderly patients compared to younger patients in a study involving 108 elderly and 240 young patients.¹⁴

A follow-up three months after discharge revealed no intracranial abscesses in our patient. However, the patient exhibited focal neurological deficits such as left hemiparesis, hearing loss, and cognitive impairment. Meningiomas are the second most common intracranial tumor.¹⁵ Although surgical management remains the primary treatment with a high survival rate, neurological sequelae related to complications can significantly reduce patients' quality of life. Consequently, some authors discourage surgical treatment in patients older than 70 years due to the high mortality and morbidity rates associated with such surgeries.^{14,15}

CONCLUSION

In conclusion, this case emphasizes the challenges and complexities involved in the surgical management of meningiomas, particularly in elderly patients. Despite advancements in surgical techniques and perioperative care, complications such as speech arrest can significantly impact postoperative outcomes and patient quality of life. The persistent inability to speak observed in our patient highlights the delicate balance required in neurosurgical interventions, where meticulous attention to tumor localization and its proximity to eloquent brain areas is paramount.

Furthermore, the high morbidity rates associated with meningioma surgery in elderly populations underscore the need for careful patient selection and comprehensive preoperative assessment. While surgical resection remains the cornerstone of treatment, alternative management strategies may need to be considered for older patients with significant comorbidities, aiming to minimize surgical risks and optimize functional outcomes.

Future research efforts should continue to focus on refining surgical techniques, evaluating perioperative management strategies, and exploring non-surgical treatment modalities to improve outcomes in this vulnerable patient population. Ultimately, individualized treatment approaches that consider tumor characteristics, patient age, and overall health status are crucial for achieving favorable long-term outcomes in meningioma management.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

Cm: Centimeter; **CT:** Computed tomography; **dL:** Deciliter; **g:** Gram; **mg:** Milligram; **mL:** Milliliter; **mmHg:** Millimeters of mercury; **min:** Minute.

PATIENT CONSENT

The physician has obtained written informed consent from the patient for the publication of this case report.

SUMMARY

This case highlights the challenge of managing complications such as speech arrest postoperatively, emphasizing the need for thorough preoperative evaluation and careful consideration of surgical risks in elderly individuals. Despite advancements in neurosurgical techniques, including minimally invasive approaches, complications like neurological deficits can significantly impact patients' quality of life. Future research should continue to explore strategies to minimize surgical risks and optimize outcomes, especially in vulnerable populations such as elderly patients with complex medical histories.

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