

## Case Report

# Endoscopic Endonasal Management of Cavernous Sinus Hemangioma: A Case Report



Matin Akhbari<sup>1\*</sup>, Bilal Bahadır Akbulut<sup>1</sup>, Mustafa Serdar Bölük<sup>1</sup>, Taşkın Yurtseven<sup>1</sup>, Hüseyin Biçeroğlu<sup>1</sup>

1. Department of Neurosurgery, Faculty of Medicine, Ege University Izmir, Turkey.



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## ABSTRACT

**Background and Aim:** Cavernous sinus hemangiomas (CSH) are rare benign vascular tumors that can result in headaches, visual disturbances, and cranial nerve palsies due to their location within the cavernous sinus.

**Case Presentation:** A 56-year-old woman presented with a headache and blurred vision persisting for the last 3 months. There were no previous surgeries, allergies, or known diseases. Upon admission, a neurological examination revealed no cranial nerve involvement, motor or sensory deficits, or other vision disturbances. Cranial magnetic resonance imaging (MRI) was obtained, which showed a 16.1×17.9 mm T2 hyperintense lesion in the cavernous sinus. Endoscopic endonasal transsphenoidal was used for the removal of the tumor. Post-operative MRI revealed total removal of the tumor. Histopathological analysis confirmed the lesion to cavernous sinus hemangioma. There were no complications or recurrences during the 6-month follow-up.

**Conclusion:** This case demonstrates the successful application of endoscopic endonasal transsphenoidal surgery (EETS) for the complete resection of cavernous sinus hemangioma.

### \* Corresponding Author:

**Matin Akhbari, MD.**

**Address:** Department of Neurosurgery, Faculty of Medicine, Ege University Izmir, Turkey.

**Tel:** + 90 (232) 3905324

**E-mail:** [mat.akhbari@gmail.com](mailto:mat.akhbari@gmail.com)



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## Highlights

- Endoscopic endonasal transsphenoidal approach was chosen for the treatment of CSH.
- Gross tumor resection was achieved without any complications in the follow-up duration.
- This approach reduces the risk of complications such as hemorrhage and cranial nerve palsies.

## Plain Language Summary

This study reports a rare presentation of a vascular tumor in the cavernous sinus that lies within the cranium of a 56-year-old female. The patient was referred to the neurosurgery department with a headache and blurred vision. Following the clinical examinations, no signs of cranial nerve involvement, motor or sensory deficits, or other vision disturbances were observed. An 18×16×20 mm lesion was revealed in the magnetic resonance imaging (MRI) scans of the cavernous sinus. The tumor was surgically removed without complications, and the follow-up MRI verified total removal. The pathological analysis confirmed the tumor as a hemangioma, which is a rare vascular tumor. The patient had no complaints in the 6-month follow-up time. This case report presents a total removal of a rare vascular tumor in the cavernous sinus by surgical method without any complications. The gold standard treatment for this type of tumor remains unclear because of the location of the tumor and its vascularity nature. There are several methods for treating these tumors, including adjuvant therapies, radiosurgery, and surgical resection. In this case, endoscopic surgery provided enhanced visualization of the anatomy in this sensitive region, which is critical. Moreover, the less invasive approach minimizes surgery's complications during the operation.

### Background and Importance

**C**avernous sinus hemangiomas (CSH) are rare vascular lesions accounting for approximately 3% of all benign tumors within the cavernous sinus [1]. These lesions are clinically significant due to their proximity to critical neurovascular structures, which often result in symptoms, such as headaches, visual disturbances, and cranial nerve palsies [2].

The management of these tumors is also complex, with options including surgical resection, radiosurgery, and adjuvant therapies. Surgical intervention carries a high risk of intraoperative bleeding and postoperative complications due to the vascular nature of the tumor [3]. However, in the last decades, endoscopic techniques (ET) have emerged as one of the surgical methods for resecting CSH, offering a less invasive approach with promising outcomes [4].

This report aims to present a case of CSH, highlighting the diagnostic challenges and treatment considerations involved.

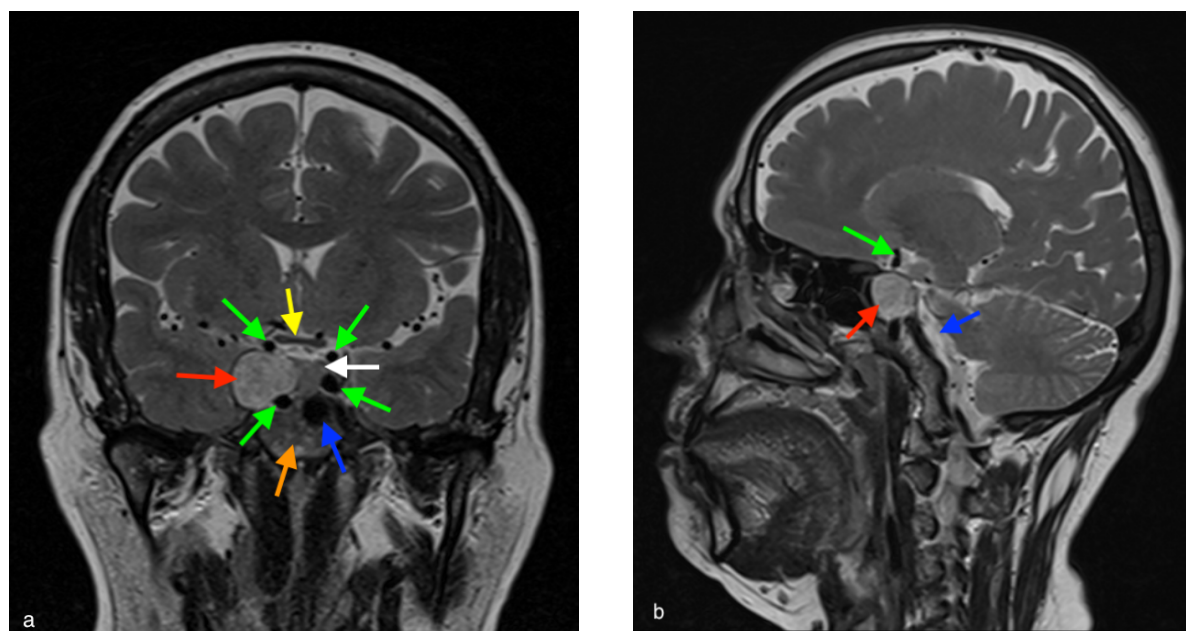
### Case Presentation

A 56-year-old female presented with a 3-month headache and blurred vision to our neurosurgery department. She had no previous surgeries, allergies, or known diseases.

Neurological examination upon admission revealed no cranial nerve involvement, motor or sensory deficits, or other vision disturbances. A cranial magnetic resonance imaging (MRI) was obtained, revealing an 18×16×20 mm T2 hyperintense lesion in the cavernous sinus (Figure 1). She had nothing of significance in her laboratory results.

The patient underwent surgical intervention after obtaining informed consent. An endoscopic endonasal transsphenoidal surgery (EETS) method was performed for the removal of the tumor.

The tumor was removed without any complications and sent to pathology for analysis. The histopathological examination revealed a tumor with the characteristics of CSH. Postoperative MRI and computed tomography demonstrated the complete excision of the tumor. The patient was discharged four days later without experiencing any notable complications. There were no complications or recurrences during the 6-month follow-up.



**Figure 1.** T2-weighted MRI planes

a) Coronal plane of T2 MRI wherein optic chiasm is marked with a yellow arrow, internal carotid arteries with green arrows, sphenoid sinus with a blue arrow, clivus with an orange arrow, the pituitary gland with a white arrow, and the hemangioma with a red arrow; b) Sagittal plane of T2 MRI wherein terminal internal carotid artery is marked with a green arrow, the cistern with blue arrow, and the hemangioma with a red arrow

## Discussion

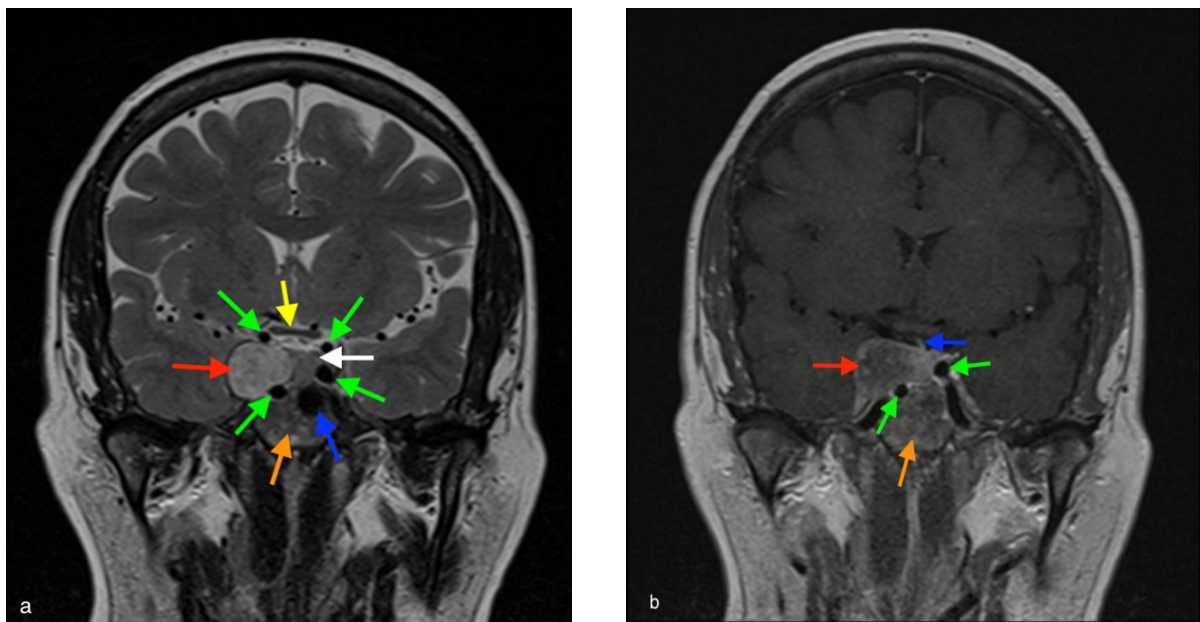
CSH comprises approximately 3% of all cavernous sinus lesions. It is more commonly observed in women aged 40 to 60 years. Clinical symptoms, such as headaches and cranial nerve deficits, typically arise from the progressive enlargement of the tumor [5].

In our case, the MRI findings of the patient's CSH were consistent with those reported in the literature. Specifically, the lesion exhibited hyperintensity on T2-weighted images and hypointensity on T1-weighted images (Figure 2). These imaging characteristics align with previously reported findings, reinforcing the diagnostic value of MRI in identifying CSH [6-8]. The consistency of these findings across multiple studies underscores the reliability of MRI as a crucial tool in diagnosing and managing this rare vascular tumor.

In this case, the patient's gender and clinical symptoms align with the findings reported in the literature on CSH. Specifically, this patient, a female, presented with headaches and visual disturbances, which are consistent with the symptoms described in several studies [6, 7, 9]. Montoya et al. [6] and Mahajan et al. [7] noted a significant female preponderance in their studies, each

reporting 11 female patients. This consistency in gender distribution and clinical presentation across multiple studies underscores the typical demographic and symptomatic profile of CSH, reinforcing these findings' diagnostic and clinical relevance.

According to the review conducted by Zhu et al., it is evident that the frontotemporal craniotomy (FC) method has been performed more frequently, achieving a gross total resection (GTR) rate of 78.97% (154 out of 195 cases) [10]. In contrast, the EETS method has been utilized less often, with a GTR rate of 57.14% (8 out of 14 cases). However, the GTR rate for EETS could be higher if it were applied to a larger number of cases. Additionally, this study highlights that the rates of postoperative short-term and long-term newly developed or deteriorative cranial-nerve function complications are significantly lower in the EETS group compared to the FC group. Specifically, the EETS group reported 0% (0 out of 7) for short-term and 0% (0 out of 6) for long-term complications, whereas the FC group reported 57% (57 out of 100) for short-term and 18.18% (18 out of 99) for long-term complications [10].



**Figure 2.** Coronal plane of T1 and T2 images

a) Coronal plane of T2 MRI wherein optic chiasm is marked with yellow arrow, internal carotid arteries with green arrows, sphenoid sinus with blue arrow, clivus with an orange arrow, the pituitary gland with a white arrow, and the hemangioma with a red arrow; b) Coronal plane of T1 MRI wherein the pituitary stalk is marked with blue arrow, internal carotid arteries with green arrows, clivus with an orange arrow, and the hemangioma with a red arrow

We utilized the EETS approach, successfully achieving GTR. Remarkably, our patient did not experience any postoperative short-term or long-term newly developed or deteriorative cranial-nerve function complications. This outcome further supports the potential advantages of the EETS method in minimizing postoperative complications and achieving successful resection.

## Conclusion

This case report presents a cavernous sinus hemangioma, a rare benign vascular tumor within the cavernous sinus. Gross tumor resection was successfully achieved through the EET surgical method without any post-operative complications, which highlights the high efficacy of this surgical method.

## Ethical Considerations

### Compliance with ethical guidelines

This is a retrospective case study at Ege University. The Research Ethics Committee of Ege University, Izmir, Turkey, has confirmed that no ethical approval was required. The patient participating in the study provided informed consent for surgery.

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## Authors' contributions

Conceptualization and study design: Hüseyin Biçeroğlu, Mustafa Serdar Bölük, and Taşkın Yurtseven; Data collection: Matin Akhbari and Bilal Bahadır Akbulut; Data analysis and interpretation: Matin Akhbari and Bilal Bahadır Akbulut; Writing the original draft: Matin Akhbari, Bilal Bahadır Akbulut, and Mustafa Serdar Bölük; Review and editing: Matin Akhbari and Bilal Bahadır Akbulut; Final approval: All authors.

## Conflict of interest

The authors declared no conflict of interest.

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