

# Rare Case Presentation of Petroclival Meningioma Presenting with Trigeminal Neuralgia



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& Health Sciences  
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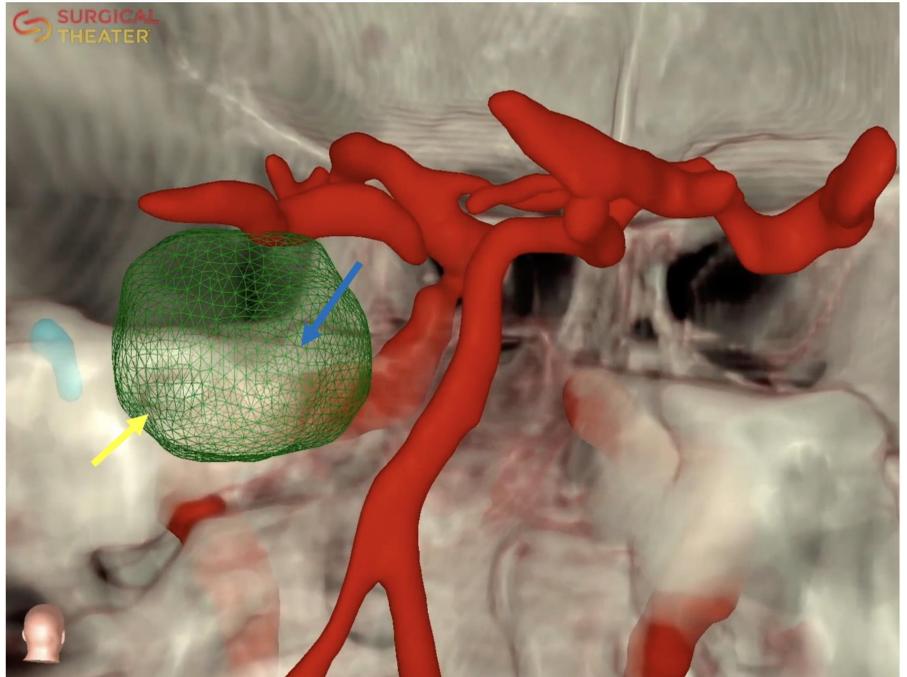
Hayes Patrick, MD<sup>1</sup>; Madeleine Smith, MD<sup>1</sup>; Ban Shoukeir<sup>1</sup>; Ashkan Monfared, MD<sup>2</sup>; Saleem Abdulrauf, MD<sup>1</sup>  
<sup>1</sup>George Washington University, Department of Neurosurgery; <sup>2</sup>George Washington University, Department of Otolaryngology

## Introduction

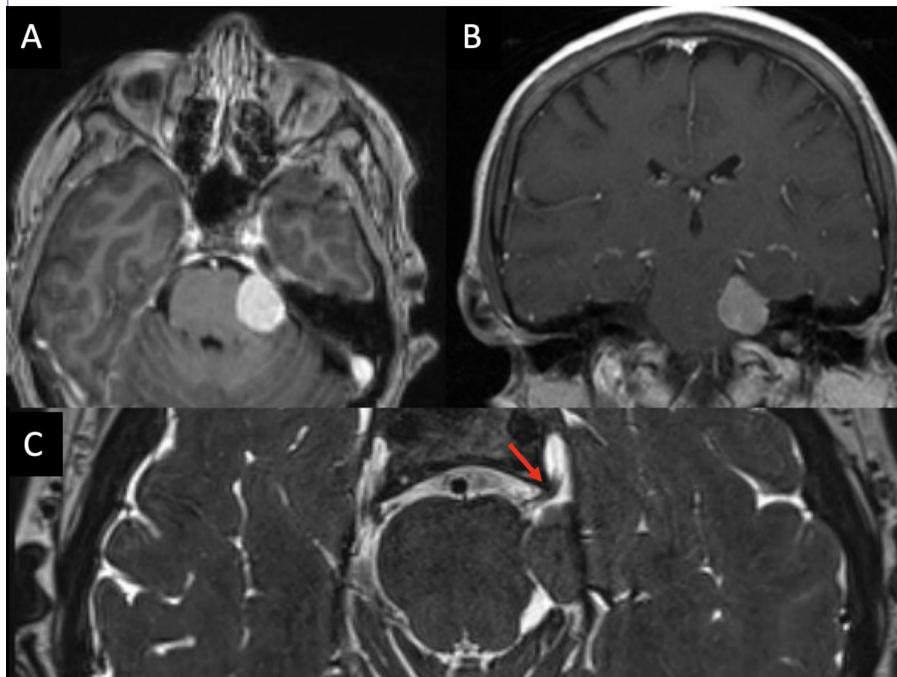
This is a rare case presentation of a patient who presented with severe trigeminal neuralgia and was found to have a petroclival meningioma. Meningiomas in the petroclival region represent 2% of meningiomas, and can present with the compression of the brainstem, cranial nerves, basilar artery or perforating arteries. Secondary trigeminal neuralgia associated with tumor compression is a rare and complex pathology, representing only 1-5% of trigeminal neuralgia cases. The severe, reproducible facial pain can significantly affect a patient's quality of life, especially when confounded by common co-existing psychiatric issues such as anxiety or depression.

## Objective and Methods

This case presentation describes the treatment of a patient who presented with trigeminal neuralgia secondary to a petroclival meningioma. The patient's facial pain was intolerable and severely worsened her co-existing psychiatric issues. The goal of the treatment was to achieve maximal safe resection of the tumor and pain relief. This case illustrates the important considerations in treating secondary trigeminal neuralgia, including the surgical technique and the management of psychiatric concerns.



**Figure 2:** 3D Rendering of the patient's tumor from a posterior-to-anterior view. This model highlights the tumor (Green) and its anatomic relationship to the vertebral basilar system (Red), the arcuate eminence (Blue), the internal acoustic canal (Yellow Arrow), and the porus trigeminus leading to Meckel's cave (Blue Arrow).



**Figure 1:** Axial (A) and Coronal (B) T1 post-contrast MRI images showing a homogeneously enhancing lesion in the cerebellopontine angle, likely originating from the tentorium, with brainstem compression. (C) Axial T2 FIESTA sequence shows compression of the trigeminal nerve as it enters Meckel's cave with an acute angulation (Red Arrow).

## Results

A 63 year old female with history of anxiety, depression, substance use disorder presented with left trigeminal neuralgia for over 6 months. Her neuro exam revealed a severe, reproducible pain in the left V1, V2, and V3 distributions. The pain had significantly worsened her anxiety and depression in the months prior to presentation. MRI findings are shown in **Figure 1**.

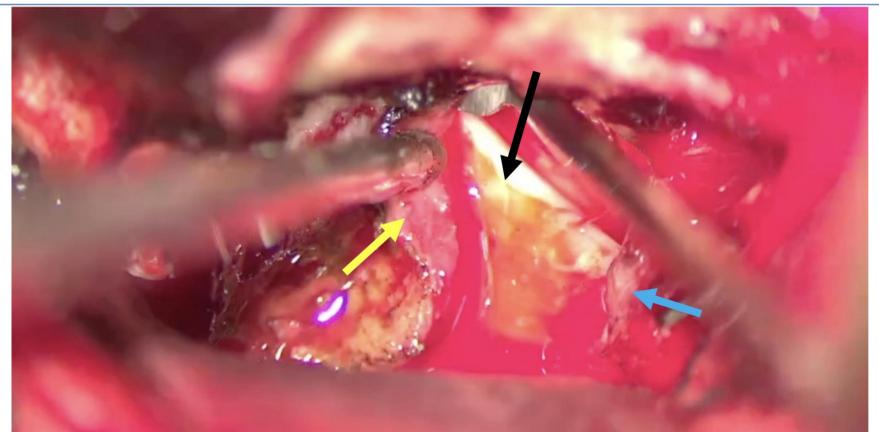
Preoperative images were used to render a 3D model (**Figure 2**) to illustrate the anatomic relationship of the tumor to the arcuate eminence, internal acoustic canal, and porus trigeminus leading to Meckel's cave.

She underwent a left middle fossa craniotomy and anterior petrosectomy for resection of the meningioma and decompression of her trigeminal nerve. The drilling was carried out between the standard Kawase quadrilateral borders, drilling medially to laterally, between the superior petrosal sinus, the arcuate eminence, the greater superior petrosal nerve, and the lateral margin of V3.

Microscopic images (**Figure 3**) showed severe compression of the trigeminal nerve at the porus trigeminus as it entered Meckel's cave. Postoperative MRI revealed gross total resection, and the patient experienced complete relief of her facial pain upon 6 month follow-up.

## Discussion

Petroclival meningiomas are among the most complex skull base tumors to manage, and their treatment is especially challenging when paired with trigeminal neuralgia. Treatment options include both microsurgical resection and stereotactic radiosurgery; however, radiosurgery can be less effective in both maintaining tumor control and providing immediate pain relief from nerve compression. This patient had intolerable pain and worsening psychiatric issues, so she opted for microsurgical decompression. Due to the location of this tumor summarized in **Figure 2**, superior to the internal acoustic canal and lateral to the porus trigeminus, an anterior petrosectomy approach was chosen to resect the tumor. She achieved complete pain relief and follow-up MRI showed no evidence of tumor recurrence at 6 month follow-up.



**Figure 3:** Intra-operative microscopic image demonstrating the severity of compression the meningioma (Yellow Arrow) exerted on the trigeminal nerve (Black Arrow) as it entered Meckel's cave (Blue Arrow).

## Conclusions

An anterior petrosectomy approach through a middle fossa craniotomy is a safe and effective way to manage petroclival meningiomas superior to the internal acoustic canal, with expansive exposure to decompress the trigeminal nerve as it enters Meckel's cave.

Exacerbations of pain have a large impact on a patient's mental health, especially with a history of psychiatric issues. In addition to the surgical management, management of these psychiatric concerns surrounding an invasive procedure should be handled with patience and compassion.

**See the attached link for the Video Abstract of the case presentation and a step-by-step overview of the surgical technique.**

## Contact

Hayes Patrick, MD  
Department of Neurosurgery  
George Washington University  
hayeshpatrick@gmail.com

## References

1. Bir, S.C., et al., *Management of Recurrent Trigeminal Neuralgia Associated with Petroclival Meningioma*. J Neurol Surg B Skull Base, 2016. **77**(1): p. 47-53.
2. Byeon, Y., et al., *Surgical Strategy for Petroclival Meningioma-Related Trigeminal Neuralgia: The Role of Porus Trigeminus Opening*. World Neurosurg, 2024. **186**: p. e114-e124.
3. Byun, J., et al., *Comparison of the efficacy in improving trigeminal neuralgia in petroclival meningioma between microsurgery and radiosurgery: a meta-analysis*. Neurosurg Rev, 2023. **46**(1): p. 314.
4. Gomes da Silva, V.T., et al., *Petroclival Meningioma Leading to Trigeminal Neuralgia: A Kawase Approach Application*. World Neurosurg, 2021. **151**: p. 110-116.
5. Jurjevic, A., et al., *Trigeminal neuralgia secondary to meningioma of petroclival localization*. Coll Antropol, 2009. **33**(1): p. 323-5.
6. Moteki, M., M. Aihara, and S. Oya, *Trigeminal neuralgia caused by compression of the trigeminal nerve between the vertebral artery and Meckel's cave meningioma extending to the posterior fossa successfully treated with the endoscopic-assisted anterior petrosal approach*. Surg Neurol Int, 2025. **16**: p. 123.
7. Park, D.J., et al., *Treatment of Trigeminal Neuralgia Secondary to Petroclival Meningioma Using Microsurgical Resection, Microvascular Decompression, and Stereotactic Radiosurgery: 2-Dimensional Operative Video*. Oper Neurosurg, 2024. **26**(1): p. 107-108.