

Picture 1 above: Endoscopic view of the keyhole approach to navigate the cerebellopontine angle. This image represents the left side. Cranial nerves, vessels and the pons are readily identified in this image

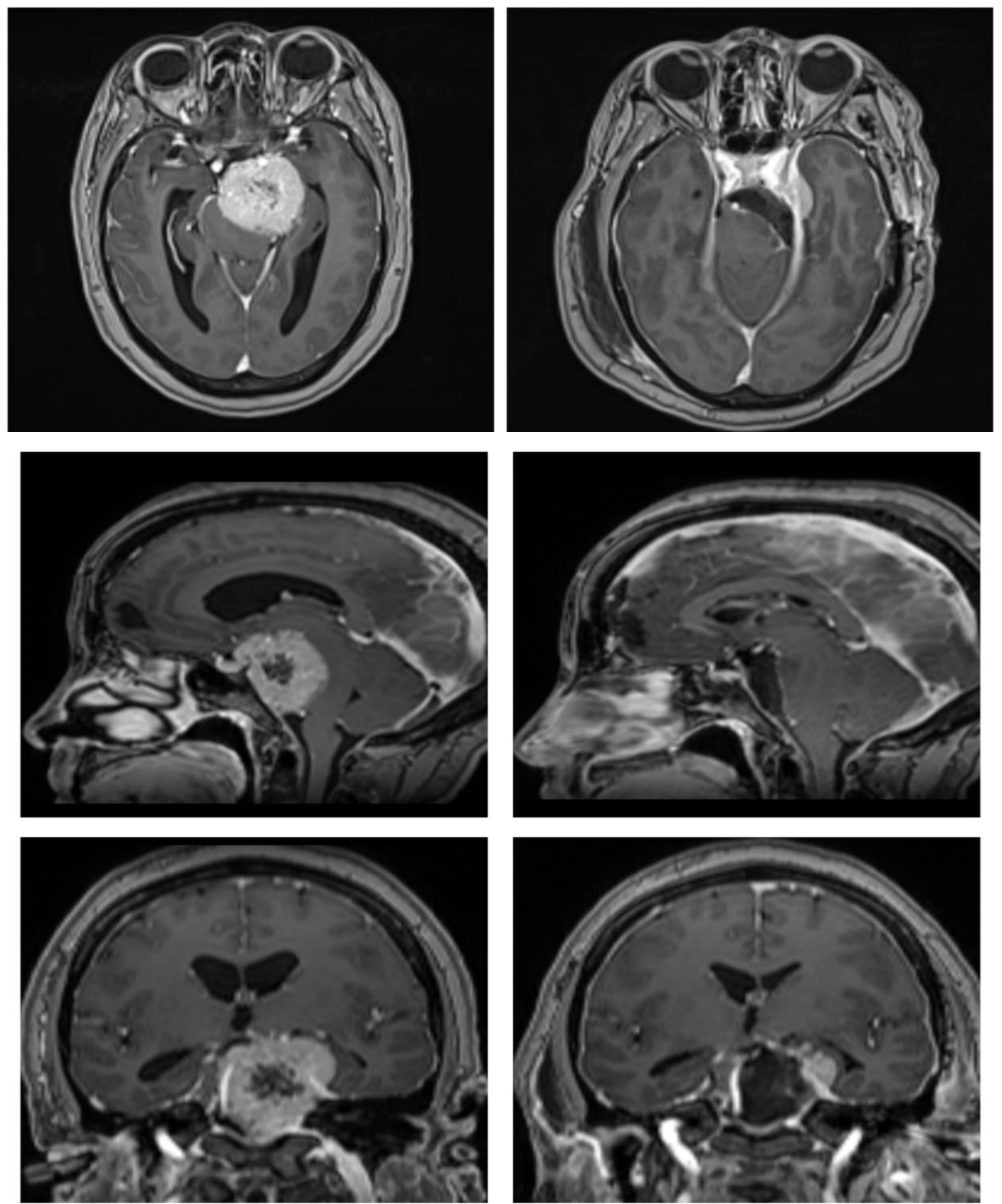


Figure 1 above : Petro-clival meningioma resection: T1 +Gad sequence MRI with Axial, sagittal and coronal views of the tumour pre-operatively (on the left of each view) and post-operatively (right sided images) after using the endoscopic keyhole approach for resection. Near total resection was achieved in this case.

## Introduction

The posterior cranial fossa presents significant surgical challenges for tumor removal due to its critical neurovascular structures, often resulting in increased patient morbidity with traditional methods. The keyhole retrosigmoid approach, leveraging advanced endoscopic technology, offers a minimally invasive alternative that utilizes a smaller surgical window for precise dissection while minimizing cerebellar retraction. This technique enhances postoperative outcomes and preserves critical anatomy, positioning itself as a promising standard for addressing posterior fossa tumors with reduced patient morbidity.

Mini Retrosigmoid approaches	Total Cases 41
Vestibular schwannoma	12
Trigeminal schwannoma	3
Meningioma	21
Petroclival Meningioma	5
Epidermoid	5

Table 1: Application of Keyholes to Posterior Fossa Pathology

**Abstract**

This study examines the keyhole retrosigmoid approach as a minimally invasive technique for managing posterior fossa tumors, highlighting the importance of endoscopic visualization in enhancing tumor resection while preserving critical neurovascular structures. The case series, the largest to date for this technique, involved 41 patients, achieving gross total resection in 36 cases with minimal complications. Results demonstrate reduced morbidity and improved surgical outcomes compared to traditional methods, providing a foundation for future research into effective minimally invasive strategies for complex posterior fossa pathology.

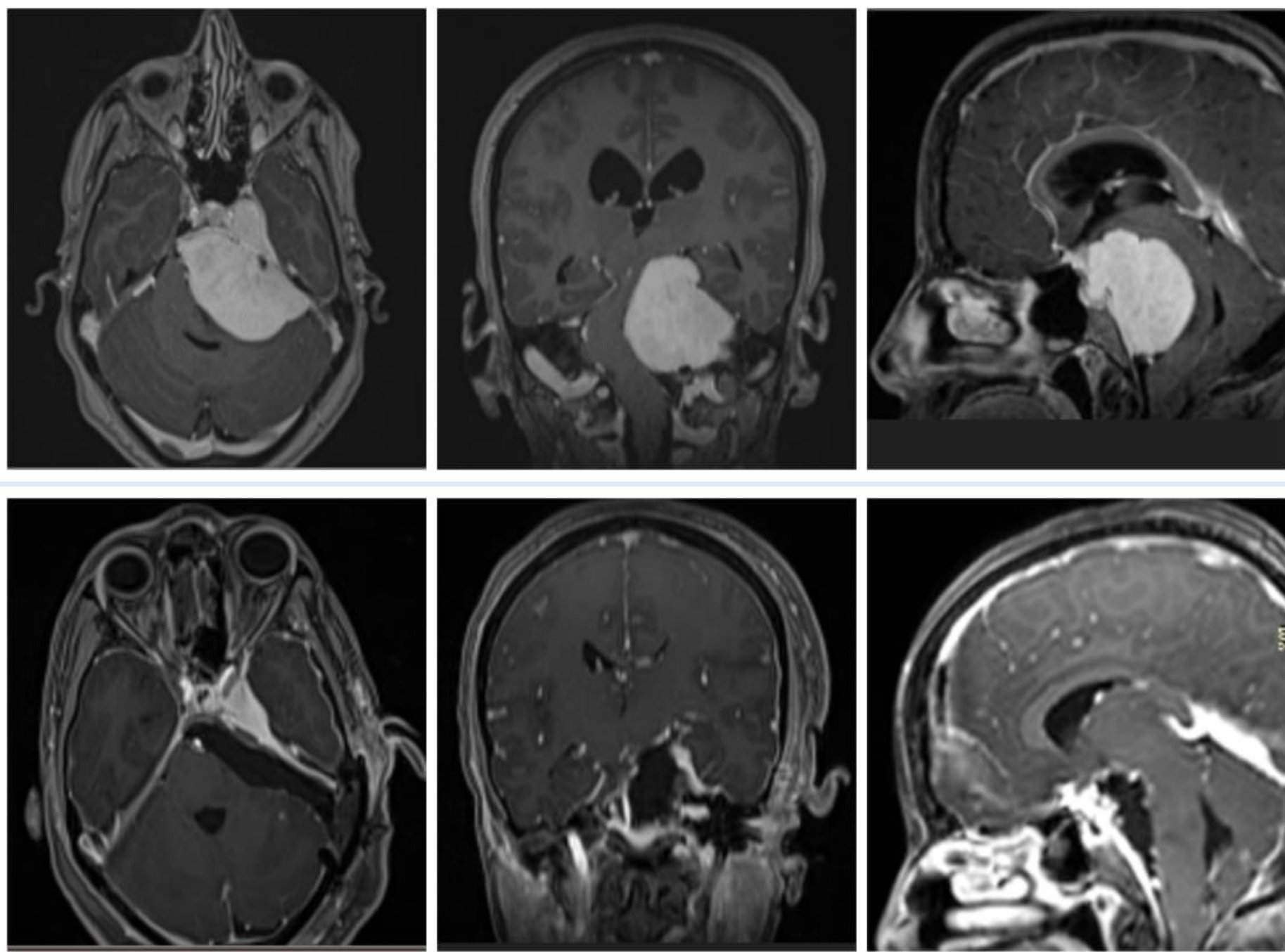
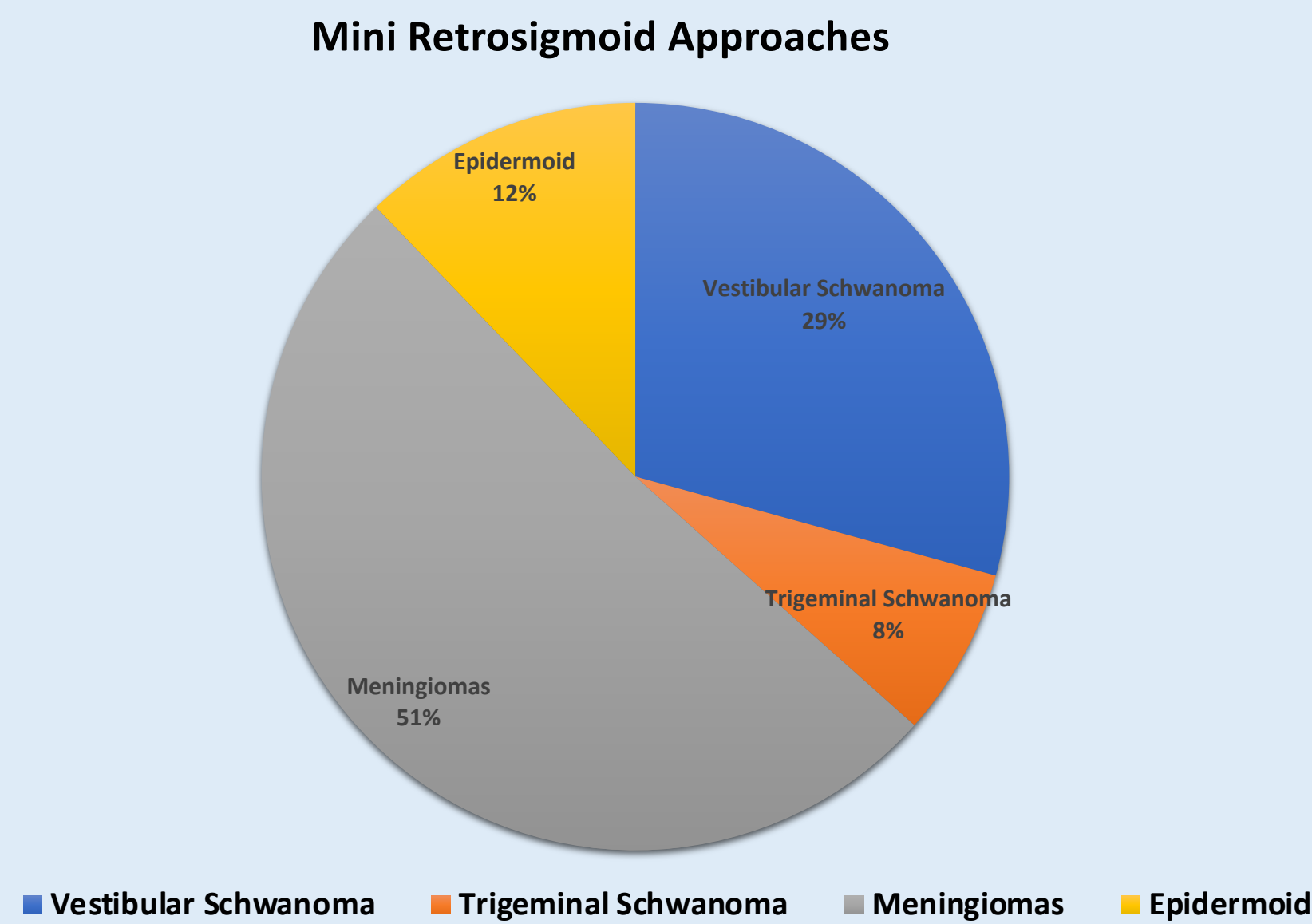


Figure 2: Petroclival meningioma. Above: axial, coronal and sagittal views seen on a T1 +Gad MRI of the tumour pre-operatively  
Below: post-operatively resection

## Results



Graph 1: Percentage distribution of posterior fossa pathology

Post operative complications	Total number 8
Cerebrospinal leak	2
Cranial nerve fallout	6

Table 3: Post Operative Complications

Resection achieved	
Gross total resection	36 of 41
Near total resection	5 of 41
Subtotal resection	2 of 41

Table 2: Resection Margins

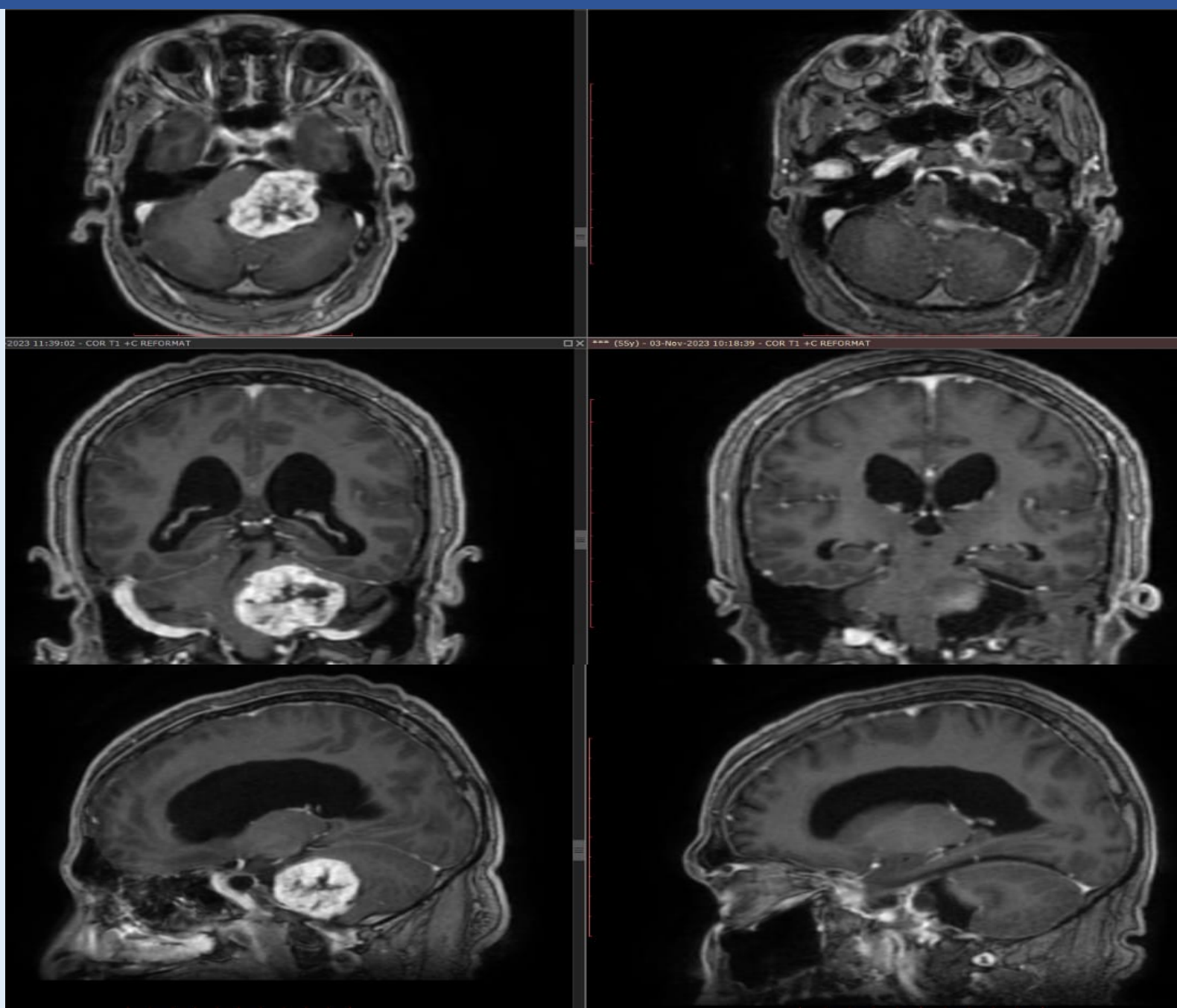


Figure 3 above: CP angle meningioma  
The above represents pre- and postoperative images of the tumour in axial, coronal and sagittal planes (contrasted T1 weighted image). Gross total resection was achieved.

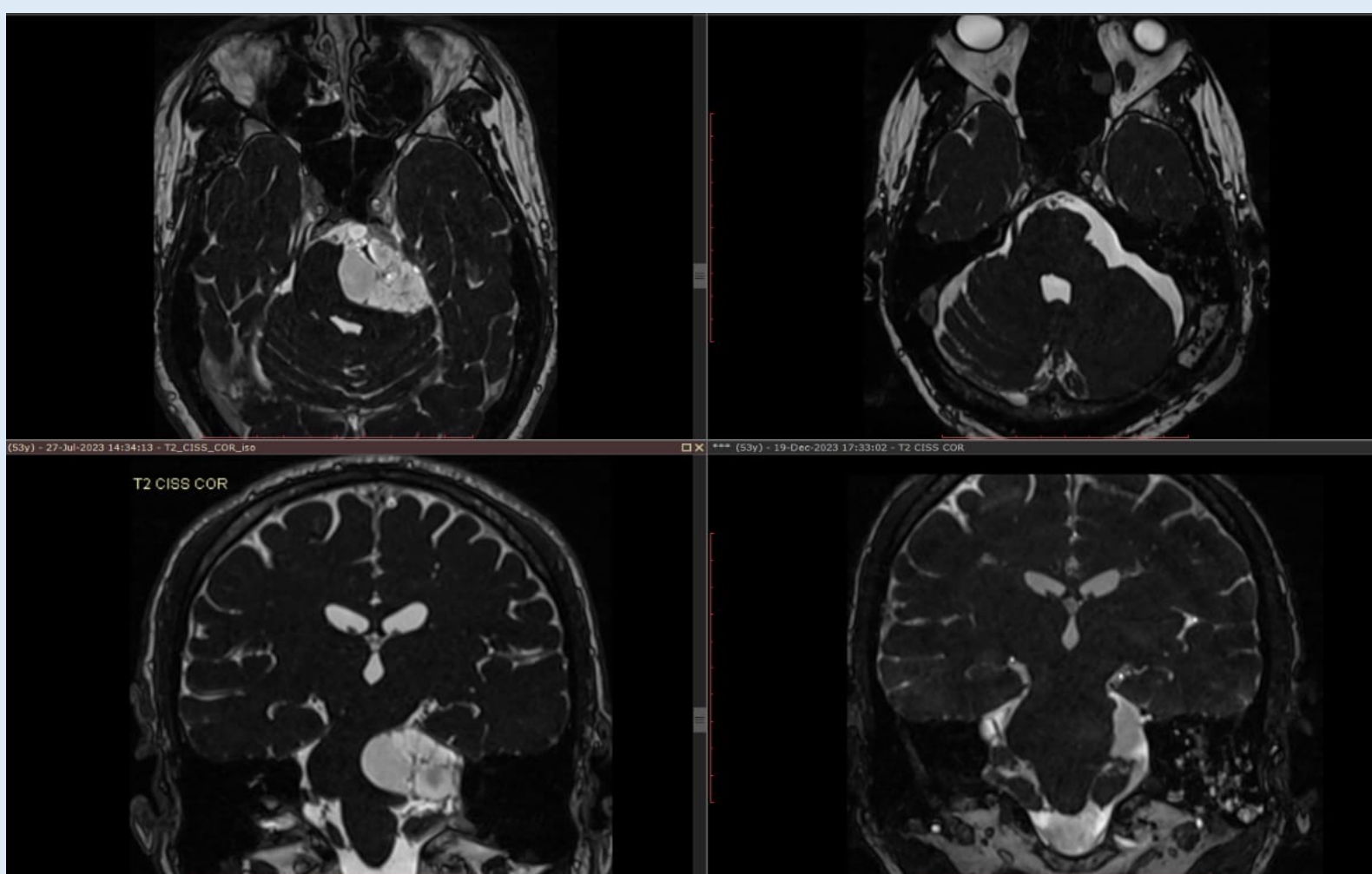


Figure 4 above: Trigeminal schwannoma  
T2 weighted image of the tumour in axial and coronal views. The left depicts pre-operative and the right is post-operative images of the lesion. Near total resection was achieved in this case.

## Discussion

Surgery for posterior fossa pathology has progressed from large bilateral suboccipital craniotomies to more localized approaches due to advancements in microsurgical techniques and diagnostics, resulting in improved procedural morbidity. This case series highlights a single surgeon's experience using a mini retrosigmoid endoscopic-assisted approach for complex cases, representing the largest reported series employing this technique. Out of 41 patients, gross total resection was achieved in 36, with no intraoperative conversions to larger craniotomies. Complications included two CSF leaks and six instances of cranial nerve fallout, with partial recovery for some. The approach demonstrated advantages such as smaller craniotomies, reduced damage to neurovascular structures, decreased blood loss, lower morbidity, and improved cosmetic outcomes, though it did entail longer operative times. Overall, this technique is presented as a safe and efficient alternative to traditional methods for carefully selected cases.

## Conclusions

This report highlights the keyhole retrosigmoid approach, emphasizing endoscopic visualization's crucial role in enhancing tumor resection while protecting vital neurovascular structures. Endoscopy provides better illumination and magnification, facilitating safer dissection in confined anatomical spaces. The results suggest that this approach enables safer and more effective management of large posterior fossa tumors, reducing morbidity and improving outcomes. Despite being a single surgeon's case series with a small sample size, it represents the largest collection on this topic to date, offering promising results and a foundation for future studies on minimally invasive surgery for complex posterior fossa pathology.

## References

- Raza, S. M., & Quinones-Hinojosa, A. (2010). The extended retrosigmoid approach for neoplastic lesions in the posterior fossa: Technique modification. *Journal of Neurological Surgery, Part A: Central European Neurosurgery*, 71(1), 16-22. <https://doi.org/10.1055/s-0030-1240031>

## Contact

Prof Christ Profyris  
University of The Witwatersrand  
7 York Road, Parktown, Johannesburg  
Division of Neurosurgery  
cp@drprofyris.com  
+27739032114

DIVISION OF NEUROLOGICAL SURGERY