


# Transpalpebral Supraorbital Craniotomy for Resection of Anterior Skull Base Meningioma: 2-Dimensional Operative Video



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Introduction

Surgical access to the anterior skull base is traditionally obtained through an open craniotomy or endoscopic endonasal corridor.<sup>1–5</sup> Criticisms of conventional transcranial approaches include the necessity of a large exposure and brain retraction for microscopic views which can be achieved through keyhole craniotomy, temporalis atrophy, frontalis nerve injury, and poor cosmetic outcome.

Although an endonasal approach can obviate several of these limitations, it is associated with higher rates of cerebrospinal fluid leak and a midline exposure can be challenging for lesions extending into the lateral optic canal.<sup>5,6</sup> Supraorbital craniotomy is a minimally invasive keyhole approach which provides direct access to this area with minimal brain retraction and reduced iatrogenic trauma.<sup>7,8</sup>

We describe the case of 76-year-old woman who presented with headaches and left sided visual deficits. Imaging revealed an enlarging anterior skull base meningioma involving the planum sphenoidale and tuberculum sellae with extension into the left optic canal.

A transpalpebral supraorbital craniotomy was selected for a minimally invasive corridor to this region. We illustrate key anatomical landmarks to guide drilling of the optic canal for circumferential optic nerve decompression and microdissection away from the optic chiasm and superior hypophyseal arteries.

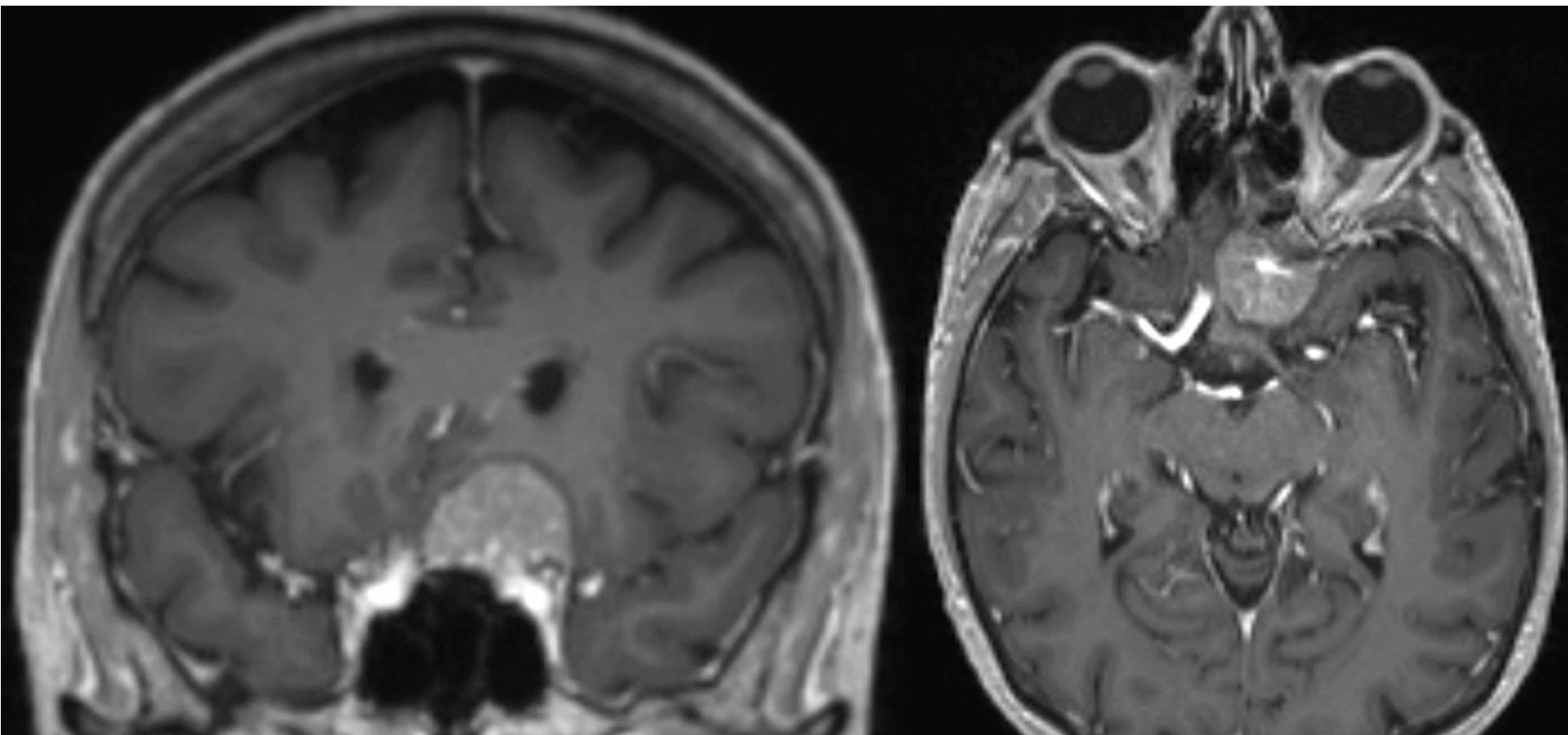


Figure 1: Dural based mass along left planum and tuberculum, displacing the prechiasmatic left optic nerve.

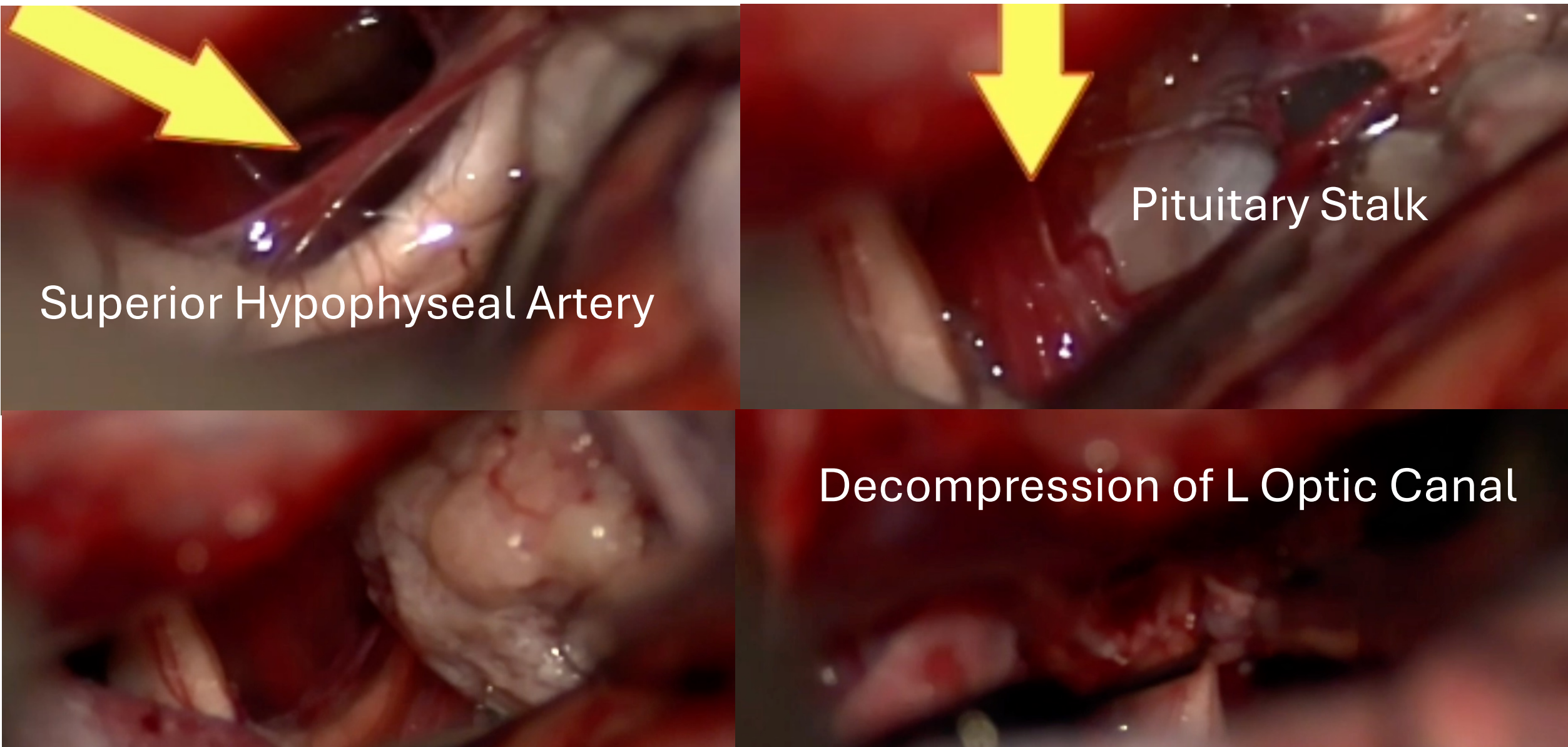


Figure 2: Intraoperative view.

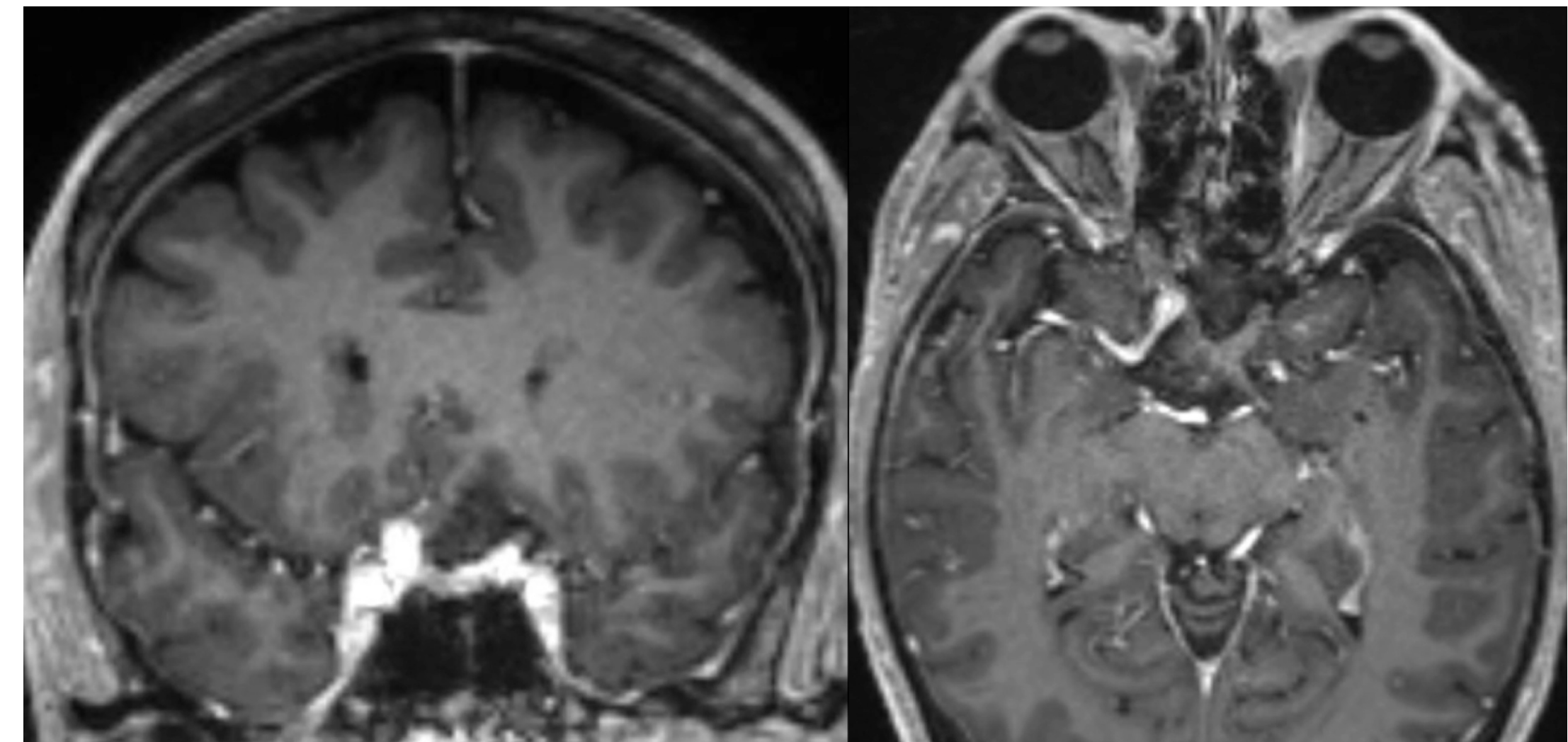


Figure 3: Post-operative MRI with GTR.

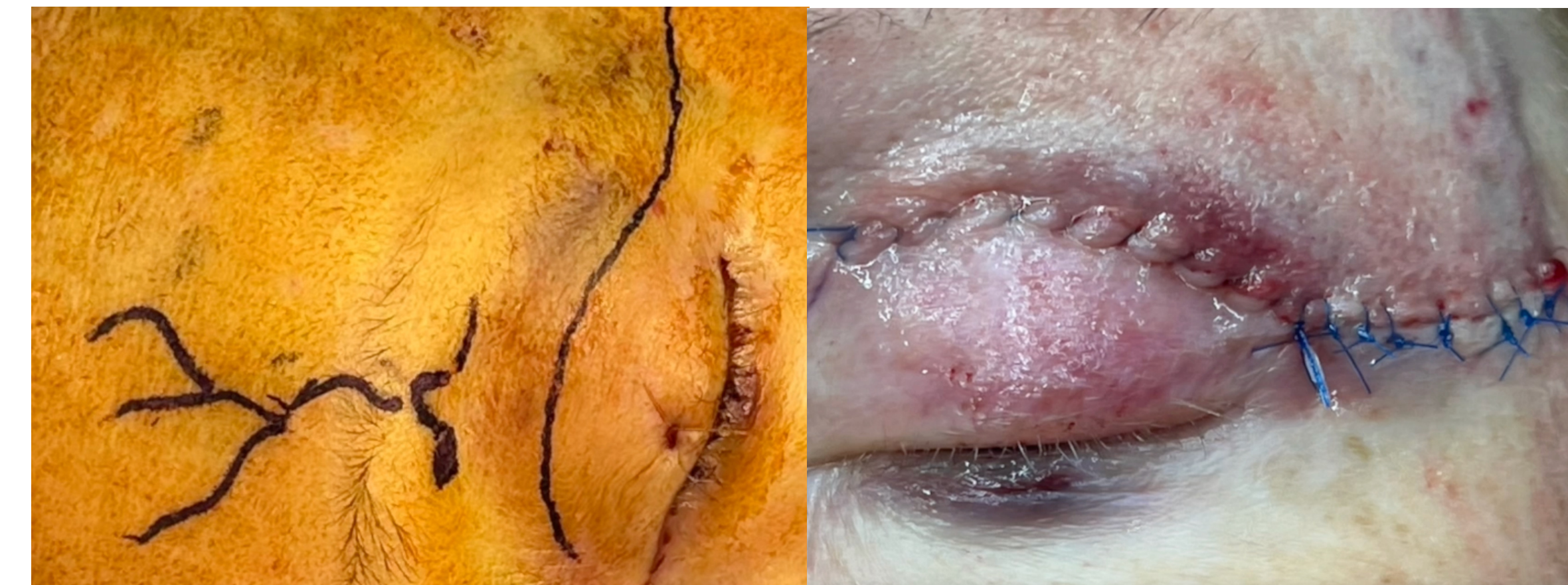


Figure 4: Pre-operative incision plan (left) and immediate post-operative wound.

Results

- Post-operative MRI with gross total resection.
- Patient discharged home on POD2
- Blurry vision in left eye improved on first outpatient visit

Conclusions

- The transpalpebral supraorbital approach is a safe and versatile corridor offering direct access to the anterior skull base.
- Offers rapid patient recovery, minimal brain and soft tissue manipulation, and favorable cosmesis.

Methods and Materials

Indications for resection

- Interval tumor growth on serial MRI
- Left eye vision changes correlating to mass effect on left optic nerve

Transpalpebral supraorbital approach

- Minimally invasive approach with limited brain retraction
- Appropriate access to the left optic canal
- Rapid patient recovery & cosmetically favorable

Alternatives

- Gamma Knife Radiosurgery
  - Size of tumor
  - Significant compression of the left optic nerve with recent visual changes
- Endoscopic Endonasal Approach
  - Extension of tumor lateral to the optic canal with involvement of the left internal carotid artery
- Pterional Craniotomy Subfrontal Approach
  - Larger cranial exposure
  - Extensive soft tissue dissection, brain tissue manipulation

Key Surgical Steps

- Supratarsal incision along natural canthal skin fold
- Supraorbital craniotomy performed
- Identification of anterior clinoid, CSF release from carotid cistern
- Anterior skull base tumor resection
  - Devascularization and internal debulking
  - Microdissection from left optic nerve and optic chiasm
  - Microdissection from superior hypophyseal vessels
  - Tumor removal enbloc after release of frontal lobe attachment
- Left optic canal tumor resection
  - Removal of bone to expose proximal canal
  - Transection of falciform ligament
  - Identification & removal of tumor along medial left optic nerve
- Closure

Contact

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References

1. Fahlbusch, R. & Schott, W. Pterional surgery of meningiomas of the tuberculum sellae and planum sphenoidale: surgical results with special consideration of ophthalmological and endocrinological outcomes. *J. Neurosurg.* **96**, 235–243 (2002).  
2. Feiz-Erfan, I. *et al.* The radical transbasal approach for resection of anterior and midline skull base lesions. *J. Neurosurg.* **103**, 485–490 (2005).  
3. Ohta, K., Yasuo, K., Morikawa, M., Nagashima, T. & Tamaki, N. Treatment of tuberculum sellae meningiomas: a long-term follow-up study. *J. Clin. Neurosci.* **8 Suppl 1**, 26–31 (2001).  
4. Raso, J. L. & Gusmão, S. Transbasal approach to skull base tumors: evaluation and proposal of classification. *Surg. Neurol.* **65 Suppl 1**, S1:33–1:37; discussion 1:37–1:38 (2006).  
5. Gardner, P. A. *et al.* Endoscopic endonasal resection of anterior cranial base meningiomas. *Neurosurgery* **63**, 36–52; discussion 52–4 (2008).  
6. Di Somma, A. *et al.* Defining the lateral limits of the endoscopic endonasal transtuberulum transplanum approach: anatomical study with pertinent quantitative analysis. *J. Neurosurg.* **130**, 848–860 (2019).  
7. Abdel Aziz, K. M. *et al.* Minimally invasive transpalpebral “eyelid” approach to the anterior cranial base. *Neurosurgery* **69**, ons195–206; discussion 206–7 (2011).  
8. Morrison, K. A., Farber, S. J., Riina, H. A. & Staffenberg, D. A. Transpalpebral eyelid approach for supraorbital frontal craniotomy and access to the anterior cranial Fossa. *Plast. Reconstr. Surg.* **151**, 463e–468e (2023).