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Abstract

We present a surgical case video to highlight the surgical access achievable through a minimally invasive expanded intra-orbital corridor through an eyelid crease incision to resect a tumor in the infratemporal and pterygopalatine fossae. We hope to demonstrate how modifications to a standard transorbital approach can be made to facilitate this exposure and discuss the limitations of the approach as well as commonly encountered surgical pitfalls

Introduction

A 51-year-old female patient with past medical history of hypertension and hyperlipidemia, was referred to our clinic for evaluation. 5 years prior, she had undergone a right cranio-orbital approach resection of a spheno-orbital meningioma which was found to be consistent with a WHO Grade 1 meningioma. She subsequently underwent stereotactic body radiation therapy (SBRT) to the infratemporal fossa component deemed not surgically accessible at the time. Her postoperative course was complicated by wound infections requiring removal of the bone flap and a mesh cranioplasty following clearance of her infection

She presented with intermittent diplopia, proptosis, headaches and right cheek pain as well as some mild decrease in visual acuity in the right eye (20/30) on objective testing.

A transorbital approach was selected as an alternative to reoperating through a transcranial approach

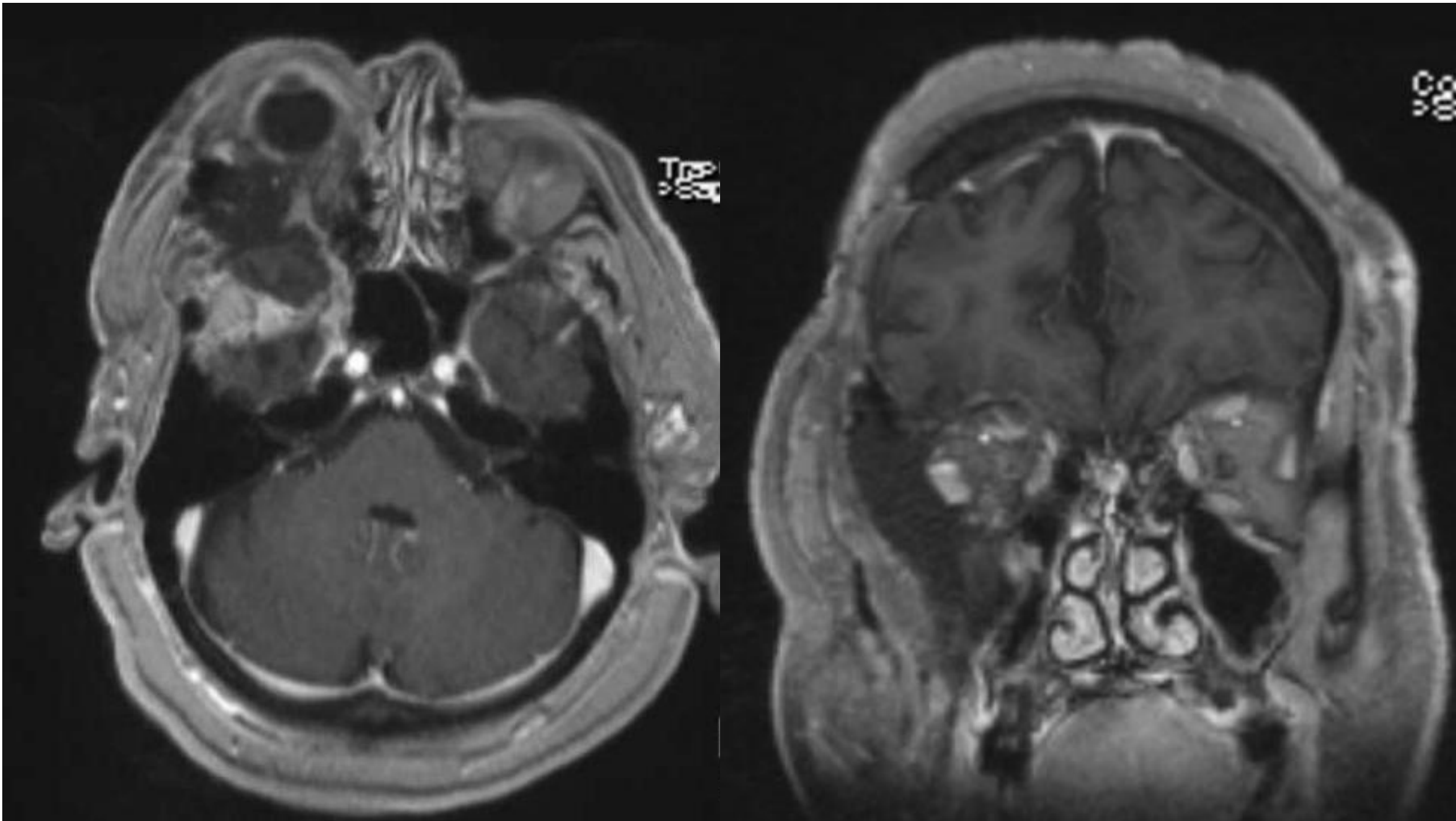


Figure 2. Postoperative MRI T1 with contrast axial (left) and coronal (right) images demonstrating near total resection of orbital and infraorbital components of the tumor with small residual along the posterior middle fossa skull base

Discussion

Postoperatively, the patient was noted to have a right oculomotor palsy, with resultant mild upgaze and downgaze limitation and ptosis which on 3-month follow up was improving. Her proptosis had resolved as did her headaches and cheek pain.

The superior eyelid incision transorbital approach (SETOA) represents an innovative, minimally invasive technique for the resection of recurrent spheno-orbital meningiomas, offering a direct, cosmetically favorable alternative to traditional cranio-orbital approaches. Dubbed the "inside-out COZ" due to its similarity in achieving extensive bony exposure akin to the cranio-orbitozygomatic (COZ) approach, SETOA leverages the natural corridors of the orbit while minimizing soft tissue disruption. This approach is particularly advantageous in recurrent cases where prior surgeries may have left extensive scarring or disrupted anatomy.

We chose to use a microscopic technique looking inferiorly rather than an endoscopic approach as the lesion in question was extending inferiorly towards the infratemporal and pterygopalatine fossae. The lateral marginotomy facilitated appropriate widening of the corridor by allowing for lateral retraction of the temporalis muscle as well as gentle medial retraction of the periorbital contents. The resulting corridor was sufficient for adequate bimanual operability throughout the resection. The tumor in this case was a totally extradural recurrence and therefore there was no dural violation. For intradural pathologies, reconstruction is of paramount importance, and we usually employ an inlay collagen substitute for a primary dural repair followed by an autologous fat graft to fill the dead space in resected hyperostotic sphenoid bone.

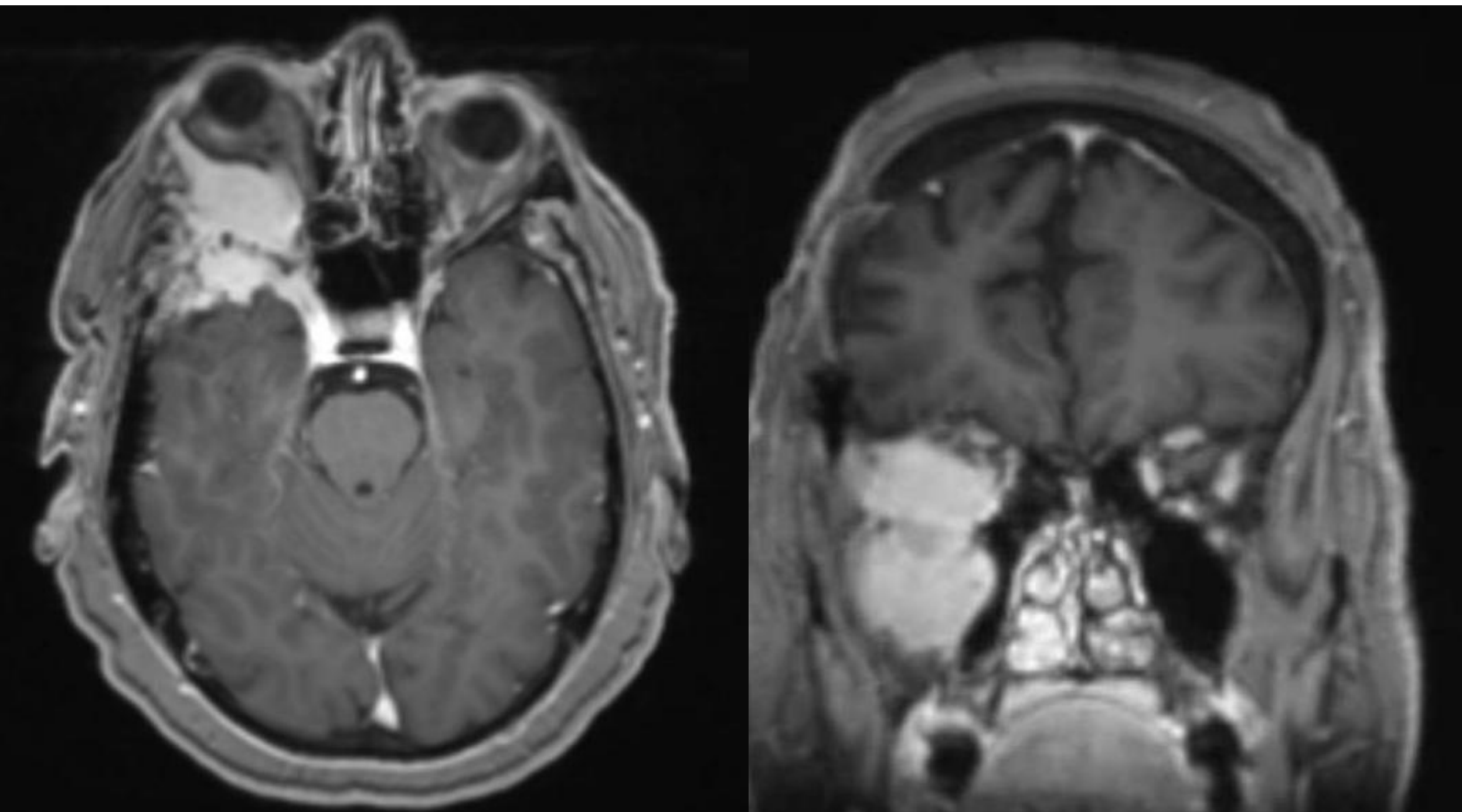


Figure 1. Preoperative MRI T1 with contrast axial (left) and coronal (right) images demonstrating recurrent right spheno-orbital meningioma with significant extension inferiorly to the infraorbital compartment

Surgical technique

A large bony marginotomy from the roof of the orbit to the lateral inferior orbital rim was performed with drilling across the anterior zygomatic arch to enlarge access to the infratemporal fossa

The tumor was found to be firmly attached to the inferior rectus muscle which was resected with sharp dissection and later reconstructed with an anterior advancement at the end of the resection

Branches of the maxillary nerve exiting foramen rotundum were identified and carefully dissected free of tumor in the pterygopalatine fossa

The internal maxillary artery was identified within its fat pad in the pterygopalatine fossa and was preserved

Gross total resection of the soft tumor component was achieved with hyperostotic bone of the middle fossa skull base left in situ.

The final pathology was in keeping with a Grade 1 menigothelial meningioma

Conclusions

Our case highlights the feasibility, safety, and efficacy of SETOA in achieving satisfactory resections of infratemporal and orbital pathologies with acceptable functional and aesthetic outcomes. This approach broadens the surgical armamentarium for skull base tumors and underscores the importance of tailoring surgical strategies to optimize outcomes while minimizing invasiveness.

Contact

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