Endoscopic transorbital resection of spheno-orbital meningiomas for orbital decompression

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Introduction

Endoscopic transorbital resection for spheno-orbital meningioma presents a less invasive alternative to craniotomy with reduced risk of post operative cosmetic deformity, with some studies citing equal or superior rates of gross total resection (GTR) than open approaches.[1,2] When the primary goal of surgery is orbital decompression, with intracranial tumor resection as a secondary aim, transorbital endoscopic surgery provides an alternative approach to traditional craniotomy.

Methods

Case series of seven patients with spheno-orbital meningiomas who underwent combined transorbital decompression surgery by neurosurgery and oculoplastic multidisciplinary teams at a single center from July 2023- July 2024.

Figure 2

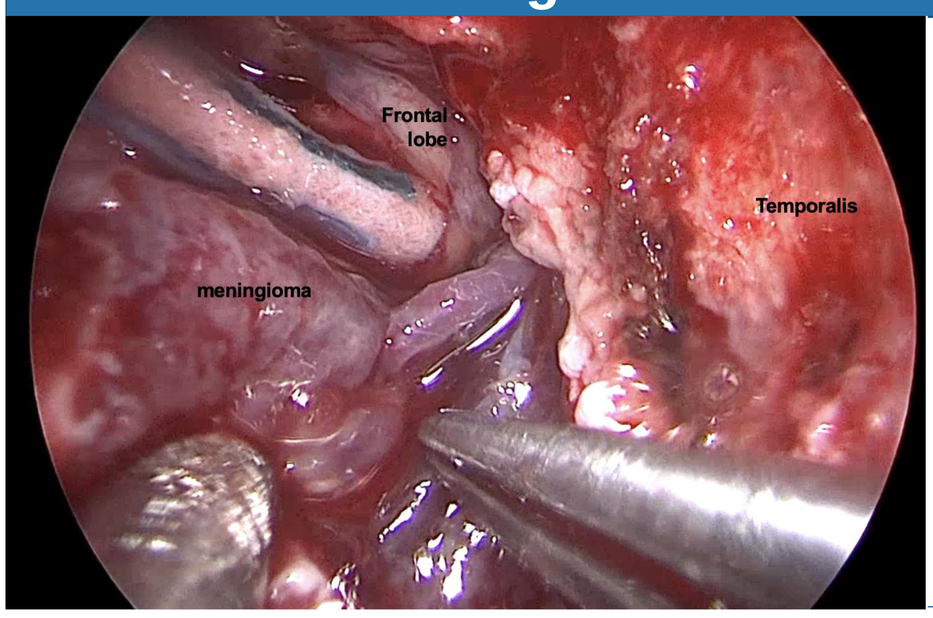

Figure 2. Endoscopic view of left sphenoid wing meningioma resection with view of frontal and temporal lobe. Dural reconstruction will follow.

Results

Patient	Presentation	Optic neuropathy	Imaging	Treatment	resection extent	WHO grade	outcome
50 F	Proptosis, diplopia, bifrontal migraines	no	L sphenoid hyperostotic mass, expansion into the orbit and L anterior middle cranial fossa	debulking, avoid RT	gross total	1	improved proptosis, diplopia, and headaches at POM 6
49 F	Proptosis, worsening vision, V2 numbness, hx prior L craniotomy	yes	L sphenoid wing hyperostosis and extension to ethmoid air cells. Prior crani with violation of lateral aspect of L frontal sinus	debulking, adjuvant RT	subtotal	1	improved proptosis, persistent LP vision, persistent facial swelling at POM 6
71 F	Proptosis, left sided superior sulcus fullness, and pain	no	L sphenoid wing meningioma involving middle cranial fossa, cavernous sinus, left orbit, and left sphenoid sinus	resection	subtotal	1	improved proptosis, improved pain, excellent vision at POM 4
60 F	Proptosis, V2 numbness	no	R sphenoid hyperostosis with expansion into the orbit and small soft tissue component	resection	gross total	1	improved proptosis, pain, no diplopia, improving numbness, residual ptosis at POM 1
51 F	Proptosis, diplopia, headache hx prior R craniotomy, s/p adjuvant RT	no	R sphenoid mass extending into the infratemporal fossa, inferolateral orbit with mild intraconal extension.	re-resection	gross total	1	Improved proptosis, improved pain, diplopia improving at POM 3
41 F	Proptosis, V1 numbness, globe dystopia	no	R spheno-orbital hyperostotic mass	resection	near gross total	1	Mild ptosis, improving V1, no diplopia at POM 6
85 F	Proptosis, worsening vision, diplopia, facial pain	yes	L sphenoid wing mass extending to orbital apex and L middle cranial fossa	resection, adjuvant RT	near gross total	2	some vision recovery from LP to CF. improving pain at POM 6

Figure 1

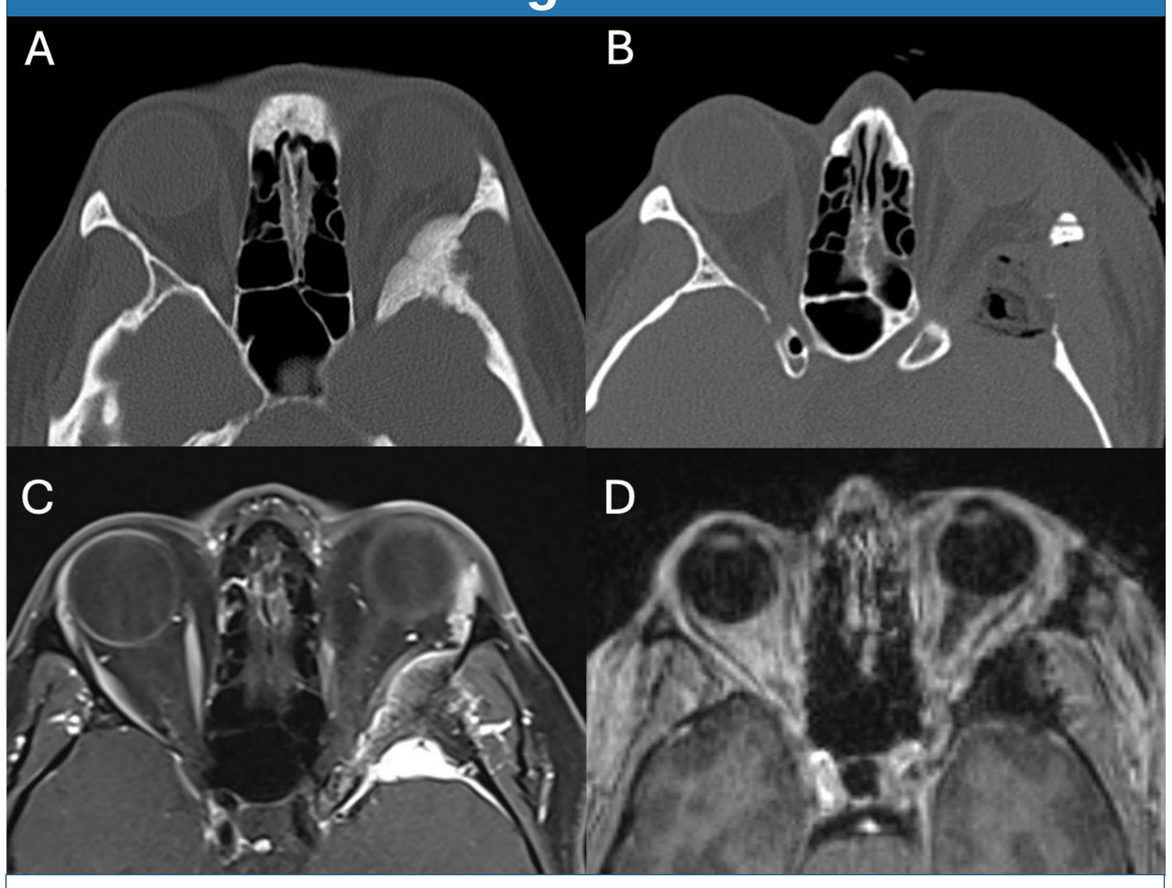

Figure 1. Axial orbit computed tomography (CT) with hyperostotic sphenoid wing meningioma (A) and after trans orbital approach for post bony orbital decompression (B). Axial magnetic resonance imaging (MRI) T1-TSE sequence with enhancing dural component (C) and MP-RAGE sequence gross total resection of bony tumor and dural component (D).

Surgical Procedure

Lateral eyelid crease incision and subperiosteal dissection to the lateral orbital rim with bony marginotomy, retraction of the temporalis, periorbita and globe. Surgical loupes were used for visualization of the superficial aspect of the hyperostotic bone, which was removed with coarse and fine drilling. Endoscope visualization was used when resection transitioned to deeper bony drilling, intracranial tumor resection, and dural reconstruction.

Discussion

For hyperostotic spheno-orbital meningiomas, orbital decompression via a transorbital endoscopic approach can achieve meaningful tumor resection and reduce pain, decrease proptosis, and relieve compressive optic neuropathy. Gross total resection is not a feasible surgical goal for patients with tumor invasion into the ethmoid sinuses or superior orbital fissure. Dural resection from a transorbital approach has limitations, thus, from an oncologic perspective, an open craniotomy may offer more complete resection. Bi-directional referral patterns and a collaborative approach between oculoplastics and neurosurgical services optimizes care for patients with these challenging skull base lesions. It also fosters cross-specialty evaluation of a symptom targeted approaches and identifies which patients are ideal surgical candidates for transcranial versus transorbital surgery.

References

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