



Endoscopic Endonasal Resection of a Tuberculum Sella Meningioma with Severe Optic Nerve Flattening

Burgos-Sosa, E., Xu Y., Yu H., Vigo V., Banu M. A., Collin L., Chang M., Fernandez-Miranda J. C.
Department of Neurosurgery, Stanford University, Palo Alto, CA, USA

Stanford MEDICINE | NeuroTrain Center
Neurosurgical Training & Innovation

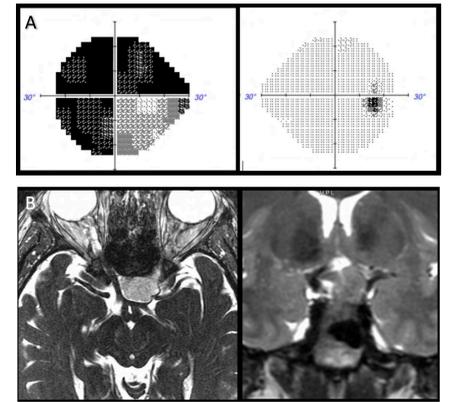
Introduction

Tuberculum sellae meningiomas are benign extra-axial tumors originating from the dura of the tuberculum sellae, limbus sphenoidale, and chiasmatic sulcus. They represent approximately 5–10% of intracranial meningiomas. Owing to their intimate relationship with the optic apparatus, these lesions commonly produce compression and adherence to the optic nerve, creating significant microsurgical challenges, particularly during careful tumor dissection and optic nerve decompression.

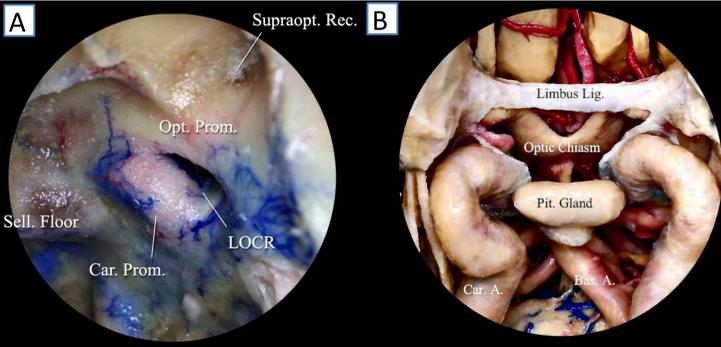
Material & Methods

A 54-year-old female presented with severe visual deficit secondary to a tuberculum sellae meningioma. An endoscopic endonasal approach was performed, including a wide sphenoidotomy with exposure of the clinoidal and sellar segments of the internal carotid artery.

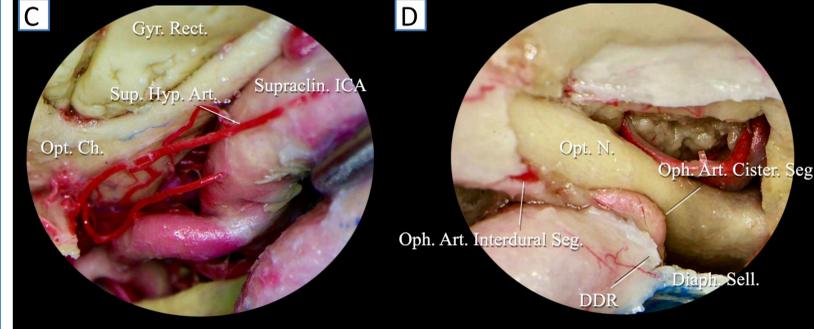
A. Humphrey perimetry demonstrated severe visual compromise in the left eye.
B. T2-weighted MRI revealed a suprasellar lesion consistent with a tuberculum sellae meningioma, located in close proximity to the internal carotid artery, anterior cerebral artery complex, and optic nerve.



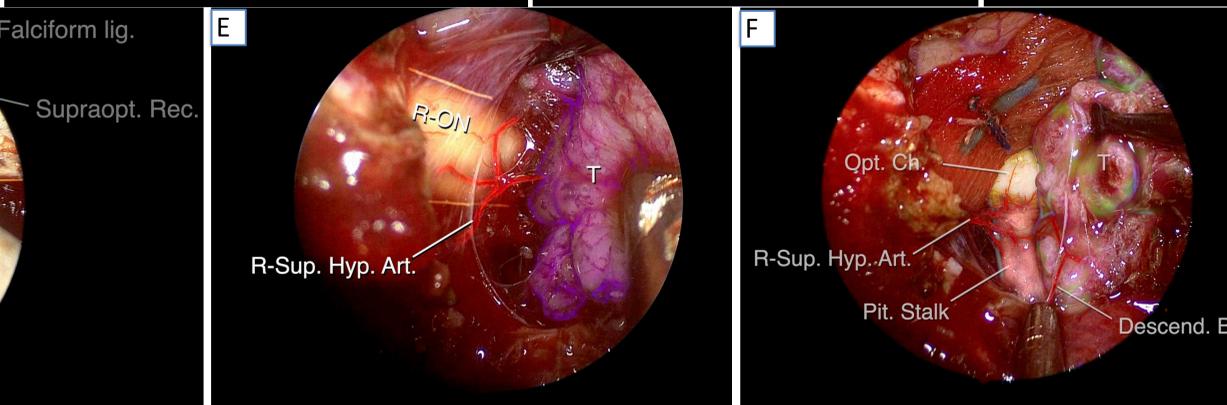
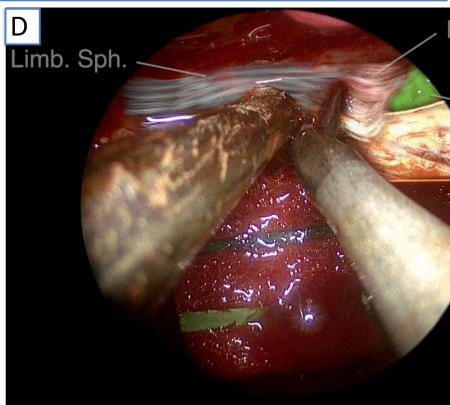
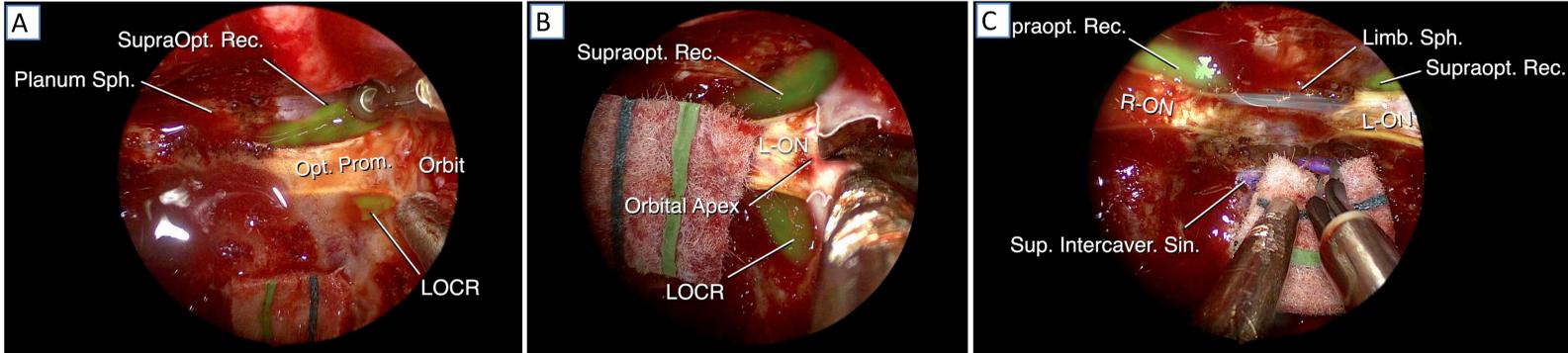
Results



A. Cadaveric dissection of the left side demonstrating key osseous anatomical landmarks, including the limbus sphenoidale, supraoptic recess, optic prominence, lateral opticocarotid recess, carotid prominence, prechiasmatic sulcus, and sellar floor. B. Anatomical relationships of the limbus sphenoidale with the ophthalmic artery, optic nerves, and the clinoidal and sellar segments of the internal carotid artery. C. Emergence of the superior hypophyseal artery from the clinoidal segment of the internal carotid artery, shown in close proximity to the optic nerve. D. Visualization of the anatomical relationships among the cisternal and interdural segments of the ophthalmic artery, distal dural ring, diaphragma sellae, and optic nerve.

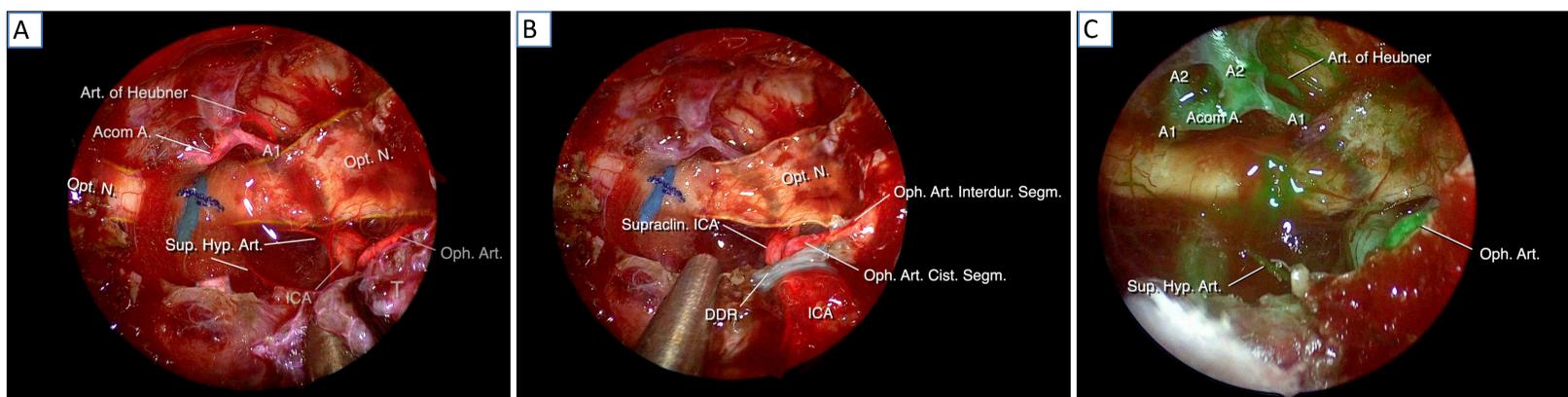


A. A wide sphenoidotomy was performed, followed by drilling of the tuberculum sellae, prechiasmatic sulcus, and posterior planum sphenoidale. Lateral extension above the optic prominences, predominantly on the left side, was carried out to optimize exposure of the supraoptic recess under continuous irrigation B, including skeletonization of the orbital apex. C, & D. Coagulation of the superior intercavernous sinus superior dural incision was then performed between the falciform ligament and the limbus sphenoidale, extending toward the supraoptic recess.



E. We can visualize the right Sup Hypophyseal artery severely attached to the meningioma. F. Posteriorly identification of the descending branch of the SHA, that was coagulated and cut for further increasing of the dissection of the tumor.

A. Continuous endoscopic dissection was performed along the ophthalmic artery and distal dural ring. Severe flattening of the left optic nerve was identified, requiring delicate and meticulous dissection along the nerve to achieve safe decompression. B. Neurovascular structures were carefully preserved. The distal dural ring and ophthalmic artery were visualized along their course toward the optic canal, demonstrating the cisternal and interdural segments of the ophthalmic artery. C. These anatomical relationships were further confirmed using fluorescein.



Conclusions

Tuberculum sellae meningiomas are surgically challenging due to their close relationship with the optic apparatus and critical vascular structures. Severe optic nerve flattening requires meticulous microsurgical decompression with preservation of surrounding neurovascular anatomy.

The endoscopic endonasal approach provides direct midline access and early optic nerve decompression. The importance of detailed endoscopic skull base anatomical knowledge is mandatory.

References

- Koutourousiou M., Fernandez-Miranda J. C., Wang E. W., Snyderman C. H., Gardner P.: Endoscopic endonasal surgery for suprasellar meningiomas: experience with 75 patients: JNS: 2014
- Mohyeldin A., Nayak J. V., Fernandez-Miranda J. C.: Endoscopic endonasal resection of a large tuberculum sella meningioma: Neurosurgical Focus Video: JNS: 2020
- Fernandez-Miranda J. C., Pinheiro-Neto C. D., Gardner P. A., Snyderman C. H.: Endoscopic endonasal approach for a tuberculum sellae meningioma: Neurosurgical Focus: JNS 2012
- Tang A., Bin-Alamer O., Plute T., Fernandes Cabral D. T., Bhuvic Patel, Abou-Al H., Choby G., Wang E., Snyderman C., Zenonos G. A., Gardner P.: Long-Term Outcomes of Endoscopic Endonasal Resection for Tuberculum Sella Meningiomas: A Single-Center Study: J Neurol Surg Skull Base: 2024

Contact

Erik Burgos-Sosa
+52 2225688978
erikburgososa@gmail.com
Erik Burgos Sosa
dr_erik_burgos



SCAN ME