Endoscopic Assisted Supraorbital Mini Orbitozygomatic Craniotomy for the Anterior Fossa

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Abstract

The supraorbital mini orbitozygomatic approach is a versatile approach for lesions of the anterior cranial fossa allowing for additional access and viewing angles compared to a standard supraorbital craniotomy. The use of endoscopic assistance is an added measure that can help the surgeon view pathology in blind spots inherent to the minimally invasive nature of this approach.

Patient Presentation

42 year old woman with history of anxiety and supraventricular tachycardia presented with acute onset vertigo and dizziness to the emergency department in the setting of worsening chronic frontal headache. Work-up with MRI head revealed an olfactory groove meningioma favoring the right side.

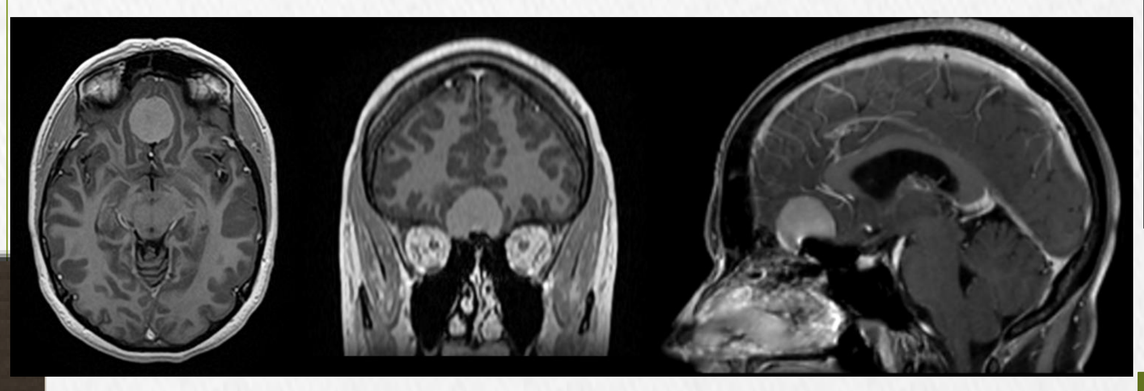

Image 1 MRI head w/wo contrast revels an anterior fossa olfactory groove meningioma measuring 2.6x2.7x2.1cm eccentric to the right with associated perilesional edema.

Surgical Technique

Patient was positioned supine in a Mayfield headrest and a lumbar drain was placed. Anatomy was registered with BrainLAB and the craniotomy was planned along the right superior edge of the eyebrow beginning at the supraorbital notch and extending laterally beyond the edge of the eyebrow. After incision, the temporalis muscle was freed from the anatomical keyhole and a 5 cutting burr was used to access the cranial fossa. Next, a craniotome was used beginning at the keyhole and advancing it medially after which a Sonopet apex knife was used to cut through the supraorbital rim and a separate cut was made through the frontozygomatic suture. Finally NT osteotomes were used along the orbital roof to remove the bone flap in a single piece. The dura was opened in a C-shaped fashion and flapped inferiorly and the arachnoid was fenestrated at the optical carotid triangle. The tumor was devascularized and disconnected from the dura and removed en bloc with microsurgical technique under the operative microscope. Finally the Qevo micro inspection endoscope was used to explore the operative field. Small amounts of residual tumor was subsequently removed. The surgical cavity was lined with Surgicel, dura was closed and the bone flap was replaced. The skin was closed in layers with a final plain gut subcuticular layer.

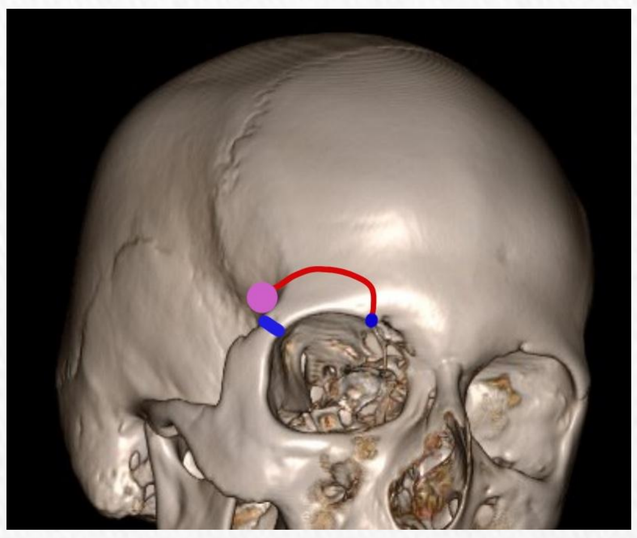

Image 2 CT head 3D depicting surgical access for the mini orbitozymatic craniotomy. McCarthy's point (purple) was burred open and the craniotome path (red) projects along the superior aspect of the eyebrow and towards the orbital rim with the supraorbital nerve as the medial border. The Sonopet apex knife (blue) was used through the frontozygomatic suture and at the supraorbital rim towards the anterior fossa floor. Osteotome trajectory not pictured.

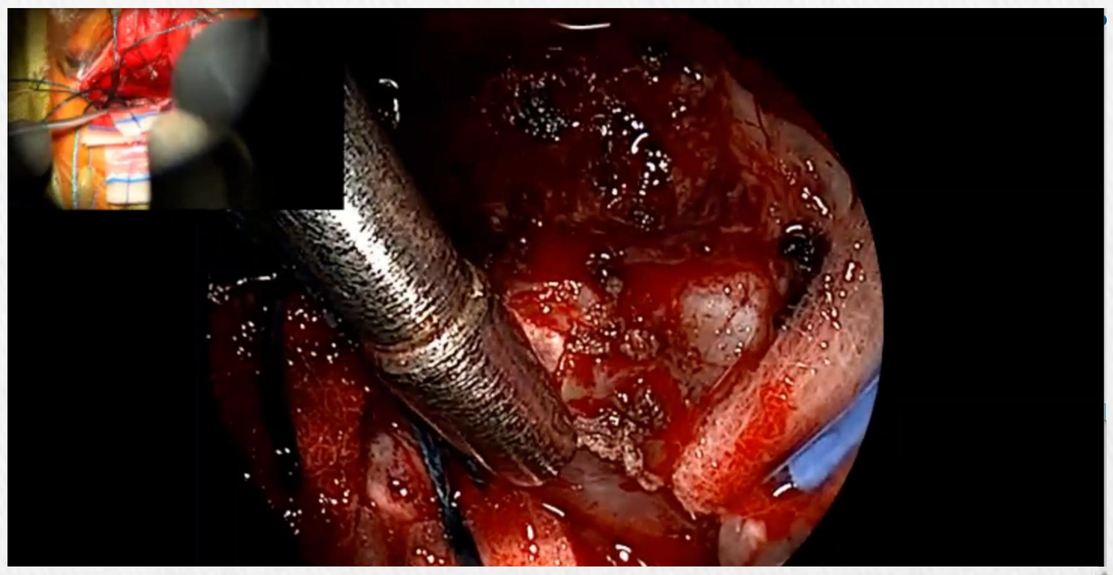

Image 3 Left upper hand corner shows a view of the operative field through the operative microscope and main center image is a projection of the operative field through the Qevo endoscope.

Post-Operative Course

The patient woke up from surgery without neurologic deficits and with intact sense of smell. Post-operative CT scan showed as expected post-op changes. She was discharged home on post-operative day 2 and pathology revealed a WHO Grade I Meningioma.

Image 4 Post-operative CT head with as expected post-op changes.

Discussion

The mini orbitozygomatic craniotomy is a modified supraorbital approach that is paralleled in working area with the addition of a larger vertical operative exposure.[1] The use of a rigid endoscope allows for the operator to visually explore areas that are difficult to view with an operative microscope. [2,3] The mini orbitozygomatic approach with the use of endoscopy offers a productive working area and leaves patients with a cosmetically pleasing closure.

Contact

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References

1. Eberval G. Figueiredo, Puspha Deshmukh, Peter Nakaji, Edson Bor Seng Shu, Neil Crawford, Robert F. Spetzler, Mark C. Preul, An anatomical analysis of the mini-modified orbitozygomatic and supra-orbital approaches, Journal of Clinical Neuroscience, Volume 19, Issue 11, 2012, Pages 1545-1550.
2. Robert Reisch, Gerrit Fischer, Axel Stadie, Ralf Kockro, Evaldas Cesnulis, Nikolai Hopf, The Supraorbital Endoscopic Approach for Aneurysms,, World Neurosurgery, Volume 82, Issue 6, Supplement, 2014, Pages S130-S137.
3. Peters DR, Mulvaney G, Monk S, Karimian B, Wait SD. Standard Orbitozygomatic Craniotomy versus Mini Orbitozygomatic Craniotomy via an Eyebrow Incision for Microsurgical Treatment of Anterior Communicating Artery Aneurysms. J Neurol Surg B Skull Base. 2023 Apr 18;85(4):431-437.