NEURO RESEARCH Case Report ISSN: 2689-3193

Case Report: Transorbital Neuroendoscopic Surgery (TONES) for a Case of Cavernoma-Associated Epilepsy Within the Mesial Temporal Lobe

MAA Salek, N Jahan, AH Manik, AUM Chowdhurty, RU Chowdhury*

Department of Neurosurgery, Combined Military Hospital Dhaka, Bangladesh

***Corresponding author:**

Md Al Amin Salek

MBBS, MCPS, FCPS, MRCS, Senior Neurosurgeon
Department of Neurosurgery, Combined Military Hospital Dhaka, Bangladesh
E-mail: salek1972@yahoo.com

Received : January 17, 2023
Published : January 31, 2023

ABSTRACT

Transorbital Neuroendoscopic Surgery (TONES) is a technique that allows access to the intracranial compartment, including the anterior cranial fossa, middle fossa and lateral cavernous sinus in addition to the contents of the orbit. Different surgical approaches are used for mesial temporal lobe epilepsy generating lesions over time. In this manuscript, we aim to share a case of a temporal lobe cavernoma who presented with refractory seizure and managed surgically by TONES procedure.

Keywords: Neuroendoscopic Surgery, Mesial Temporal Lobe, Case of Cavernoma, Epilepsy

INTRODUCTION

Cavernomas of the temporal lobe occur in 10-20% of patients with cerebral cavernomas [1]. They frequently cause epileptic seizures by stimulation of the surrounding cortex following repeated microbleeds rather than by the lesion itself. Sufficient clinical evidence affirms that surgical intervention for with epilepsy is superior to medication or irradiation [2].

There are several ways to safely access mesial temporal structures. The traditional transsylvian-transcisternal approach is a good way to access the mesial structures while preserving the lateral and basal temporal structures [3]. Regardless, the ultimate goal of all epilepsy surgeries is to maximize seizure control while maintaining neurological function.

Transorbital neuroendoscopic surgery through an extended superior eyelid crease approach is the workhorse approach for most lesions affecting the superior and lateral orbital walls, like sphenoid wing meningiomas and for accessing the anterior and middle cranial fossa [4]. In this manuscript, we shared a case report involving a temporal lobe cavernoma who presented with refractory seizure and was managed surgically.

ISSN: 2689-3193

CASE REPORT

A 23-year-old male presented with refractory generalized tonic-clonic seizure not responding to optimum medical management. An obtained MRI scan of the brain revealed a rounded, popcorn appearance well-defined intra-axial lesion in the right mesial temporal lobe (Figure 1).

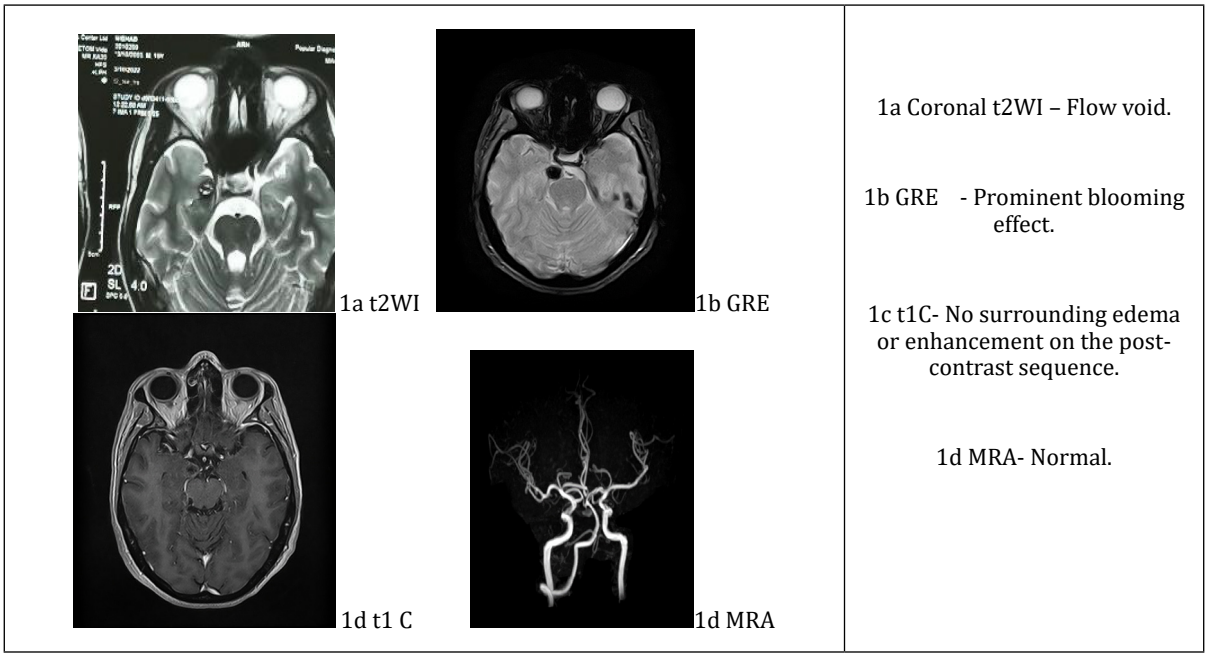


Figure 1: Preop MRI and MRA of brain.

Scalp Electroencephalography (EEG) including long-term video-EEG was suggestive of right medial temporal lobe epilepsy without interictal discharges. Cavernoma as the source of the refractory seizures, the patient had been offered surgery, in which he underwent and he underwent lesionectomy and hippocampectomy by TONES approach. He became seizure-free following surgical intervention.

Surgical Technique

Position and anaesthesia of the patient

The patient was placed in a supine position, and general anesthesia was administered. His head was rotated slightly toward the surgeon, and the neck was extended approximately 15 degrees to allow the brain to retract from the skull base. The head of the bed was elevated to minimize bleeding. Eyes, the nose, and any other relevant anatomy were prepped and draped in the usual sterile fashion. The pupils were checked for baseline size and symmetry. Eyes were rinsed, and lubricant was applied.

Instruments

Basic instrumentation was used for performing an endoscopic skull base approach. In addition, a suction elevator, fine scissors, and range of malleable brain retractors and high-speed electric drill were needed.

Steps of surgery: Superior eyelid crease (SLC) approach

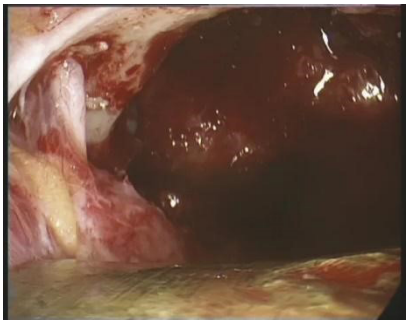
The SLC approach is performed by a superior eyelid incision with careful dissection along the superior orbital rim. By drilling the orbit through the greater wing of the sphenoid, the temporal pole was exposed and intradural exposure of the mesial temporal lobe was completed. Corticotomy was done to reach the cavernoma under zero-degree endoscope guidance. Complete removal of the lesion and the hippocampus was done. Meticulous haemostasis was achieved, the dura was closed with tissue glue and the pad of fat. Skin was closed with transdermal nonabsorbable suture material.

DOI: https://doi.org/10.35702/nrj.10015

ISSN: 2689-3193

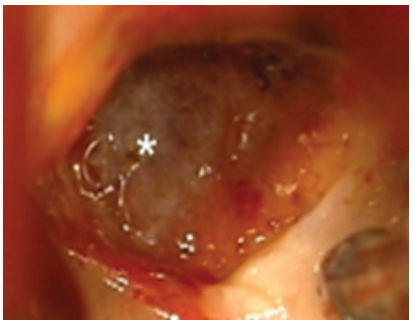
2a

2a Superior eyelid crease (SLC) incision



2b

2b Exposure of the temporal lobe after drilling of the greater wing of sphenoid



2c

2c Endoscopic view of the cavernoma

Figure 2: Superior eyelid crease (SLC) approach.

Post of Recovery and Follow Up

Immediate recovery was uneventful except for right periorbital swelling without any visual impairment.

No CSF leaks.

At three months follow up, the patient is seizure free and on no medications. The patient developed partial ptosis with a faintly visible surgical scar.

DOI: https://doi.org/10.35702/nrj.10015

ISSN: 2689-3193

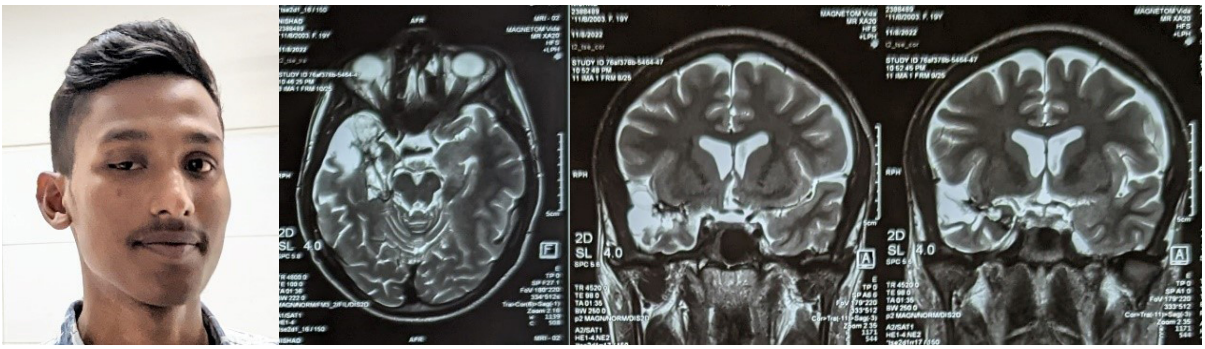


Figure 3: Post op imaging (partial ptosis, lesionectomy and hippocampectomy).

DISCUSSION

Endoscopic surgery of the orbit, periorbital region, and adjacent areas of the anterior and middle cranial fossae and brain has gained significant popularity over the last decade. The approaches provide minimally disruptive, scarless access to regions that previously required extensive open operations with significant retraction of critical neurovascular structures leading to prolonged morbidity and hospitalization [5].

Some have found the transorbital approach to be limited, but these limitations have arisen from failing to recognize the orbit as a four-quadrant system with angles and trajectories that must be deliberately chosen to suit the pathology [6]. The advantages of expanding the indications for the use of a TONES surgical procedure are many and include increased working angles, increased ease of four handed operating, an absence of a cranial incision, limited or absent brain retraction, and similar outcomes from more traditional open approaches. Moreover, TONES avoids crossing critical neurovascular structures in contradistinction to expanded endonasal approaches. When selected appropriately, the addition of transorbital portal(s) allows for optimal visualization and instrumentation at the target location while minimizing collateral tissue damage [7].

There are a number of reasons transorbital surgery should be considered over craniotomy and standard endonasal procedures for suitable pathologies. First, transorbital approaches to appropriate lesions of the skull base avoids many of the craniotomy-based risks. Second, TONES most often represents an operative adjunct to endoscopic endonasal surgery.

Orbital morbidity from TONES procedures is certainly a concern, both from a cosmetic and functional point of view. Transient postoperative clinical sequelae, including diplopia and ptosis, were increasingly associated with the superior lid crease incision and the sole transorbital approach [8]. In our patient, transient partial ptosis occurred, which may resolve.

Three technical maneuvers have helped minimize the complication rate, namely conservative approach to patient selection, orbital retraction of less than 10 millimeters, and frequent removal of intraorbital instruments to allow for orbital relaxation (every 15–20 minutes). The techniques described herein build on technical skills gained in the transorbital skull: International hands-on course [9].

CONCLUSION

TONES represents a new direction in skull base surgery for the neurosurgical treatment armamentarium.

ACKNOWLEDGMENT

Prof Theodore H Schwartz, MD

Course Director, Transorbital skull base surgery: International hands-on course

Cornell University, New York, USA

REFERENCES

1. Kivelev J, Niemelä M, Blomstedt G, Roivainen R, Lehecka M, Hernesniemi J. (2011). Microsurgical treatment of temporal lobe cavernomas. Acta Neurochir (Wien). 153(2):261-270.

2. Cossu M, Raneri F, Casaceli G, Gozzo F, Pelliccia V, Lo Russo G. (2015). Surgical treatment of cavernoma-related epilepsy. J Neurosurg Sci. 59(3):237-253.

DOI: https://doi.org/10.35702/nrj.10015

ISSN: 2689-3193

3. Lee JY, Phi JH, Wang KC, Cho BK, Kim SK. (2011). Transsylvian-transcisternal selective lesionectomy for pediatric lesional mesial temporal lobe epilepsy. Neurosurgery. 68(3):582-587.

4. Lubbe D. (2017). Transorbital neuroendoscopic surgery (TONES). ENT & AUDIOLOGY NEWS. 26(5).

5. Miller C, Bly R, Moe KS. (2020). Endoscopic Orbital and Periorbital Approaches in Minimally Disruptive Skull Base Surgery. J Neurol Surg B Skull Base. 81(4):459-471.

6. Kong DS, Kim YH, Hong CK. (2020). Optimal indications and limitations of endoscopic transorbital superior eyelid surgery for spheno-orbital meningiomas. J Neurosurg. 134(5):1472-1479.

7. Ramakrishna R, Kim LJ, Bly RA, Moe K, Ferreira M Jr, (2016). Transorbital neuroendoscopic surgery for the treatment of skull base lesions. J Clin Neurosci. 24:99-104.

8. Houlihan LM, Staudinger Knoll AJ, Kakodkar P, Zhao X, O'Sullivan MGJ, Lawton MT, et al. (2021). Transorbital Neuroendoscopic Surgery as a Mainstream Neurosurgical Corridor: A Systematic Review. World Neurosurg. 152:167-179.e4.

9. Transorbital Skull Base Surgery. (2022). International Hands-On Course. New York, USA.

DOI: https://doi.org/10.35702/nrj.10015