

Endoscopic endonasal approach for Tuberculum Sellae Meningioma

Endoscopic endonasal approach has several advantages for meningiomas in the medial optic canal and associated with progressive visual disturbance. In surgery of tuberculum sellae meningiomas, optic canal decompression and exploration inside the optic canal are important procedures to avoid symptomatic recurrence, which may be facilitated by the endoscopic endonasal approach. optic atrophy and duration of visual deterioration are predictive factors for postoperative visual outcomes¹⁾.

The results of a study of Kong et al., support EEA over TCA, at least with respect to visual improvement with acceptable complications, although TCA is still an effective approach for TS meningioma²⁾.

Fernandez-Miranda et al present the technical and anatomical nuances needed to perform an endoscopic endonasal removal of a tuberculum sellae meningioma. The patient is a 47-year-old female with headaches and an incidental finding of a small tuberculum sellae meningioma with no vascular encasement, no optic canal invasion, but mild inferior to superior compression of the cisternal segment of the left optic nerve. Neuroophthalmology assessment revealed no visual defects. Treatment options included clinical observation with imaging follow-up studies, radiosurgery, and resection. The patient elected to undergo surgical removal and an endonasal endoscopic approach was the preferred surgical option. Preoperative radiological studies showed the presence of an osseous ring between the left middle and anterior clinoids, the so-called carotico-clinoidal ring. The surgical implications of this finding and its management are illustrated. The surgical anatomy of the suprasellar region is reviewed, including concepts such as the chiasmatic sulcus and limbus sphenoidale, medial and lateral optico-carotid recesses, and the paraclinoidal and supraclinoidal segments of the internal carotid artery. Emphasis is made in the importance of exposing the distal dural ring of the internal carotid artery and the precanalicular segment of the optic nerve for adequate intradural dissection. The endonasal route allows for early coagulation of the tumor meningeal supply and extensive resection of dural attachments, and importantly, provides an inferior to superior access to the infrachiasmatic region that facilitates complete tumor removal without any manipulation of the optic nerve. The lateral limit of dural removal is formed by the distal dural ring, which is gently coagulated after the tumor is resected. A 45° scope is used to inspect for any residual tumor, in particular at the entrance of the optic nerve into the optic canal and at the most anterior margin of the exposure (limbus sphenoidale). The steps for reconstruction are detailed and include intradural placement of dural substitute and extradural placement of the nasoseptal flap. The nuances for proper harvesting, positioning, and reinforcement of the flap are described. No lumbar drain was used. The patient had an uneventful recovery with no Cerebrospinal fluid fistula or any other complications. Imaging follow-up at 6 months showed complete removal of the tumor. The patient had no sinonasal or neurological symptoms, and olfaction was fully preserved. The video can be found here: <http://youtu.be/kkuV-yyEHMg>³⁾.

Recent reports of surgical resection of tuberculum sellae meningiomas through an endoscopic endonasal approach (EEA) have provided an alternative to transcranial approaches in selected cases. However, these published reports have been limited by small sample size from single institutions.

A systematic review of the literature and analyzed pooled data for descriptive statistics on short-term morbidity and outcomes, compared EEA to transcranial approaches reported during the same time-frame. Six studies (49 patients) met inclusion criteria for EEA. A pooled analysis of transcranial results reported during a similar time period yielded 11 studies (412 patients). There were no differences in rate of gross total resection or peri-operative complications between the two groups. Although the EEA group was associated with higher rates of Cerebrospinal fluid fistula ($p < 0.05$; OR 3.9; 95 % CI 1.15, 15.75), EEA were also associated with significantly higher rates of post-operative visual improvement compared to transcranial approaches ($p < 0.05$; OR 1.5; 95 % CI 1.18, 1.82). A systematic review of the small series of EEA for tuberculum sellae meningiomas published to date revealed similar extent of resection and morbidity, but increased post-operative visual improvement compared to transcranial approaches during a similar time period. Long-term follow-up will be needed to define recurrence rates of EEA as compared to transcranial approaches. Cautious use of EEA for the removal of smaller tuberculum sellae meningiomas after formal endoscopic training may be warranted ⁴⁾.

The [internal carotid artery](#) (ICA) and the patent [cavernous sinus](#) were detected with the [indocyanine green](#) (ICG) endoscope in real-time and at high resolution. The ICG endoscope is very useful Hide et al. suggest that the real-time observation of the blood supply to the [optic nerves](#) and pituitary helps to predict the preservation of their function ⁵⁾.

Systematic reviews

[Transcranial](#) approaches (TCAs) were the mainstay before [endoscopic endonasal approaches](#) (EEA) were developed, however the efficacy and safety of EEA approaches relative to TCA approaches remains unclear.

Jimenez et al. conducted a [PRISMA](#)-compliant [systematic review](#) of existing literature detailing the outcomes of both approaches. PubMed, Embase, Cochrane Library, and Clinicaltrials.gov were searched. Studies were included if they analyzed TS and/or PS meningiomas, included ≥ 5 patients, and reported at least one outcome of interest.

Overall, 44 retrospective studies met inclusion criteria, the majority being from single centers, between 2004 and 2020. In studies directly comparing postoperative outcomes among TCA and EEA approaches, EEA had significantly higher odds of visual improvement (OR = 3.24, $p = 0.0053$) and significantly higher odds of Cerebrospinal fluid fistula (OR = 3.71, $p = 0.0098$) relative to TCA. Further, there were no significant differences between visual worsening ($p = 0.17$), complications ($p = 0.51$), and GTR rates ($p = 0.30$) for the two approaches. Meta-analysis demonstrated no significant association between nasoseptal flap (NSF) use and postoperative outcomes among EEA patients. There was also no significant association between study publication year and postoperative EEA outcomes.

The present study demonstrates that EEA offers a viable alternative to TCA in the treatment of suprasellar meningiomas. In particular, EEA shows promise for superior visual outcomes, though postoperative Cerebrospinal fluid fistulas are an important consideration among patients undergoing this approach ⁶⁾

1)

Sakata K, Takeshige N, Nagata Y, Yoshitake H, Komaki S, Miyagi N, Morioka M. Endoscopic Endonasal Removal of Primary/Recurrent Meningiomas in the Medial Optic Canal: Surgical Technique and Long-

Term Visual Outcome. Oper Neurosurg (Hagerstown). 2019 Feb 7. doi: 10.1093/ons/opz001. [Epub ahead of print] PubMed PMID: 30753703.

2)

Kong DS, Hong CK, Hong SD, Nam DH, Lee JI, Seol HJ, Oh J, Kim DG, Kim YH. Selection of endoscopic or transcranial surgery for tuberculum sellae meningiomas according to specific anatomical features: a retrospective multicenter analysis (KOSEN-002). J Neurosurg. 2018 May 18:1-10. doi: 10.3171/2017.11.JNS171337. [Epub ahead of print] PubMed PMID: 29775151.

3)

Fernandez-Miranda JC, Pinheiro-Nieto C, Gardner PA, Snyderman CH. Endoscopic endonasal approach for a tuberculum sellae meningioma. J Neurosurg. 2012 Jan;32 Suppl:E8. PubMed PMID: 22251256.

4)

Clark AJ, Jahangiri A, Garcia RM, George JR, Sughrue ME, McDermott MW, El-Sayed IH, Aghi MK. Endoscopic surgery for tuberculum sellae meningiomas: a systematic review and meta-analysis. Neurosurg Rev. 2013 Jul;36(3):349-59. doi: 10.1007/s10143-013-0458-x. Epub 2013 Apr 9. Review. PubMed PMID: 23568697.

5)

Hide T, Yano S, Shinojima N, Kuratsu JI. Usefulness of the indocyanine green fluorescence endoscope in endonasal transsphenoidal surgery. J Neurosurg. 2015 Feb 27:1-8. [Epub ahead of print] PubMed PMID: 25723307.

6)

Jimenez AE, Harrison Snyder M, Rabinovich EP, Malkawi D, Chakravarti S, Wei O, Cheshire M, Carrie Price MLS, Khalafallah AM, Rowan NR, Mukherjee D. Comparison and evolution of transcranial versus endoscopic endonasal approaches for suprasellar Meningiomas: A systematic review. J Clin Neurosci. 2022 Mar 21;99:302-310. doi: 10.1016/j.jocn.2022.03.029. Epub ahead of print. PMID: 35325729.

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