Endoscopic Endonasal Transsphenoidal Approach

see also Extended endoscopic endonasal approach

- Secondary Pituitary Abscess Inside a Macroadenoma Complicated by Postoperative Hemorrhage and Reinfection: A Case Report
- Road map to enhanced recovery protocol for endonasal endoscopic approach to pituitary adenomas: Surgical short-term outcome and experience of a single ENT/neurosurgery collaboration
- Transcranial Microsurgery as a Salvage Strategy in Giant Pituitary Adenomas: A Single-Center Experience and Long-Term Follow-up Results
- Safety and efficacy of endoscopic vs. microscopic approaches in pituitary adenoma surgery: A systematic review and meta-analysis
- Sellar collision tumors: difficulties of preoperative neuroimaging and selection of surgical approach. Case reports and literature review
- Outcome metrics for primary endoscopic endonasal surgery for low-risk patients with Cushing's disease: an evidence-based position statement from the Registry of Adenomas of the Pituitary and Related Disorders consortium
- Contralateral Transmaxillary Approach For a 13-Year-Old Boy with a Petrous Apex Cholesterol Granuloma: A Case Report
- Bilateral anteromedial petrosectomy via endoscopic endonasal transclival approach for calcified sphenopetroclival chondrosarcoma with petrous apices and cavernous sinus involvement: technical nuances of a minimally invasive solution. Illustrative case

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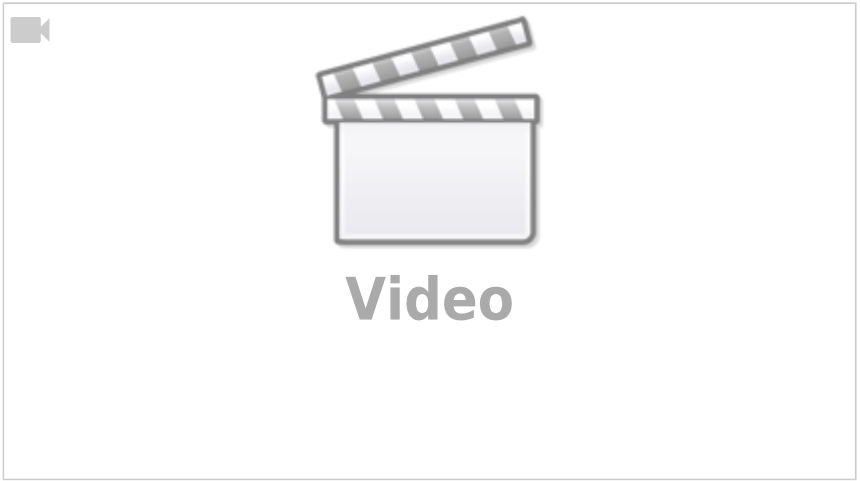

Indications

see Endoscopic endonasal approach for pituitary neuroendocrine tumor.

The endoscopic transsphenoidal approach shown to be as effective as, if not more than, the

traditional transseptal microscopic transsphenoidal surgery [1) 2) 3) 4) 5) 6) 7) 8) 9) 10) 11)].

Endoscopic transsphenoidal surgery is associated with higher gross tumor removal and lower incidence of septal perforation in patients with pituitary neuroendocrine tumor. Future large-scale prospective randomized controlled trials are needed to verify these findings [12)]

The interest in endoscopic endonasal transsphenoidal surgery for the treatment of sellar and perisellar lesions is growing as a consequence of the results achieved in the past years and of the interest by patients, endocrinologists, and neurosurgeons. Furthermore, the special ability of the endoscope to offer a wider and detailed view of anatomic structures is a major advantage that increases the attention of neurosurgeons who seek less invasive procedures and better results. Most neurosurgeons performing transsphenoidal surgery, however, are not used to endoscopy, and changing from microsurgical to endoscopic technique can be difficult and even discouraging, often because of difficulties in the initial phase of the procedure.

With the purpose of helping minimize some of the difficulties, Cavallo et al., described useful tips and tricks that mainly concern familiarization with the endoscopic equipment, details of the transsphenoidal anatomy, and endoscopic skills. They stressed the steps and details that they judge most important.

They believed that by following these recommendations neurosurgeons can overcome, or even avoid, the difficulties frequently encountered transsphenoidal surgery, allowing them to safely and efficiently perform endonasal transsphenoidal endoscopic procedures [13)].

Planning

Preoperative radiological analysis with CT & MRI is inevitable in planning endonasal transsphenoid surgery to avoid complications because of the high variability concerned with sphenoid anatomy. Anatomical variations of sphenoid sinus esp. degree of pneumatization, sellar configuration, septation pattern, inter carotid distance were evaluated. Results were significant and in concordance with other similar studies. Most frequently encountered pneumatization was sellar type and least was conchal type Sphenoid sinus pneumatization is directly linked to safe access to sella. Presence of septae within sinus need to be identified preoperatively to avoid damage and confusion intraoperatively [14)]

Anatomical Variations

Castle-Kirszbaum et al. described the skeletal, vascular and neural anatomical variations that could be encountered from the nasal phase, through the sphenoid phase, to the sellar phase of the operative exposure. A preoperative checklist is also provided [15)]

Technique

Endoscopic transsphenoidal approach technique

Complications

see Transsphenoidal approach complications

Outcome

A study assessed the long-term impact of endoscopic skull base surgery on olfaction, sinonasal symptoms, mucociliary clearance time (MCT), and quality of life (QoL). Patients with pituitary neuroendocrine tumors underwent TTEA (n = 38), while patients with other benign parasellar tumours who underwent an EEA with vascularised septal flap reconstruction (n = 17) were enrolled in this prospective study between 2009 and 2012. Sinonasal symptoms (Visual Analogue Scale), subjective olfactometry (Barcelona Smell Test-24, BAST-24), MCT (saccharin test), and QoL (short form SF-36, rhinosinusitis outcome measure/RSOM) were evaluated before, and 12 months after, surgery. At baseline, sinonasal symptoms, MCT, BAST-24, and QoL were similar between groups. Twelve months after surgery, both TTEA and EEA groups experienced smell impairment compared to baseline. Moreover, EEA (but not TTEA) patients reported increased posterior nasal discharge and longer MCTs compared to baseline. No significant changes in olfactometry or QoL were detected in either group 12 months after surgery. Over the long-term, expanded skull base surgery, using EEA, produced more sinonasal symptoms (including loss of smell) and longer MCTs than pituitary surgery (TTEA). EEA showed no long-term impact on smell test or QoL [16].

Case series

Endoscopic transsphenoidal approach case series.

Instruments

Endoscopic transsphenoidal approach Instruments.

In-Hospital Costs

All endoscopic transphenoidal pituitary surgeries performed from January 1, 2015, to October 24, 2017, with complete data were evaluated in a retrospective single-institution study. The electronic medical record was reviewed for patient factors, tumor characteristics, and cost variables during each hospital stay. Multivariate linear regression was performed using Stata software.

The analysis included 190 patients and average length of stay was 4.71 days. Average total in-hospital cost was $28,624 (95% confidence interval $25,094-$32,155) with average total direct cost of $19,444 ($17,136-$21,752) and total indirect cost of $9181 ($7592-$10,409). On multivariate regression, post-operative cerebrospinal fluid (CSF) leak was associated with a significant increase in all cost variables, including a total cost increase of $40,981 ($15,474-$66,489, P = .002). Current smoking status was associated with an increased total cost of $20,189 ($6,638-$33,740, P = .004). Self-reported Caucasian ethnicity was associated with a significant decrease in total cost of $6646 (-$12,760 to -$532, P = .033). Post-operative DI was associated with increased costs across all variables that were not statistically significant.

Post-operative Cerebrospinal fluid fistula, current smoking status, and non-Caucasian ethnicity were associated with significantly increased costs. Understanding of cost drivers of endoscopic transphenoidal pituitary surgery is critical for future cost control and value creation initiatives [17].

1)
The endoscopic versus the traditional approach in pituitary surgery. Frank G, Pasquini E, Farneti G, Mazzatenta D, Sciarretta V, Grasso V, Faustini Fustini M. Neuroendocrinology. 2006;83:240–248.
2)
Pure endoscopic endonasal approach for pituitary neuroendocrine tumors: early surgical results in 200 patients and comparison with previous microsurgical series. Dehdashti AR, Ganna A, Karabatsou K, Gentili F. Neurosurgery. 2008;62:1006–1015.
3)
Microscopic versus endoscopic transnasal pituitary surgery. Schaberg MR, Anand VK, Schwartz TH, Cobb W. Curr Opin Otolaryngol Head Neck Surg. 2010;18:8–14.
4)
Endoscopic versus microscopic trans-sphenoidal pituitary surgery: a systematic review and meta-analysis. Goudakos JK, Markou KD, Georgalas C. Clin Otolaryngol. 2011;36:212–220.
5)
Meta-analysis of endoscopic versus sublabial pituitary surgery. DeKlotz TR, Chia SH, Lu W, Makambi KH, Aulisi E, Deeb Z. Laryngoscope. 2012;122:511–518.
6)
Evaluation of trans-sphenoidal surgery in pituitary GH-secreting micro- and macroadenomas: a comparison between microsurgical and endoscopic approach. Lenzi J, Lapadula G, D'Amico T, et al. https://www.minervamedica.it/en/journals/neurosurgical-sciences/article.php?cod=R38Y2015N01A0011. J Neurosurg Sci. 2015;59:11–18.
7)
Endoscopic versus microscopic transsphenoidal surgery in the treatment of pituitary tumors: systematic review and meta-analysis of randomized and non-randomized controlled trials. Bastos RV, Silva CM, Tagliarini JV, Zanini MA, Romero FR, Boguszewski CL, Nunes VD. Arch Endocrinol Metab. 2016;60:411–419.
8)
Endoscopic versus microscopic approach in pituitary surgery. Gao Y, Zheng H, Xu S, Zheng Y, Wang Y, Jiang J, Zhong C. J Craniofac Surg. 2016;27:157–159.
9)
Resection of pituitary tumors: endoscopic versus microscopic. Singh H, Essayed WI, Cohen-Gadol A, Zada G, Schwartz TH. J Neurooncol. 2016;130:309–317.
10)
Endoscopic endonasal versus microsurgical transsphenoidal approach for growth hormone-secreting pituitary neuroendocrine tumors-systematic review and meta-analysis. Phan K, Xu J, Reddy R, Kalakoti P, Nanda A, Fairhall J. http://www.sciencedirect.com/science/article/pii/S1878875016310178. World Neurosurg. 2017;97:398–406.
11) 12)
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Endoscopic versus microscopic transsphenoidal surgery in the treatment of pituitary neuroendocrine tumor: A Systematic review and meta-analysis. Li A, Liu W, Cao P, Zheng Y, Bu Z, Zhou T. http://www.sciencedirect.com/science/article/pii/S1878875017300323. World Neurosurg. 2017;101:236–246.

13)

Cavallo LM, Dal Fabbro M, Jalalod'din H, Messina A, Esposito I, Esposito F, de Divitiis E, Cappabianca P. Endoscopic endonasal transsphenoidal surgery. Before scrubbing in: tips and tricks. Surg Neurol. 2007 Apr;67(4):342-7. Review. PubMed PMID: 17350397.

14)

Prakash BG, Vasan TSC, Babu AR, Saju S. Anatomical Variations of Sphenoid Sinus in South Indian Population: All That You Need for Trans-Sphenoidal Pituitary Surgery. Indian J Otolaryngol Head Neck Surg. 2022 Oct;74(Suppl 2):1646-1650. doi: 10.1007/s12070-021-02793-5. Epub 2021 Aug 3. PMID: 36452778; PMCID: PMC9702382.

15)

Castle-Kirszbaum M, Uren B, Goldschlager T. Anatomical Variation for the Endoscopic Endonasal Transsphenoidal Approach. World Neurosurg. 2021 Oct 2:S1878-8750(21)01456-X. doi: 10.1016/j.wneu.2021.09.103. Epub ahead of print. PMID: 34610448.

16)

Rioja E, Bernal-Sprekelsen M, Enriquez K, Enseñat J, Valero R, de Notaris M, Mullol J, Alobid I. Long-term outcomes of endoscopic endonasal approach for skull base surgery: a prospective study. Eur Arch Otorhinolaryngol. 2015 Dec 19. [Epub ahead of print] PubMed PMID: 26688432.

17)

Parasher AK, Lerner DK, Glicksman JT, et al. Drivers of In-Hospital Costs Following Endoscopic Transphenoidal Pituitary Surgery [published online ahead of print, 2020 Aug 24]. Laryngoscope. 2020;10.1002/lary.29041. doi:10.1002/lary.29041