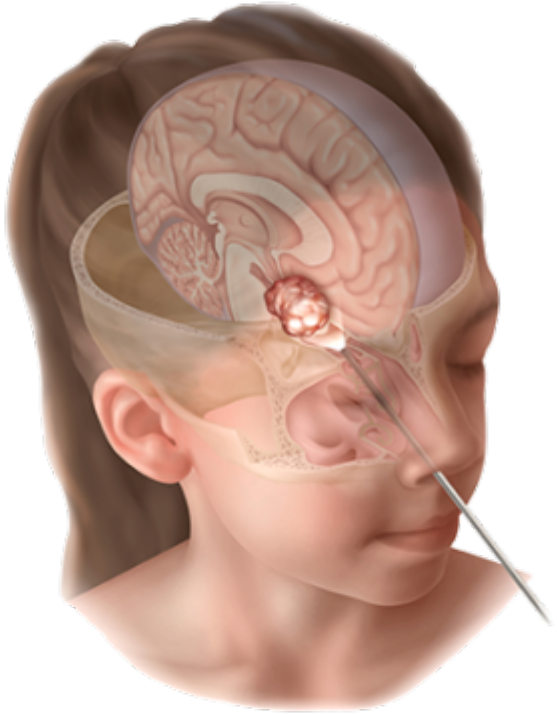
Craniopharyngioma endoscopic endonasal approach



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Indications

Craniopharyngioma endoscopic endonasal approach Indications.

Systematic reviews

The endoscopic endonasal approach (EEA) for craniopharyngiomas has proven to be a safe option for extensive tumor resection, with minimal or no manipulation of the optic nerves and excellent visualization of the superior hypophyseal artery branches when compared to the Transcranial Approach (TCA). However, there is an ongoing debate regarding the criteria for selecting different approaches. To explore the current results of EEA and discuss its role in the management of craniopharyngiomas, Figueredo et al. performed MEDLINE, Embase, and LILACS searches from 2012 to 2022. Baseline characteristics, the extent of resection, and clinical outcomes were evaluated. Statistical analysis was performed through an X2 and Fisher exact test, and a comparison between quantitative variables through a Kruskal-Wallis and verified with post hoc Bonferroni. The tumor volume was similar in both groups (EEA 11.92 cm3, -TCA 13.23 cm3). The mean follow-up in months was 39.9 for EEA and 43.94 for TCA, p = 0.76). The EEA group presented a higher visual improvement rate (41.96% vs. 25% for TCA, p < 0.0001, OR 7.7). Permanent DI was less frequent with EEA (29.20% vs. 67.40% for TCA, p < 0.0001, OR 0.2). CSF Leaks occurred more frequently with EEA (9.94% vs. 0.70% for TCA, p < 0.0001, OR 15.8). Recurrence rates were lower in the EEA group (EEA 15.50% vs. for TCA 21.20%, p = 0.04, OR 0.7). The results demonstrate that, in selected cases, EEA for resection of craniopharyngiomas is associated with better results regarding visual preservation and extent of tumor resection. Postoperative cerebrospinal fluid fistula rates associated with EEA have improved compared to the historical series. The decision-making process should consider each person's characteristics; however, it is noticeable that recent data regarding EEA justify its widespread application as a first-line approach in centers of excellence for skull base surgery [1].

Qiao et al., conducted a systematic review and meta-analysis. They conducted a comprehensive search of PubMed to identify relevant studies. Pituitary, hypothalamus functions and recurrence were used as outcome measures. A total of 39 cohort studies involving 3079 adult patients were included in the comparison. Among these studies, 752 patients across 17 studies underwent endoscopic transsphenoidal resection, and 2327 patients across 23 studies underwent transcranial resection. More patients in the endoscopic group (75.7%) had visual symptoms and endocrine symptoms (60.2%) than did patients in the transcranial group (67.0%, p = 0.038 and 42.0%, p = 0.016). There was no significant difference in hypopituitarism and pan-hypopituitarism after surgery between the two groups: 72.2% and 43.7% of the patients in endoscopic group compared to 80.7% and 48.3% in the transcranial group (p = 0.140 and p = 0.713). We observed same proportions of transient and permanent diabetes insipidus in both groups. Similar recurrence was observed in both groups (p = 0.131). Pooled analysis showed that neither weight gain (p = 0.406) nor memory impairment (p = 0.995) differed between the two groups. Meta-regression analysis revealed that gross total resection contributed to the heterogeneity of recurrence proportion (p < 0.001). They observed similar proportions of endocrine outcomes and recurrence in both endoscopic and transcranial groups. More recurrences were observed in studies with lower proportions of gross total resection [2].

Komotar et al performed a systematic review of the available published reports after endoscope-assisted endonasal approaches and compared their results with transsphenoidal purely microscope-based or transcranial microscope-based techniques.

The endoscopic endonasal approach is a safe and effective alternative for the treatment of certain craniopharyngiomas. Larger lesions with more lateral extension may be more suitable for an open approach, and further follow-up is needed to assess the long-term efficacy of this minimal access approach [3)]

Nowadays, an endoscopic endonasal approach (EEA) provides an “easier” way for CPs resection allowing a direct route to the tumor with direct visualization of the surrounding structures, diminishing inadvertent injuries, and providing a better outcome for the patient [4)].

Historically, aggressive surgical resection was the treatment goal to minimize the risk of tumor recurrence via open transcranial midline, anterolateral, and lateral approaches, but could lead to clinical sequela of visual, endocrine, and hypothalamic dysfunction. However, recent advances in the endoscopic endonasal approach over the last decade have mostly supplanted transcranial surgery as the optimal surgical approach for these tumors. With viable options for adjuvant radiation therapy, targeted medical treatment, and alternative minimally invasive surgical approaches, the management paradigm for craniopharyngiomas has shifted from aggressive open resection to more minimally invasive but maximally safe resection, emphasizing quality of life issues, particularly in regards to visual, endocrine, and hypothalamic function. [5)].

Craniopharyngioma surgery has evolved over the last two decades. Traditional transcranial microsurgical approaches were the only option until the advent of the endoscopic endonasal approach [6)].

The endoscopic endonasal approach for craniopharyngiomas is increasingly used as an alternative to microsurgical transsphenoidal or transcranial approaches. It is a step forward in treatment, providing improved resection rates and better visual outcome. Especially in retrochiasmatic tumors, this approach provides better lesion access and reduces the degree of manipulations of the optic apparatus. The panoramic view offered by endoscopy and the use of angulated optics allows the removal of lesions extending far into the third ventricle avoiding microsurgical brain splitting. Intensive training is required to perform this surgery [7)].

The highest priority of current surgical craniopharyngioma treatment is to maximize tumor removal without compromising the patients' long-term functional outcome. Surgical damage to the hypothalamus may be avoided or at least ameliorated with a precise knowledge regarding the type of adherence for each case.

Endoscopic endonasal approach, has been shown to achieve higher rates of hypothalamic

preservation regardless of the degree of involvement by tumor [8] [9].

Extended endoscopic transsphenoidal approach have gained interest. Surgeons have advocated for both approaches, and at present there is no consensus whether one approach is superior to the other.

With the widespread use of endoscopes in endonasal surgery, the endoscopic transtuberculum transplanum approach have been proposed as an alternative surgical route for removal of different types of suprasellar tumors, including solid craniopharyngiomas in patients with normal pituitary function and small sella.

As part of a minimally disruptive treatment paradigm, the extended endoscopic transsphenoidal approach has the potential to improve rates of resection, improve postoperative visual recovery, and minimize surgical morbidity [10].

Corridors

The endoscopic endonasal approach has become a valid surgical technique for the management of craniopharyngiomas. It provides an excellent corridor to infra- and supradiaphragmatic midline craniopharyngiomas, including the management of lesions extending into the third ventricle chamber. Even though indications for this approach are rigorously lesion based, the data confirm its effectiveness in a large patient series [11].

The endoscopic endonasal approach offers advantages in the management of craniopharyngiomas that historically have been approached via the transsphenoidal approach (i.e., purely intrasellar or intra-suprasellar infradiaphragmatic, preferably cystic lesions in patients with panhypopituitarism).

Use of the extended endoscopic endonasal approach overcomes the limits of the transsphenoidal route to the sella enabling the management of different purely suprasellar and retrosellar cystic/solid craniopharyngiomas, regardless of the sellar size or pituitary function [12].

They provide acceptable results comparable to those for traditional craniotomies. Endoscopic endonasal surgery is not limited to adults and actually shows higher resection rates in the pediatric population [13].

Infrachiasmatic corridor

Infrachiasmatic corridor

Complications

Craniopharyngioma endoscopic endonasal approach complications.

Case series

see Craniopharyngioma endoscopic endonasal approach case series.

References

1)
Figueredo LF, Martínez AL, Suarez-Meade P, Marenco-Hillembrand L, Salazar AF, Pabon D, Guzmán J, Murguiondo-Perez R, Hallak H, Godo A, Sandoval-Garcia C, Ordoñez-Rubiano EG, Donaldson A, Chaichana KL, Peris-Celda M, Bendok BR, Samson SL, Quinones-Hinojosa A, Almeida JP. Current Role of Endoscopic Endonasal Approach for Craniopharyngiomas: A 10-Year Systematic Review and Meta-Analysis Comparison with the Open Transcranial Approach. Brain Sci. 2023 May 23;13(6):842. doi: 10.3390/brainsci13060842. PMID: 37371322.
2)
Qiao N. Endocrine outcomes of endoscopic versus transcranial resection of craniopharyngiomas: A system review and meta-analysis. Clin Neurol Neurosurg. 2018 Apr 7;169:107-115. doi: 10.1016/j.clineuro.2018.04.009. [Epub ahead of print] Review. PubMed PMID: 29655011.
3)
Komotar RJ, Starke RM, Raper DM, Anand VK, Schwartz TH. Endoscopic endonasal compared with microscopic transsphenoidal and open transcranial resection of craniopharyngiomas. World Neurosurg. 2012 Feb;77(2):329-41. doi: 10.1016/j.wneu.2011.07.011. Epub 2011 Nov 1. Review. PubMed PMID: 22501020.
4)
Aragón-Arreola JF, Marian-Magaña R, Villalobos-Diaz R, López-Valencia G, Jimenez-Molina TM, Moncada-Habib JT, Sangrador-Deitos MV, Gómez-Amador JL. Endoscopic Endonasal Approach in Craniopharyngiomas: Representative Cases and Technical Nuances for the Young Neurosurgeon. Brain Sci. 2023 Apr 28;13(5):735. doi: 10.3390/brainsci13050735. PMID: 37239207; PMCID: PMC10216292.
5)
Hong CS, Omay SB. The Role of Surgical Approaches in the Multi-Modal Management of Adult Craniopharyngiomas. Curr Oncol. 2022 Feb 24;29(3):1408-1421. doi: 10.3390/curroncol29030118. PMID: 35323318; PMCID: PMC8947636.
6)
Fong RP, Babu CS, Schwartz TH. Endoscopic endonasal approach for craniopharyngiomas. J Neurosurg Sci. 2021 Apr;65(2):133-139. doi: 10.23736/S0390-5616.21.05097-9. PMID: 33890754.
7)
Baldauf J, Hosemann W, Schroeder HW. Endoscopic Endonasal Approach for Craniopharyngiomas. Neurosurg Clin N Am. 2015 Jul;26(3):363-75. doi: 10.1016/j.nec.2015.03.013. Epub 2015 May 26. PMID: 26141356.
8)
Tan TSE, Patel L, Gopal-Kothandapani JS, Ehtisham S, Ikazoboh EC, Hayward R, et al: The neuroendocrine sequelae of paediatric craniopharyngioma: a 40-year meta-data analysis of 185 cases from three UK centres. Eur J Endocrinol 176:359–369, 2017
9)
Yokoi H, Kodama S, Kogashiwa Y, Matsumoto Y, Ohkura Y, Nakagawa T, et al: An endoscopic endonasal approach for early-stage olfactory neuroblastoma: an evaluation of 2 cases with minireview of literature. Case Rep Otolaryngol 2015:541026, 2015
10)
Zacharia BE, Amine M, Anand V, Schwartz TH. Endoscopic Endonasal Management of Craniopharyngioma. Otolaryngol Clin North Am. 2016 Feb;49(1):201-12. doi: 10.1016/j.otc.2015.09.013. Review. PubMed PMID: 26614838.

11)

Cavallo LM, Frank G, Cappabianca P, Solari D, Mazzatenta D, Villa A, Zoli M, D'Enza AI, Esposito F, Pasquini E. The endoscopic endonasal approach for the management of craniopharyngiomas: a series of 103 patients. J Neurosurg. 2014 May 2. [Epub ahead of print] PubMed PMID: 24785324.

12)

Cavallo LM, Solari D, Esposito F, Villa A, Minniti G, Cappabianca P. The Role of the Endoscopic Endonasal Route in the Management of Craniopharyngiomas. World Neurosurg. 2014 Dec;82(6S):S32-S40. doi: 10.1016/j.wneu.2014.07.023. Review. PubMed PMID: 25496633.

13)

Koutourousiou M, Gardner PA, Fernandez-Miranda JC, Tyler-Kabara EC, Wang EW, Snyderman CH. Endoscopic endonasal surgery for craniopharyngiomas: surgical outcome in 64 patients. J Neurosurg. 2013 Nov;119(5):1194-207. doi: 10.3171/2013.6.JNS122259. Epub 2013 Aug 2. PubMed PMID: 23909243.