Endoscopic Endonasal Approach Indications

A PubMed search for articles published between January 1990 and January 2014 about “endoscopic skull base surgery”, “endoscopic transsphenoidal approach”, “endoscopic treatment of parasellar tumors” and “suprasellar lesions” was performed.

According to the current data, endoscopic surgery seems to be superior to open and transsphenoidal surgery microscopic removal of giant pituitary neuroendocrine tumors. Endoscopy is at least as successful as transsphenoidal microsurgery for the removal of pituitary neuroendocrine tumors and craniopharyngiomas. Transcranial open approaches, in the context of anterior midline skull base meningiomas, present higher rates of gross total resection, fewer complications and better clinical results than endoscopy approaches. The rate of postoperative Cerebrospinal fluid fistula has been significantly reduced with the introduction of new techniques such as the Hadad- Bassagasteguy flap but still represent one of the most important complications of this technique.

Currently, selected tumors located at the anterior, middle and posterior fossa can be adequately assessed using the endoscope with low rates of postoperative Cerebrospinal fluid fistulas. Endoscopic surgery has substantially evolved in the last decades through the collaboration of different teams around the world. The endoscope is now an essential tool in the neurosurgery armamentarium with great potential for new applications in the nearby future [1].

The evolution of the endoscopic endonasal transsphenoidal approach, which was initially reserved only for sellar lesions through the sphenoidal sinus cavity, has lead in the last decades to a progressive possibility to access the skull base from the nose. This route allows midline access and visibility to the suprasellar, retrosellar and parasellar space while obviating brain retraction, and makes possible to treat transsphenoidally a variety of relatively small midline skull base and parasellar lesions traditionally approached transcranially.

In a cadaveric model, the piezoelectric endoscopic transsphenoidal craniotomy (PETC) is technically feasible. This technique allows the surgeon to create a bone flap in endoscopic transnasal approaches similar to existing standard transcranial craniotomies. Future trials will focus on skull base reconstruction using this bone flap [2].

Preserving normal sinonasal physiology by limiting middle turbinate resections, avoiding unnecessary maxillary antrostomies, and reducing the use of nasoseptal flaps when feasible results in less sinonasal morbidity and more rapid recovery during the postoperative period [3].

Pituitary surgery

see Endoscopic endonasal approach for pituitary neuroendocrine tumor.

Cerebral Aneurysm

see Endoscopic endonasal approach for intracranial aneurysm

Optic neuropathy

Based on the anatomic relationship between sinonasal complex and orbit, this approach could be a smart solution for approaching the medial orbital region.

These techniques should be considered a valid option for optic nerve decompression in cases of Graves ophthalmopathy and post-traumatic optic neuropathy as well as for addressing extraconal or intraconal lesions placed medially to the optic nerve course [4].

Four main pathologies with outcomes after treatment were identified for discussion: pituitary neuroendocrine tumors, craniopharyngiomas, anterior skull base meningiomas, and chordomas. Within all four of these tumor types, articles have demonstrated the efficacy, and in certain cases, the advantages over more traditional microscope-based techniques, of the endonasal endoscopic technique [5].

The endoscopic endonasal approach is a safe and effective procedure for the management of recurrent and/or regrowing pituitary tumors previously treated by either a microsurgical or an endoscopic approach [6].

Craniopharyngiomas

see Craniopharyngioma endoscopic endonasal approach

Anterior skull base meningiomas

Is feasible and safe for the complete resection of anterior skull base meningiomas with intra- and extracranial extension in one stage in selected cases.

Although the endonasal endoscopic approach has been applied to remove olfactory groove meningiomas, controversy exists regarding the efficacy and safety of this approach compared with more traditional transcranial approaches

Cavernous sinus lesion.

Petrous apex Choleterol granulomas

The EEA is a safe and effective alternative to traditional open approaches to petrous apex CGs [7].

Cerebrospinal fluid fistula

Endoscopic endonasal approach for Cerebrospinal fluid fistula

Access to the intraorbital optic nerve segment

see transorbital approach.

Nonvestibular schwannomas

Nonvestibular schwannomas of the skull base often represent a challenge owing to their anatomic location. With improved techniques in endoscopic endonasal skull base surgery, resection of various ventral skull base tumors, including schwannomas, has become possible.

To assess the outcomes of using endoscopic endonasal approach (EEA) for nonvestibular schwannomas of the skull base.

Seventeen patients operated on for skull base schwannomas by EEA at the University of Pittsburgh Medical Center from 2003 to 2009 were reviewed.

Three patients underwent combined approaches with retromastoid craniectomy (n = 2) and orbitopterional craniotomy (n = 1). Three patients underwent multistage EEA. The rest received a single EEA operation. Data on degree of resection were found for 15 patients. Gross total resection (n = 9) and near-total (>90%) resection (n = 3) were achieved in 12 patients (80%). There were no tumor recurrences or postoperative Cerebrospinal fluid fistulas. In 3 of 7 patients with preoperative sensory deficits of trigeminal nerve distribution, there were partial improvements. Patients with preoperative reduced vision (n = 1) and cranial nerve VI or III palsies (n = 3) also showed improvement. Five patients had new postoperative trigeminal nerve deficits: 2 had sensory deficits only, 1 had motor deficit only, and 2 had both motor and sensory deficits. Three of these patients had partial improvement, but 3 developed corneal neurotrophic keratopathy.

An EEA provides adequate access for nonvestibular schwannomas invading the skull base, allowing a high degree of resection with a low rate of complications [8].

1)
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2)
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3)
Thompson CF, Suh JD, Liu Y, Bergsneider M, Wang MB. Modifications to the endoscopic approach for anterior skull base lesions improve postoperative sinonasal symptoms. J Neurol Surg B Skull Base. 2014 Feb;75(1):65-72. doi:10.1055/s-0033-1356492. Epub 2013 Oct 10. PubMed PMID: 24498592.
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6)

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Paluzzi A, Gardner P, Fernandez-Miranda JC, Pinheiro-Neto CD, Scopel TF, Koutourousiou M, Snyderman CH. Endoscopic endonasal approach to cholesterol granulomas of the petrous apex: a series of 17 patients: clinical article. J Neurosurg. 2012 Apr;116(4):792-8. doi: 10.3171/2011.11.JNS111077. Epub 2012 Jan 6. PubMed PMID: 22224788.
8)

Shin SS, Gardner PA, Stefko ST, Madhok R, Fernandez-Miranda JC, Snyderman CH. Endoscopic endonasal approach for nonvestibular schwannomas. Neurosurgery. 2011 Nov;69(5):1046-57; discussion 1057. doi: 10.1227/NEU.0b013e3182287bb9. PubMed PMID: 21673609.