Endoscopic Endonasal Approach for Olfactory Groove Meningioma

Because these tumors originate at the ventral skull base, the endonasal route provides direct access to the tumor blood supply for early devascularization and removal of the underlying hyperostotic bone at the cranial base. In carefully selected patients, these tumors can be totally removed without additional brain retraction or manipulation.

Technological advances (angled endoscopes, specialized instrumentation, image guidance, neurophysiological monitoring) and increasing experience have expanded the indications of endoscopic endonasal surgery (EES) to include anterior skull base meningiomas.

A study provides preliminary evidence that EEA is associated with quantifiable improvements in postoperative frontal lobe imaging.

**Technique**

An endonasal “keyhole craniectomy” is performed in the ventral skull base directly over the basal dural attachment, extending from the posterior wall of the frontal sinus to the planum sphenoidale and tuberculum sellae in the anteroposterior plane, and from one medial orbit to the other in the coronal plane. Excellent panoramic visualization of the keyhole skull base defect can be obtained with a 30° endoscope after performing a modified Lothrop procedure. Because the dural attachment is adjacent to the paranasal sinuses, early devascularization and total Simpson Grade I removal of the tumor including the dural attachment and underlying hyperostotic bone can be achieved in properly selected patients.

**Comparison of endoscopic endonasal and bifrontal craniotomy approaches for olfactory groove meningioma**

de Almeida et al. compare the outcomes and postoperative MRI changes of endoscopic endonasal (EEA) and bifrontal craniotomy (BFC) approaches for olfactory groove meningiomas (OGM). All patients who underwent either BFC or EEA for OGM were eligible. Matched pairs were created by matching tumor volumes of an EEA patient with a BFC patient, and matching the timing of the postoperative scans. The tumor dimensions, peritumoral edema, resectability issues, and frontal lobe changes were recorded based on preoperative and postoperative MRI. Postoperative fluid-attenuated inversion recovery (FLAIR) hyperintensity and residual cystic cavity (porencephalic cave) volume were compared using univariable and multivariable analyses. From a total of 70 patients (46 EEA, 24 BFC), 10 matched pairs (20 patients) were created. Three patients (30%) in the EEA group and two (20%) in the BFC had postoperative cerebrospinal fluid leaks (p=0.61). Gross total resections were achieved in seven (70%) of the EEA group and nine (90%) of the BFC group (p=0.26), and one patient from each group developed a recurrence. On postoperative MRI, there was no significant difference in FLAIR signal volumes between EEA and BFC approaches (6.9 versus 13.3cm3; p=0.17) or in porencephalic cave volumes (1.7 versus 5.0cm3; p=0.11) in univariable analysis. However, in a multivariable analysis, EEA was associated with less postoperative FLAIR change (p=0.02) after adjusting for the volume of preoperative edema. This study provides preliminary evidence that EEA is associated with quantifiable improvements in postoperative frontal lobe imaging.

**Case series**
2016

Nineteen cases were reviewed and divided according to operative technique into 3 different groups: purely endonasal (6 cases); supraorbital eyebrow (microscopic with endoscopic assistance; 7 cases); and combined endonasal endoscopic with either the bicornoral or eyebrow microscopic approach (6 cases). Resection was judged on postoperative MRI using volumetric analysis. Tumors were assessed based on the Mohr radiological classification and the presence of the lion's mane sign. RESULTS The mean age at surgery was 61.4 years. The mean tumor volume was 19.6 cm$^3$ in the endonasal group, 33.5 cm$^3$ in the supraorbital group, and 37.8 cm$^3$ in the combined group. Significant frontal lobe edema was identified in 10 cases (52.6%). The majority of tumors were either Mohr Grade II (moderate) (42.1%) or Grade III (large) (47.4%). Gross-total resection was achieved in 50% of the endonasal cases, 100% of the supraorbital eyebrow cases with endoscopic assistance, and 66.7% of the combined cases. The extent of resection was 87.8% for the endonasal cases, 100% for the supraorbital eyebrow cases, and 98.9% for the combined cases. Postoperative anosmia occurred in 100% of the endonasal and combined cases and only 57.1% of the supraorbital eyebrow cases. Excluding anosmia, permanent complications occurred in 83.3% of the cases in the endoscopic group, 0% of the cases in the supraorbital eyebrow group, and 16.7% of cases in the combined group ($p = 0.017$). There were 3 tumor recurrences: 2 in the endonasal group and 1 in the combined group.

The supraorbital eyebrow approach, with endoscopic assistance, leads to a higher extent of resection and lower rate of complications than the purely endonasal endoscopic approach. The endonasal endoscopic approach by itself may be suitable for a small percentage of cases. The combined above-and-below approaches are useful for large tumors with invasion of the ethmoid sinuses.

Case reports

2014

Herein, the authors describe a 39-year-old female who presented with a progressively enlarging olfactory groove menigioma. An endoscopic endonasal resection with a septal transposition technique was performed. On follow-up, the nasal cavity had completely normal anatomy with preservation of the turbinates and nasal septum. The authors conclude that septal transposition is a useful technique that allows wide exposure of the anterior cranial base with maximal preservation of normal nasal anatomy and avoidance of a large septal perforation.

2008

Webb-Myers et al. report a case of olfactory groove menigioma treated with a minimally invasive entirely endoscopic technique. The endoscopic endonasal technique represents a possible alternative for suitably selected cases and could be expected to minimize neuropsychiatric sequelae.


