

Endoscopic anterior skull base surgery

Its a [anterior skull base surgery](#) type.

Since the 1970s, the introduction and promotion of the surgical endoscope by Messerklinger, Stammberger, and Kennedy, commenced the era of endoscopic sinus surgery.

Thaler and colleagues described the utility of the endoscope for ASB surgery at the turn of the century. This allowed direct visualization and safer, more accurate removal of tumors. In 2001, Casiano reported the first purely endoscopic endonasal ASB resection, a novel technique that has been adopted by major skull base centers. The success of ASB surgery can be attributed to both the development of the skull base team as well as improvements in surgical techniques, instrumentation, and visualization technology ¹⁾.

As a result, tumors of the anterior skull base that were once considered inoperable are now routinely resected with reliable results and decreasing morbidity ²⁾.

Endoscopic cadaveric dissections confirmed technical feasibility of ASB surgery and greatly enhanced understanding of ASB anatomical concepts. The 30 degrees rigid endoscope provided the most optimal view from the frontal sinus to the planum sphenoidale with the least distortion, relative to 0 degrees and 70 degrees scopes. Careful identification of the anterior ethmoid artery (AEA) and posterior ethmoid artery (PEA) and was requisite for proper orientation at the ASB. The posterior one third of the ASB was thickest and always required drilling for resection. The mean boundaries of the ASB window were 33.7 mm (anterior to posterior) and 23.5 and 19.1 mm at the AEA and PEA (orbit to orbit), respectively ³⁾.

Technical aspects

During the [endonasal approach](#) for [anterior skull base](#) surgery, full advantage of the surgical corridor made by the [middle turbinate](#) resection should be taken. To control intraoperative bleeding, it is critical to identify [anterior ethmoidal artery](#) and [posterior ethmoidal artery](#). Identification and protection of [orbital medial wall](#) and the [optic nerve](#), and controlling the ranges of anterior basicranial craniotomy are of great importance for surgical safety ⁴⁾.

Neuronavigation

Detailed knowledge of the vascular anatomy of the anterior skull base is critical to successful surgery in this area. Whereas conventional neuronavigational approaches combine MRI (+/- contrast) for tumor visualization and CT (+/- C) for bony and vascular anatomy, a protocol integrating MR angiography (MRA) into surgical neuronavigation provide superior visualization of the carotid arteries. The pre-operative imaging protocol employs a T1-weighted, 3D fast spoiled gradient echo MRI (+/- C) for soft tissue anatomy, a plain CT for bony anatomy, and a 3D time-of-flight MR angiography for carotid anatomy. The series are imported into the Medtronic StealthStation⁵⁾ TREON⁶⁾ Treatment Guidance System; during intra-operative neuronavigation, each series (MRI, CT, MRA) can be viewed individually, or layered and viewed as a composite image. Our protocol has important advantages. First, it provides detailed tissue, tumor, vascular and bony anatomy. Second, a contrast CT is not necessary; this is important, as numerous reports have highlighted the nephrotoxic nature of radiographic contrast material. Third, visualization of the carotid system is superior than can be

obtained from CT angiography. This imaging protocol routinely for endoscopic transsphenoidal surgeries provide superior visualization of the carotid arteries during anterior skull base surgery ⁷⁾

Quality-of-Life

Endoscopic skull base surgery is a valuable tool in the neurosurgical management of anterior skull base pathology, leading to improvements in site-specific QOL ⁸⁾.

Sinonasal Outcomes Test (SNOT)-20 survey scores at preoperative and at three postoperative time points. An ordinal logistic regression model was used to analyze the data, summarizing the relationship between the outcome (SNOT score) and the predictor (time point) using an odds ratio. Scores for the symptoms of need to blow nose, sneezing, runny nose, postnasal discharge, thick nasal discharge, ear fullness, and facial pain showed significant worsening at the early postoperative time point. These symptoms showed significant improvement over time; however, scores for post nasal discharge remained high at the late time period compared with baseline. All patients will experience considerable sinonasal symptoms following transnasal endoscopic skull base surgery. Postnasal discharge and thick nasal discharge improve significantly over time. Symptoms approach baseline by 6 to 9 months following surgery ⁹⁾.

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