Abstract

Introduction: Large cranial base defects after skull base surgery expose the brain to iatrogenic injury via insertion of endonasal tubes. It has reported in the literature that nasogastric tubes (NGT) have inadvertently been placed into the brain stem or spinal cord postoperatively. This can have devastating ramifications including neurologic sequelae and patients have died secondary to intracranial NGT placement. For these reasons, it is prudent to implement surgical techniques to help protect the cranial base against iatrogenic injury after endoscopic, endonasal skull base surgery.

Methods and Results: We describe techniques including middle turbinate preservation and medialization, a limited posterior nasal septectomy and transseptal approaches that help protect the cranial base after transphenoidal surgery. In addition, we provide a video illustrating how the cranial base is protected using these methods.

Conclusion: Operative techniques in endoscopic skull base surgery that facilitate closure of the sphenoid sinus likely decreases the risk of postoperative iatrogenic injury via inadvertent placement of endonasal tubes.

Techniques for Protecting the Cranial Base

Herein we describe operative techniques that serve to protect the cranial base after transphenoidal surgery. One method to protect the cranial base is by creating conservative sphenoidotomies (1.5 approach, Figure 3). For example, a right sided wide sphenoidotomy is performed along with a small contralateral sphenoidotomy. A limited posterior septectomy of <2 cm is created. Once healed, the opening to the sphenoid sinus is very narrow. In our experience, not only does a smaller posterior septectomy serve to protect the cranial base, but it also has the additional advantage of decreasing post-operative sinonasal morbidity.

A septoplasty with a submucosal “tunnel” approach can be utilized to correct septal deviations. On the side of the hemi-transfixion incision, the surgeon works inside the submucosal septal tunnel to create a sphenoidotomy in a submucosal fashion and access the skull base. Thus, the sphenoid sinus ostium on the side of the hemi-transfixion incision is not widened and the skull base is not exposed (Figure 4).

The middle turbinates are preserved and complete ethmoidectomies are not performed. Limited posterior ethmoidectomies are utilized when needed for access. The middle turbinates are medialized at the end of the procedure. This serves to protect access to the sphenoidotomy by a NGT.

In contrast to routinely removing bone over the carotid artery and optic nerves, we maintain these protective bony structures. Routine bony removal exposing critical structures along the cranial base is avoided and exposure is based on the access required for each individual case. Additionally, we ensure patients are adequately informed of their risk for a cranial base defect after their surgery, and some have found wearing medical alert bracelets detailing their special circumstances to be extremely helpful in relaying this potentially life-saving information to other medical providers in emergency settings.

References