Transfacial and Craniofacial Approaches for Resection of Sinonasal and Ventral Skull Base Malignancies

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KEYWORDS

• Ventral skull base surgery • Craniofacial approach • Transfacial approach
• Sinonasal malignancy • Skull base • Open resection

KEY POINTS

- A transfacial or craniofacial approach allows for wide, potentially en bloc resection and is ideal for tumors that involve surrounding soft tissue, the palate, anterolateral frontal sinus, and dura.
- Regardless of an open versus combined approach, a complete resection with negative margins should be the primary goal.
- The transfacial approach can be gradual and stepwise depending on the extent of the disease and often begins with a lateral rhinotomy to gain access to facial and orbital regions.
- Craniofacial approaches combine the traditional transfacial approaches with a bifrontal or subfrontal craniotomy to provide greater exposure to the ventral skull base.
- Transfacial and craniofacial approaches have been greatly refined since their initial descriptions, but now are mostly reserved for advanced lesions not amenable to endoscopic removal.

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Otolaryngol Clin N Am ■ (2016) ■–■
http://dx.doi.org/10.1016/j.otc.2016.12.006 **oto.theclinics.com**

INTRODUCTION

Malignancies of the paranasal sinuses present unique challenges to physicians given their late presentation, diverse histology, and involvement of complex anatomic structures. Surgical resection with sound oncologic principles and reconstruction can restore function and prolong meaningful life. Small tumors of the anterior ventral skull base, such as T1 or T2, can often be managed solely by endoscopic resection. Larger tumors involving complex neurovascular or intraorbital structures often necessitate open transfacial or craniofacial resection. The decision to proceed with endoscopic versus open versus a combined approach should be made based on tumor location, reconstruction options, and surgeon experience. The preoperative planning, surgical steps, postoperative care, and clinical results from the literature are discussed in this article.

PREOPERATIVE PLANNING

The evaluation of every patient with concerns for a sinonasal and ventral skull base malignancy should begin with a thorough clinical history, review of systems and physical examination. With careful attention made to the ocular and cranial nerve examination, the extent and spread of tumor can be predicted. Sinonasal endoscopy is performed for further tumor characterization and to exclude any underlying infection. Imaging is essential to diagnosis and preoperative planning. A combination of computed tomography (CT) and MRI is invaluable for determining the extent of tumor involvement, orbital invasion, and intracranial extension (**Fig. 1**). Although CT is superior to MRI in evaluating bony detail (particularly the skull base), MRI is beneficial for evaluating the soft tissues, perineural and dural involvement, and intracranial extension (see **Fig. 1**). Contraindications to surgical management of ventral skull base lesions include significant gross brain invasion, bilateral invasion of the optic nerve or optic chiasm, carotid artery invasion, and distant metastasis.[1]

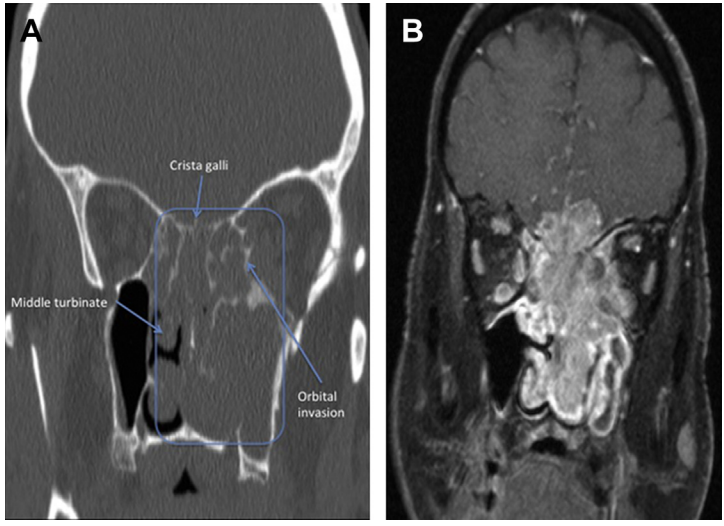

Fig. 1. Coronal CT (*A*) and T1-weighted MRI (*B*) show highly infiltrative sinonasal carcinoma centered within the left nasal cavity with extensions to the orbit, anterior cranial fossa, soft tissue of the nose, and pterygoid fossa.