Endoscopic Endonasal Surgery for Tumors of the Cavernous Sinus – Experience with 235 Cases

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Introduction

For many years, tumors of the cavernous sinus (CS) were considered inoperable given the high density of neurovascular structures within the CS. During the past two decades detailed microsurgical studies have described numerous approaches to the CS. We present our experience with endoscopic endonasal surgery (EES).

Methods

We retrospectively reviewed the surgical outcomes and complications of 235 patients with skull base tumor invading the CS (period: April 2002 - November 2012).

Results

Mean patients' age was 53 years (range 20-88) and the cohort consisted mainly of pituitary adenomas (n=168, 71.5%), meningiomas (n=34, 14.5%), chordomas (n=20, 8.5%) and 13 other rare skull base tumors. In 19 non-adenomatous lesions the goal of surgery was biopsy and decompression; among the remaining tumors, the overall gross total resection rate was 34.7% (35.5% in adenomas, 31.3% in non-adenomatous lesions). In pituitary adenomas, CS invasion was evaluated with the Knosp criteria (>grade 3) and confirmed with intraoperative observation. Among 56 patients (23.8%) who presented with cranial neuropathies due to CS compression (CN III, IV, V1, V2, VI palsies), 34 (60.7%) showed postoperative improvement or normalization of the pre-existing palsy, 21 (37.5%) remained unchanged and 1 (1.8%) further deteriorated. New cranial neuropathies occurred in 14 patients (6%) and included 6 abducens nerve palsies and 6 trigeminal neuropathies in non-adenomatous cases, as well as 2 oculomotor palsies in pituitary cases, both due to hemorrhage of residual giant adenomas. Other complications included CSF leak in19 patients (8%) and carotid artery injury in 6 (2.5%) mainly occurred in non-adenomatous cases; one of these patients died of stroke.

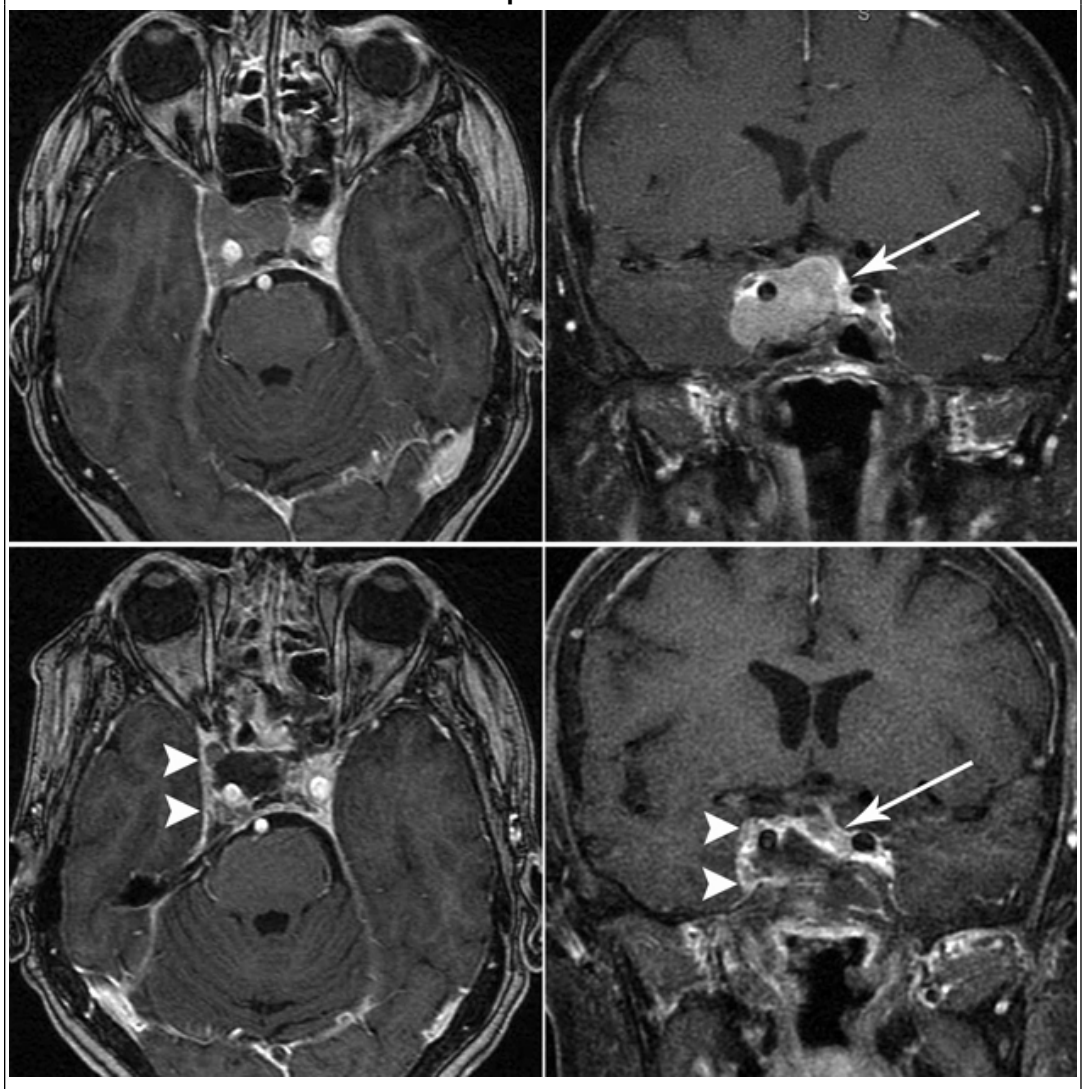
Conclusions

Tumors invading the CS are difficult to access by open approaches without new neurological deficit. EES has acceptable results in the management of these tumors. The risk of intracavernous carotid injury remains high and may be dependent on pathology.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of EES in the treatment of skull base tumors with invasion of the cavernous sinus. 2) Discuss the advent of endoscopic technologies and techniques that facilitates tumor resection with minimal neurological deficit compared to open approaches to the cavernous sinus. 3) Identify an effective treatment in the management of cavernous sinus tumor.

. Near total resection of an ectopic esthesioneuroblastoma of the CS



Upper: Preop MRIs with contrast show a tumor occupying the whole CS and expanding the medial wall of the CS towards the midline displacing the pituitary stalk and compressing the pituitary gland (arrow). Lower: Immediate postop MRIs with contrast demonstrate an extensive evacuation of the right CS with small residual remaining attached the lateral wall of the CS (arrowheads), lateral to the paraclinoidal segment of the ICA. The pituitary stalk and gland have been decompressed (arrow) and returned in a more natural location