



Endoscopic Endonasal Surgery for Ventral Foramen Magnum Meningiomas

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Learning Objectives

To understand the advantages and limitations of endoscopic endonasal surgery for the treatment of ventral foramen magnum meningiomas.

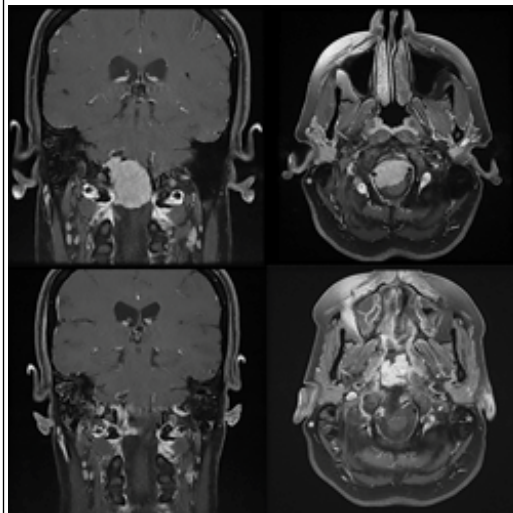
Introduction

Purely ventral foramen magnum meningiomas are challenging tumors to treat given their location, proximity and relationship to the brainstem, lower cranial nerves and vertebral arteries. Even though meningiomas represent 70% of all foramen magnum tumors, they account for 0.2-3.2% of all intracranial meningiomas (1-5). Endoscopic Endonasal Surgery (EES) has been used as an alternative to traditional approaches in the management of many ventral tumors, providing a direct anterior approach with wide access to the foramen magnum (4,6-7). In this study, we evaluate the surgical outcomes of patients treated with EES, discuss the factors that restrict gross total resection (GTR) of these tumors and compare our results and complications with those of other approaches.

Methods

From May 2008 to October 2013, 5 patients underwent EES for primary ventral foramen magnum meningiomas. Patient age ranged from 48 to 75 and they were all female. The goal of surgery was decompression of the brainstem and the lower cranial nerves with gross-total resection (GTR) when possible. Gross total resection was defined as Simpson Grade I. Degree of tumor resection was classified as near total resection (NTR) when =95% of the tumor was removed and subtotal (STR) for resection <95%. We retrospectively reviewed their records to evaluate outcomes.

Gross total resection of a foramen magnum meningioma with EES



Upper: Preoperative coronal and axial T1-weighted MRI demonstrating a ventral foramen magnum meningioma. Lower: Postoperative coronal and axial T1-weighted MRI studies obtained after GTR with EES

Results

Three patients presented with long-tract and lower cranial nerves deficits. Gross or near total resection was achieved in every case. Preoperative median Karnofsky score was 80 (range: 40-100) which improved to 100 postoperatively (range: 90-100). Pre-existing long-tract and lower cranial nerves deficits improved in every patient and normalized in 2 (66.7 %). Following EES, one patient (20%) developed CSF leak that resulted in meningitis. Other complications included epidural abscess formation in one patient following necrosis of the nasoseptal flap which was surgically treated. Hydrocephalus occurred in 2 patients without long-term deficits after ventriculo-peritoneal shunt insertion. Two patients developed deep venous thrombosis, which resulted in a pulmonary embolism in one of them; they were managed with anticoagulation without further sequelae. No one developed occipito-cervical instability following EES. There were no new lower cranial neuropathies but one patient developed partial abducens nerve palsy. There was no operative mortality.

Conclusions

EES is a competitive alternative to open approaches for the treatment of purely ventral foramen magnum meningiomas with good results when performed by experienced endoscopic skull base surgeons.

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