



Preoperative Endovascular Carotid Occlusion Facilitates Internal Carotid Artery Resection for Lateral Skull Base Lesions.



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Introduction

While lateral skull base tumor involvement of the ICA has traditionally been thought to be a relative contraindication to surgical management, in exceptional cases, carotid resection may offer survival or outcome advantages. This case series presents and discusses how preoperative endovascular balloon occlusion testing and carotid occlusion can facilitate resection of the internal carotid artery allowing for total or near total ablation of select advanced lateral skull base lesions.

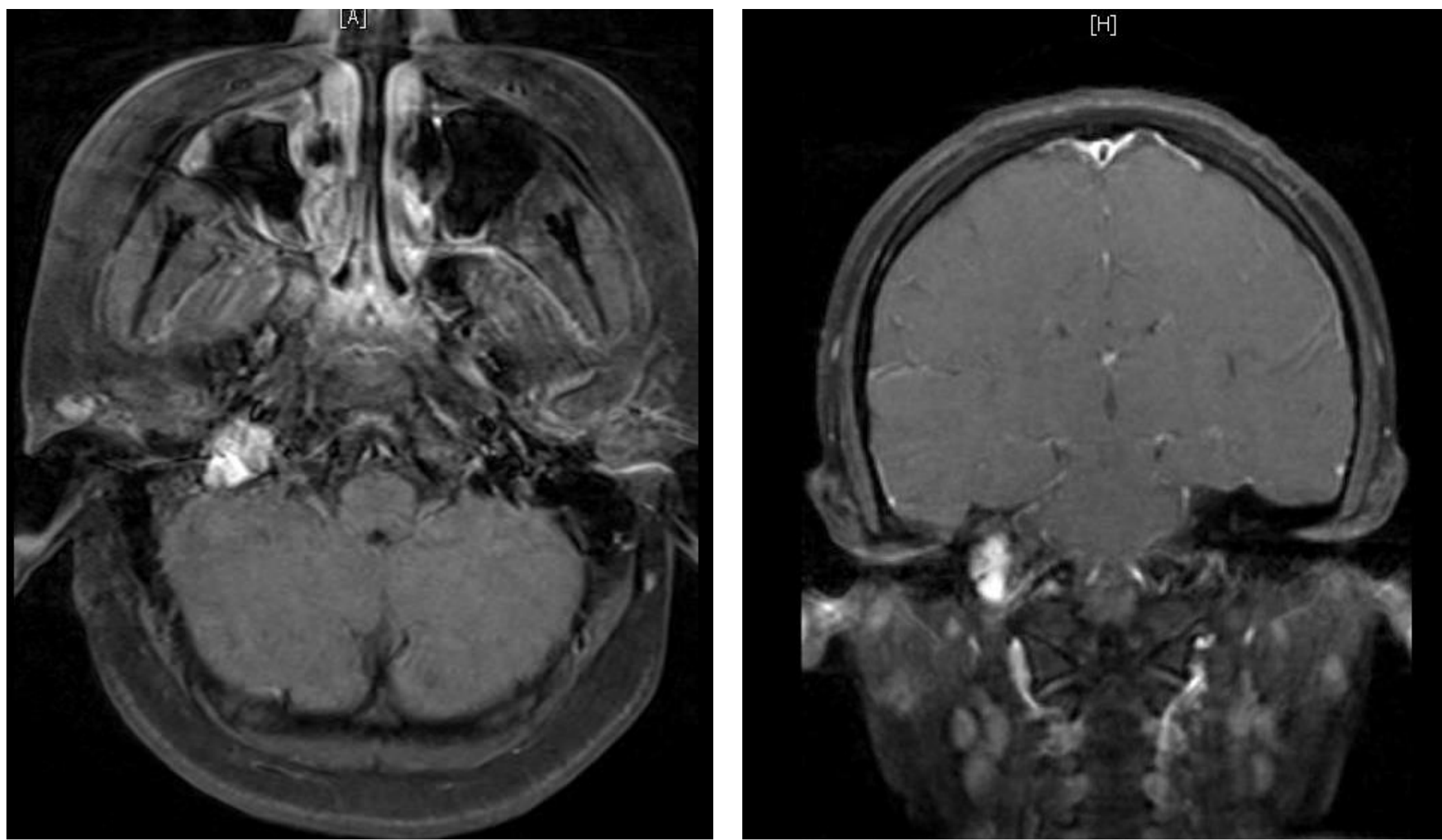


Figure 1. T1 with contrast MR of recurrent right sided endolymphatic sac tumor. The lesion had recurred following a translabyrinthine approach.

Methods and Materials

Retrospective review of patients undergoing preoperative carotid occlusion in a referral skull base center. Two patients underwent balloon occlusion to demonstrate cooperative vascular anatomy, followed by endovascular occlusion, post-embolization supportive care and surgical resection of the lesion with sacrifice of the ICA. One patient is an 11 year-old female with a recurrent endolymphatic sac tumor with invasion of the ICA at the vertical portion of the petrous segment. The second patient is a 48 year-old female who had undergone multiple surgeries for a left sided paraganglioma. The lesion had grown to 6.5 cm at the jugular foramen with an additional 3.5cm cerebellopontine angle component which surrounded and narrowed the cervical and petrous portion of the ICA.

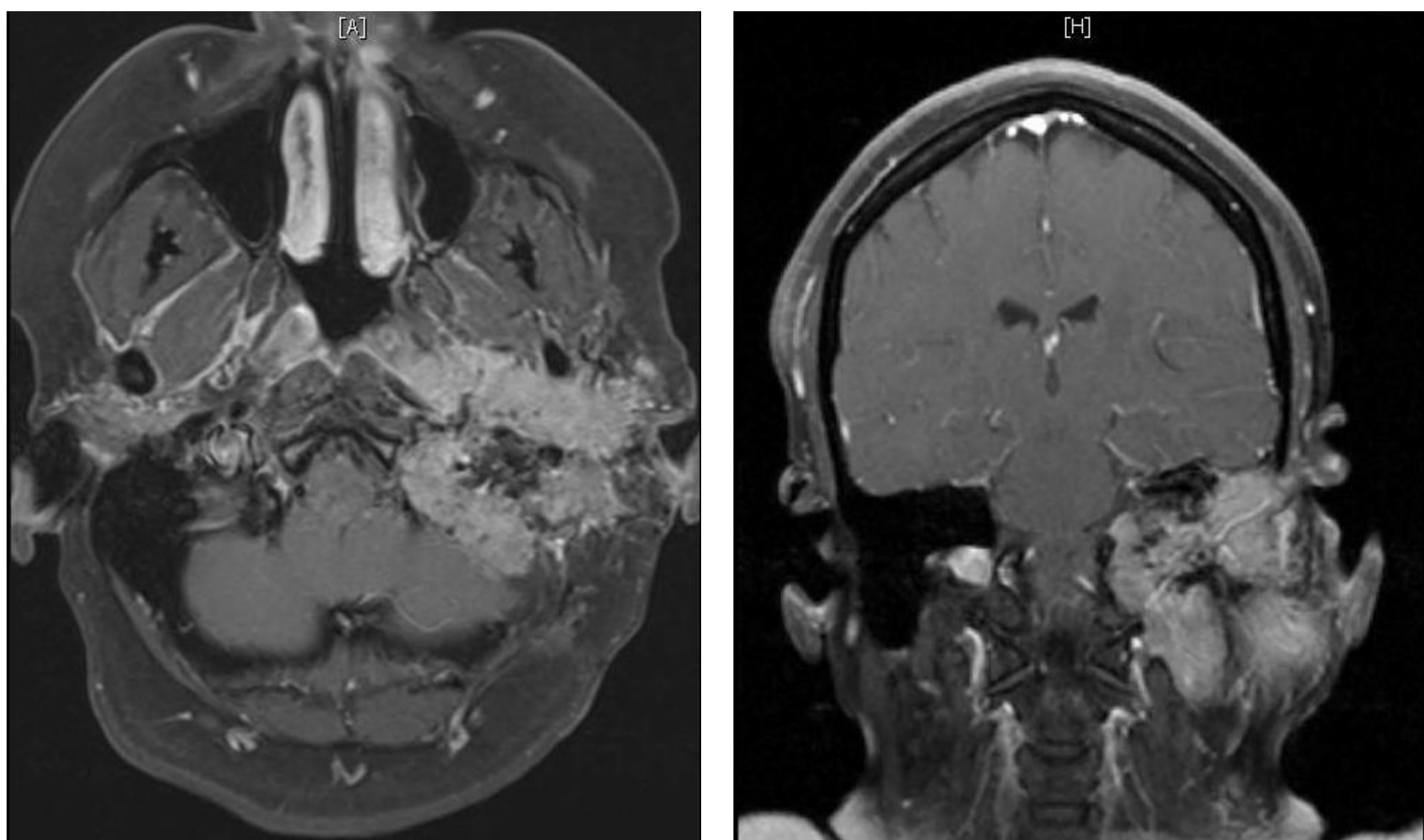


Figure 2. T1 contrast MR of recurrent left sided jugular paraganglioma. Tumor has recurred and grown following two surgical resections.

Results

Both patients tolerated the balloon occlusion, embolization, surgery well and without neurological insult. Utilization of this stepwise evaluation and management allowed for safe resection of the internal carotid artery in conjunction with the lesion. Resection of the internal carotid artery allowed for complete resection of the endolymphatic sac tumor and near complete resection of the paraganglioma. Both patients did well post operatively without neurologic sequelae and were discharged home. Both patients are over 1 year status post definitive therapy. The patient with the endolymphatic sac tumor is without evidence of disease. The patient with the recurrent paraganglioma underwent stereotactic radiation therapy to residual tumor and has not demonstrated growth.

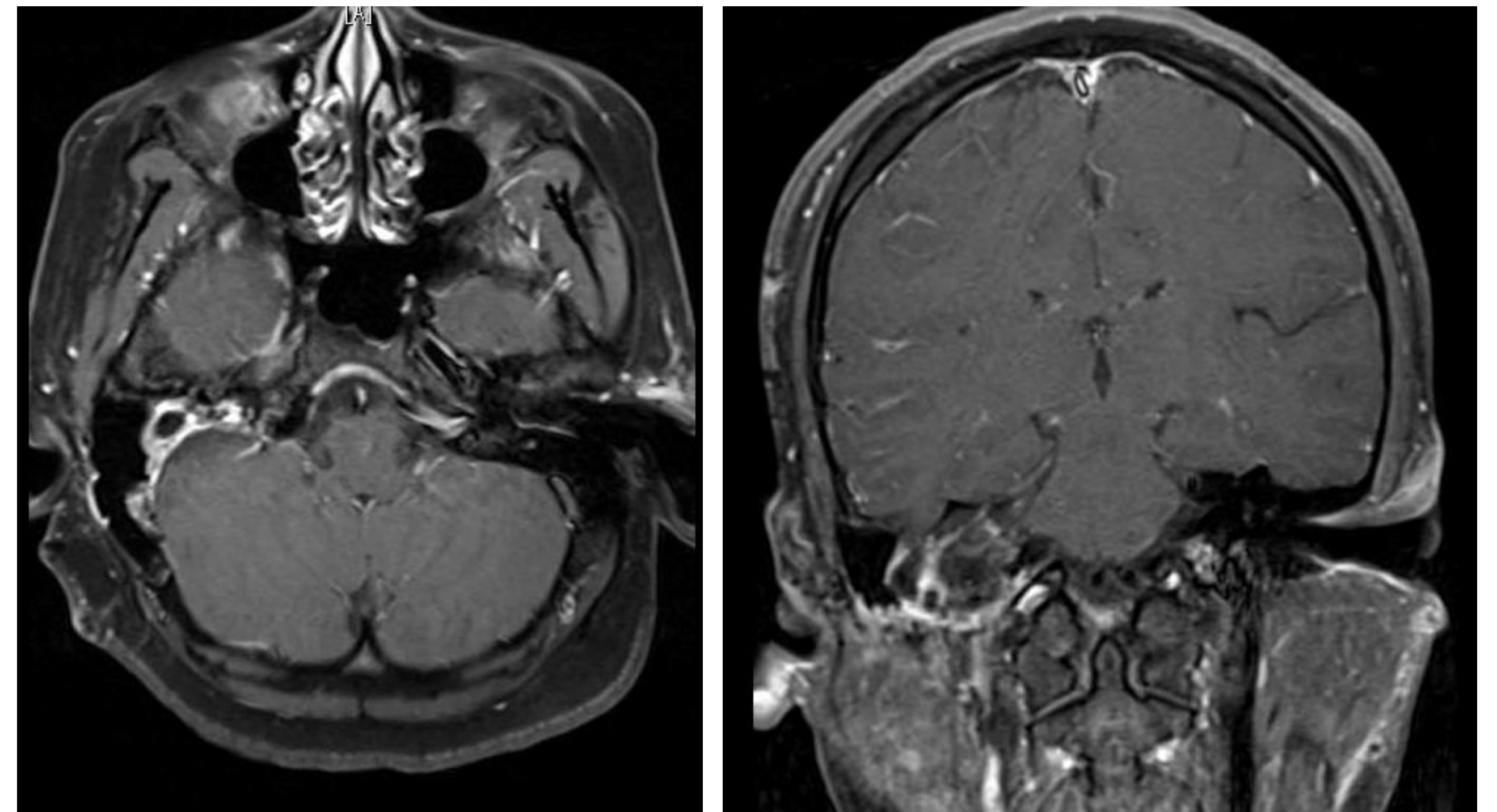


Figure 3. T1 with contrast MR following transpetrosal approach with sacrifice of the internal carotid artery for resection of recurrent endolymphatic sac tumor. Sacrifice of the internal carotid artery allowed for resection of the lesion. The patient is doing well without evidence of recurrence.

Discussion

Lateral skull base lesions are a rare clinical entity and lesions involving the internal carotid artery are fortunately even rarer. Traditionally involvement of the internal carotid artery has been felt to be a contraindication to surgical resection. In exceptional cases carotid resection can offer surgical or outcome advantages. We present 2 patients who underwent balloon occlusion to demonstrate cooperative vascular anatomy and endovascular occlusion prior to surgical resection. The utilization of a systematic and controlled step-wise evaluation followed by embolization and surgical resection allowed for tumor resection which included the internal carotid artery. The pathologies included in this series included an endolymphatic sac tumor, and a recurrent paraganglioma. The fact that both of these lesions were not malignant facilitated this management strategy. Utilization of this strategy requires selecting patients with appropriate non-malignant pathology who have acceptable vascular anatomy. It also allows for resection of the carotid and tumor in a controlled fashion minimizing excessive blood loss which may result in neurologic insult despite adequate vascular anatomy. Additionally, it demands coordination and communication with colleagues in interventional radiology as well as head and neck surgery and possibly neurosurgery.

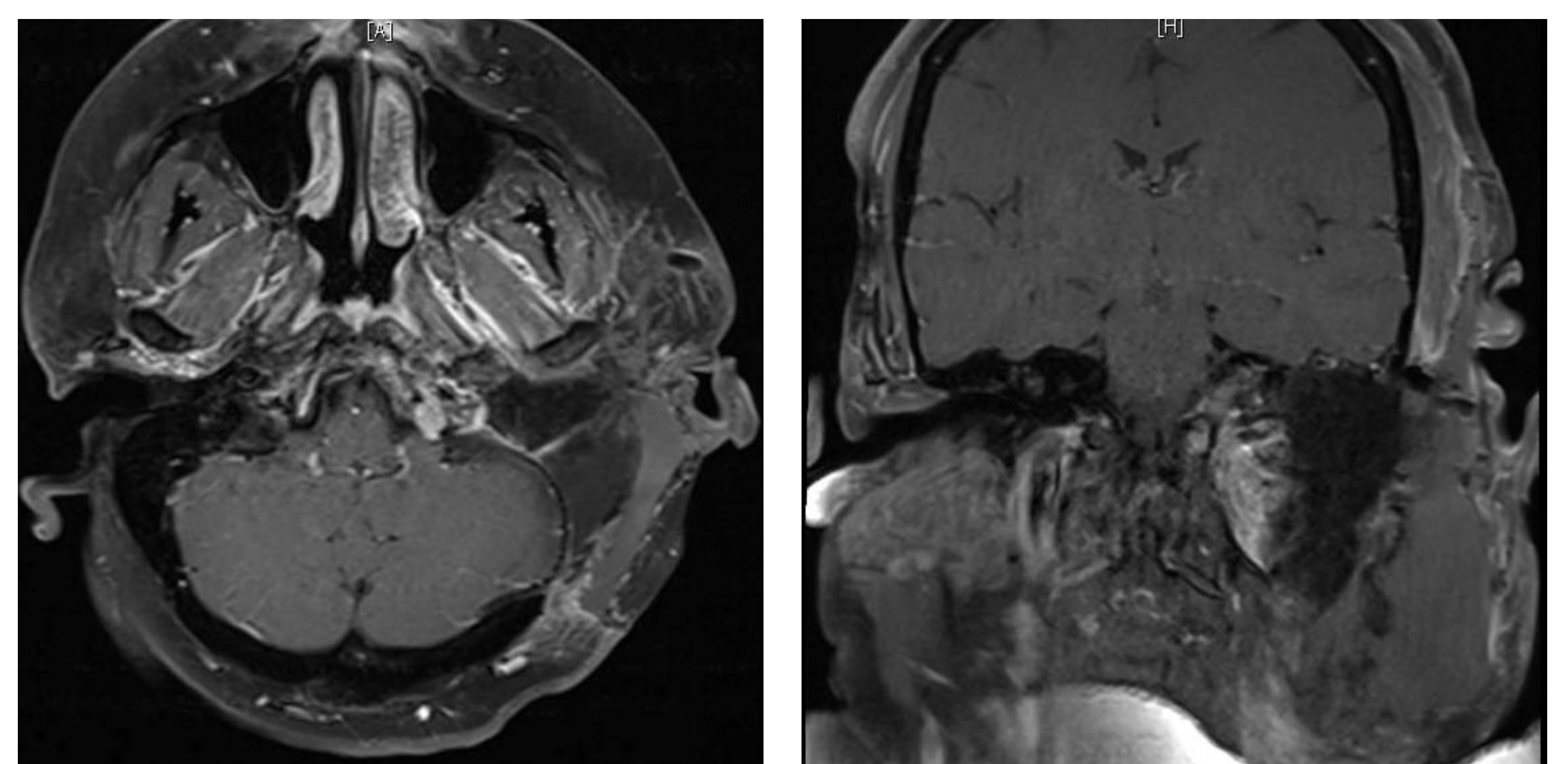


Figure 4. T1 with contrast fat suppression MR following transcochlear approach for recurrent left jugular paraganglioma. Sacrifice of the internal carotid artery and the facial nerve allowed for near complete resection of the recurrent tumor. The patient underwent stereotactic radiation therapy to the residual tumor.

Conclusions

Preoperative balloon occlusion testing followed by permanent endovascular carotid ablation, and resection of the ICA is a viable strategy for management of select advanced tumors where the vessel would be at significant risk during surgical resection. Such a strategy permits hemodynamic intensive care focused solely on the carotid sacrifice prior to the multiple fluid, hemorrhage, and anesthetic issues when carotid sacrifice is part of tumor resection. This management allowed for complete and near complete safe resection of two lateral skull base lesions in conjunction with internal carotid artery sacrifice.

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