

Intraoperative Laceration of Internal Carotid Artery During Transsphenoidal Pituitary Adenoma Resection

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Introduction

Endoscopic transsphenoidal surgery is minimally invasive, and one of the most common methods of pituitary resection. It is often done as a two-surgeon approach, with an otolaryngology (ENT) surgeon typically making the initial sphenoid exposure, which is beneficial due to the ENT surgeon's expertise on nasal anatomy and familiarity with sinus endoscopy. The neurosurgeon will then remove the bony structures at the skull base, along with the lesion. The endoscopic method has various benefits including decreased soft tissue manipulation, enhanced visualization of the anatomy, less postoperative pain, and reduced hospital stays, all of which lead to greater patient satisfaction. However, though generally considered to be safe, this method still carries risks such as CSF rhinorrhea, meningitis, diabetes insipidus, hemorrhage, and visual changes.

Case Report

A 30-year-old female with past medical history of gestational diabetes presented for endoscopic transsphenoidal pituitary adenoma resection. The patient had recently experienced weight gain, with labs revealing elevated cortisol and ACTH levels, along with imaging showing a cystic sella suprasellar mass. Intraoperatively, the surgeons noted laceration to the left carotid artery, and the patient was emergently taken to interventional radiology for repair and possible stent. Angiogram showed that the patient had good collateral flow from the ACOM and PCOM, so the patient underwent coil occlusion of the left ICA, and was subsequently extubated in the operating room. Post-operatively, the patient was also treated for diabetes insipidus before ultimately being discharged home on post-op day 14.

Discussion

Endoscopic transsphenoidal pituitary resections are not without risk, and hemorrhage is a significant concern, given the proximity of the carotid artery to the surgical site. A large multi-center study found ICA injury in 17 (0.9%) of 1800 transsphenoidal surgeries. The study attributed 3 deaths and 5 permanent deficits to the arterial injury during surgery. Patients with pre-existing vascular malformations and those with tumors invading into the cavernous sinus are at significant risk. Should a vascular injury occur, communication with the surgical team is important to maintaining hemodynamic stability and choosing the appropriate course of action. Different treatment options can include suturing the injury, coagulation, open vessel ligation, surgical packing or ICA sacrifice via coiling. It is important for the anesthesiologist to be well-prepared for any potential complications by ensuring proper intravenous and arterial access before the case, along with blood product and vasopressor availability.

References

1. Yan, J. L., Chang, C. N., & Chen, P. Y. (2021). Endoscopic transsphenoidal surgery for resection of pituitary macroadenoma: a retrospective study. *PloS one*, 16(8), e0255599.
2. Esfahani, K., & Dunn, L. K. (2021). Anesthetic management during transsphenoidal pituitary surgery. *Current Opinion in Anesthesiology*, 34(5), 575-581.
3. Romero, A. D. C. B., Ial Gangadharan, J., Bander, E. D., Gobin, Y. P., Anand, V. K., & Schwartz, T. H. (2017). Managing arterial injury in endoscopic skull base surgery: case series and review of the literature. *Operative Neurosurgery*, 13(1), 138-149.
4. Berker, M., Hazer, D. B., Yücel, T., Gürlek, A., Cila, A., Aldur, M., & Önerci, M. (2012). Complications of endoscopic surgery of the pituitary adenomas: analysis of 570 patients and review of the literature. *Pituitary*, 15(3), 288-300.
5. *Transsphenoidal surgery*. Barrow Neurological Institute. (2025, November 11). <https://www.barrowneuro.org/treatment/transsphenoidal-surgery/>
6. Sylvester, P. T., Moran, C. J., Derdeyn, C. P., Cross, D. T., Dacey, R. G., Zipfel, G. J., ... & Chicoine, M. R. (2016). Endovascular management of internal carotid artery injuries secondary to endonasal surgery: case series and review of the literature. *Journal of neurosurgery*, 125(5), 1256-1276.

