

Endoscopic Transsphenoidal Resection of Giant Pituitary Adenomas

Mickey L. Smith; Smruti K Patel BA; Osamah J. Choudhry MD, BA; Jean Anderson Eloy MD; James K. Liu MD
Department of Neurological Surgery and Otolaryngology-Head and Neck Surgery, Center for Skull Base and Pituitary Surgery, Neurological Institute of New Jersey, University of Medicine and Dentistry of New Jersey, New Jersey Medical School, Newark, New Jersey

Introduction

Giant pituitary adenomas, defined as those greater than 4 cm in diameter, can be surgically formidable lesions. We evaluate our experience with resection of giant pituitary adenomas using the endoscopic transsphenoidal approach.

Methods

Retrospective review of a prospective database of endoscopic skull base procedures performed within a two-year period revealed 7 cases of giant pituitary adenomas. We evaluated each case for tumor size, extent of resection, and postoperative complications.

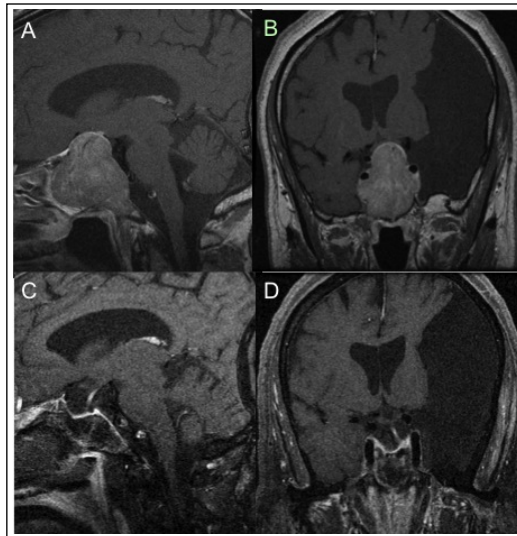


Figure 1. Patient 2. 63 year old male. Preoperative T1-weighted post-gadolinium sagittal (A) and coronal (B) views demonstrate 4.3 X 4.2 5.6 cm giant pituitary adenoma. Postoperative views (C, D) demonstrate gross total resection utilizing an endoscopic transsellar approach. Note the large incidental arachnoid cyst.

Results

Seven patients (4 males, 3 females) presented with giant pituitary adenomas with an average size of 4.5 in greatest diameter (range: 4.1 cm to 7.2 cm). Gross-total resection was achieved in 3 cases, where the tumors were less than 5 cm without any cavernous sinus invasion. Subtotal resection was achieved in 4 cases because of cavernous sinus invasion and tumor adherence to optic nerves, hypothalamus and cerebral arteries. An extended transplanum approach was performed in 2 patients because of significant suprasellar extension. All patients experienced visual improvement postoperatively. Complications included postoperative apoplexy in two patients, transient diplopia in one, and permanent diabetes insipidus in one. Nasoseptal flap reconstruction was used in all cases, and there were no postoperative CSF leaks.

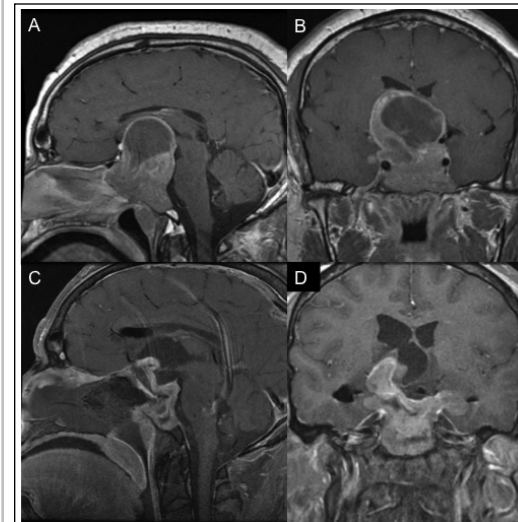


Figure 2. Patient 5. 51 year old male. Preoperative T1-weighted post-gadolinium MRI sagittal (A) and (B) coronal views demonstrate a 7.0 x 5.7 x 4.3 heterogeneously enhancing suprasellar mass with solid and cystic components compressing the optic chiasm and exhibiting significant mass effect on the lateral ventricles. Bilateral cavernous sinus invasion is also present. A transplanum approach was used, and post-operative views (C, D) demonstrate subtotal resection. Residual tumor was treated with radiotherapy.

Conclusions

The endoscopic endonasal transsphenoidal approach provides excellent exposure for resection of giant pituitary adenomas with a wide-angle field of view. Tumors with considerable suprasellar extension may require a transplanum transtuberulum approach for better access. Gross-total resection is limited by cavernous sinus invasion and tumor adherence to critical neurovascular structures. Postoperative residual tumor may pose a risk for postoperative pituitary apoplexy.

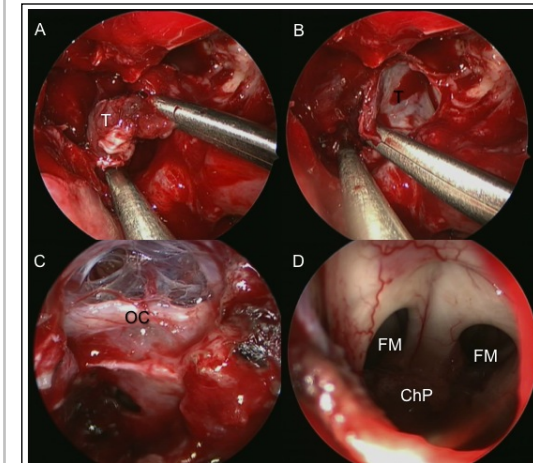


Figure 3. Intraoperative views for patient 5. An approach through the planum sphenoidale provided access for tumor resection (A) and (B). Adequate decompression of the optic chiasm (C) was achieved and a view through the roof of the third ventricle (D) displays unobstructed CSF flow from the lateral ventricles. T, tumor; OC, optic chiasm; FM, Foramen of Monro; ChP, choroid plexus

References

1. de Paiva Neto MA, Vandergrift A, Fatemi N, Gorgulho AA, Desalles AA, Cohan P, et al: Endonasal transsphenoidal surgery and multimodality treatment for giant pituitary adenomas. *Clin Endocrinol (Oxf)* 72:512-519, 2010
2. Hofstetter C, Anand CK, Schwartz TH: Endoscopic Transsphenoidal Pituitary Surgery. *Op Tech Otolaryng* 22: 206-211, 2011
3. Nakao N, Itakura T: Surgical outcome of the endoscopic endonasal approach for non-functioning giant pituitary adenoma. *J Clin Neurosci* 18:71-75, 2011
4. Romano A, Chibbaro S, Marsella M, Oretti G, Spiriev T, Iaccarino C, et al: Combined endoscopic transsphenoidal-transventricular approach for resection of a giant pituitary macroadenoma. *World Neurosurg* 74:161-164, 2010

Table 1. Summary of Results

Patient	Age, Sex	Tumor Size (cm)	Approach	CS Invasion	EOR	Complications
1	59, M	4.2 x 3.5 x 4.0	Transsellar	No	STR, GTR*	Postoperative apoplexy
2	63, M	4.3 x 4.2 x 5.6	Transsellar	No	GTR	None
3	57, M	4.6 x 7.2 x 3.6	Transsellar	Yes	STR	Transient diplopia
4	75, F	4.1 x 2.0 x 2.9	Transsellar	No	GTR	None
5	51, M	7.0 x 5.7 x 4.3	Transplanum	Yes	STR	Permanent diabetes insipidus
6	62, F	4.4 x 3.8 x 3.2	Transsellar, Transplanum*	Yes	STR, STR*	Postoperative apoplexy
7	71, F	4.2 x 2.7 x 3.7	Transsellar	Yes	STR	None

EOR, extent of resection; STR, subtotal resection; GTR, gross total resection; CS, cavernous sinus; *second operation