Endoscopic Transsphenoidal Approach for Pituitary Neuroendocrine Tumors (PitNETs)

Introduction

The **endoscopic transsphenoidal approach (ETSA)** has become the standard surgical method for PitNETs, offering advantages over the traditional microscopic approach, including improved visualization, better tumor resection rates, and lower complication rates.

Surgical Approach: Endoscopic Transsphenoidal Surgery (ETSS)

1. Indications

- Functioning PitNETs (GH-secreting, ACTH-secreting, PRL-secreting, TSH-secreting)
- Non-functioning PitNETs (gonadotroph, null-cell tumors)
- PitNETs causing mass effect (optic chiasm compression, cavernous sinus invasion)
- Recurrence after prior surgery

2. Advantages of Endoscopic vs. Microscopic Approach

Feature	Endoscopic Approach	Microscopic Approach
Visualization	Wide-angle, panoramic	Narrower field
Depth Perception	3D with angled endoscopes	2D view
Tumor Resection	Better for suprasellar & cavernous sinus extension	Limited
Invasiveness	Less nasal trauma	More retraction required
Complication Rate	Lower risk of CSF leaks, nasal complications	Higher risk of damage to nasal structures

Outcomes & Complications

1. Surgical Outcomes

- Resection Rates: Gross total resection (GTR) ~50-80% (dependent on tumor size, invasiveness)
- Endocrine Remission: Varies by tumor type (e.g., GH-secreting ~60%, ACTH-secreting ~70-80%)
- Visual Improvement: ~85% of patients with preoperative visual deficits

2. Complications

Complication	Incidence (%)	Notes
CSF leak	5-10%	Higher in large, invasive tumors

Complication	Incidence (%)	Notes
Diabetes insipidus (transient)	20-30%	Most cases resolve spontaneously
Permanent DI	~2-5%	Requires desmopressin
Hypopituitarism	5-25%	May require hormone replacement
Carotid artery injury	<1%	Life-threatening, rare

Future Directions

- Augmented Reality & AI-based neuronavigation to enhance surgical precision
- Endoscopic-assisted robotic surgery for improved dexterity
- Minimally invasive transorbital approaches for extended cases

Conclusion

The **endoscopic transsphenoidal approach** has revolutionized the surgical treatment of PitNETs, offering **better visualization, higher resection rates, and lower complication risks** compared to traditional microscopic surgery. While the approach has limitations in highly invasive tumors, technological advancements continue to improve outcomes.

Retrospective multicenter observational studies

TESSPAIN evaluates TSS outcomes in Spanish centers to assess the influence of surgical volume and specialized neurosurgical teams on success and complication rates.

A retrospective, nationwide study of Spanish centers performing TSS between January 2018 and December 2022. Centers were classified as high volume (HV) [n=11, defined as centers with recognized expertise in Spain or those performing more than 25 TSS/year] or non-HV. Data collection included surgical success rates, complications, and pituitary adenoma resectability (R-PA). Additional analyses evaluated the impact of dedicated neurosurgical teams (DNT) within HV centers.

2815 TSS from 29 Spanish centers were included (1421 NSPA, 436 GH-secreting, 323 Cushing's disease, 127 PRL-secreting, and 25 TSH-secreting PA). The overall success rate was 50.5%, 76.8% for R-PA. HV centers had a higher overall success rate (53.1 vs. 47.7%; p=0.03). Better TSS outcomes for NSPA accounted for this difference. The overall TSS complication rate was 22.1%, which was higher for NSPA than for SPA (25.0 vs. 17.7%). The overall complication rate of TSS for PA was significantly higher in non-HV centers than in HV centers (24 vs 20.4.0; p <0.01). Centers with a DNT showed a trend to higher success rate in R-PA, while having a lower overall incidence of complications in TSS for PA than HV centers without a DNT (18.5 vs. 23.0; p=0.058), mainly reducing the rate of permanent ADH deficiency in all TSS for PA (2.7 vs. 8.4%; p<0.001).

Higher surgical volume and DNT are associated with improved TSS outcomes for PA in Spain. The results support the recommendation of concentrating pituitary surgery in a reduced number of centers of expertise in the country to improve the success rate and reduce complications, mainly postoperative ADH deficiency¹⁾

1)

Paja M, Soto A, Hanzu FA, Guerrero-Pérez F, Cámara R, Moure D, Gálvez Á, Simó-Servat A, Villar-Taibo

R, Calatayud M, Vicente A, Recio-Córdova JM, Serra G, Martín Rojas-Marcos P, Parra-Ramírez P, Araujo-Castro M, Librizzi S, Irigaray A, Ollero D, Aznar S, Muñoz F, Aulinas A, González-Fernández L, García-Centeno R, Egaña N, González-Vidal T, Menéndez E, Delgado AM, Abarca J, Sottile J, Picó AM, Novo C, Ortiz I, Tenorio C, de León R, de Pablos-Velasco P, Crespo C, Peñalver D, Díaz-Soto G, Puig-Domingo M, Biagetti B. Outcomes of transsphenoidal surgery for pituitary adenomas in Spain: a retrospective multicenter study. Front Endocrinol (Lausanne). 2025 Feb 21;16:1529418. doi: 10.3389/fendo.2025.1529418. PMID: 40060376; PMCID: PMC11886961.

From: https://neurosurgerywiki.com/wiki/ - Neurosurgery Wiki

Permanent link:

https://neurosurgerywiki.com/wiki/doku.php?id=endoscopic_transsphenoidal_approach_for_pituitary_neuroendocrine_tumor Last update: 2025/03/11 09:08

