Sinonasal Morbidity and Related Healthcare Utilization Following Transsphenoidal Hypophysectomy: A Population-Based Cohort Study

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Background

- Pituitary tumors account for ~17% of primary brain tumors, though clinically significant tumors are less common (89.1 per 100,000), nearly half of which are macroadenomas
- Transsphenoidal hypophysectomy (TSH) is the primary treatment for medically refractory functional macroadenomas and nonfunctioning macroadenomas
- Endoscopic transnasal transsphenoidal surgery requires permanent alteration of normal nasal anatomy to access the sella. Approaches may involve turbinate resection, posterior septectomy, and/or free graft or nasoseptal flap harvest
- Even with middle turbinate preservation, inadequate postoperative medialization can lead to synechiae or osteomeatal complex obstruction and sinonasal dysfunction
- Long-term sinonasal morbidity following TSH remains poorly characterized

Objectives

- We evaluated the incidence of sinonasal procedures, healthcare utilization, and the development of chronic rhinosinusitis (CRS) and sinonasal symptoms up to 5 years after TSH using a large population-based database
- We also compared sinonasal procedure rates between patients with prior TSH and healthy controls without TSH

Methods

Database Selection

- U.S. Collaborative Network within the TriNetX Analytics platform comprising deidentified electronic health record (EHR) data from over 100 million patients across over 60 healthcare organizations was utilized in this study

Cohort Selection

TSH Cohort

- Includes all patient who underwent TSH including CPT 61548, 62165, 62164
  - 62165: Endoscopic transnasal TSH
  - 61548: Transnasal or transseptal TSH
  - 62164: Endoscopic transnasal TSH

Healthy Control Cohort

- Includes all patients with an encounter for pre-employment examination (ICD-10-Z02.1) with no prior history of TSH

Outcome Variables

- **Sinonasal procedures** at 1- and 5-year follow-up: turbinate reduction, septoplasty, endoscopic sinus surgery, balloon sinus dilation, and lysis of intranasal synechiae
- **New-onset CRS** at 1 and 5 years postoperatively
- **Postoperative sinonasal symptoms** within 1 year: olfactory dysfunction, nasal congestion, epistaxis, and postnasal drainage
- **Healthcare utilization** within 90 days postop: corticosteroid or antibiotic prescriptions, emergency department visits, nasal endoscopy, and nasal debridement

Statistical Analysis

- Propensity score matching was conducted at a 1:1 ratio for cohort analysis with OR and 95% CI

Results

Figure 1: Risk of Sinonasal Procedures 1-year following Transsphenoidal Hypophysectomy

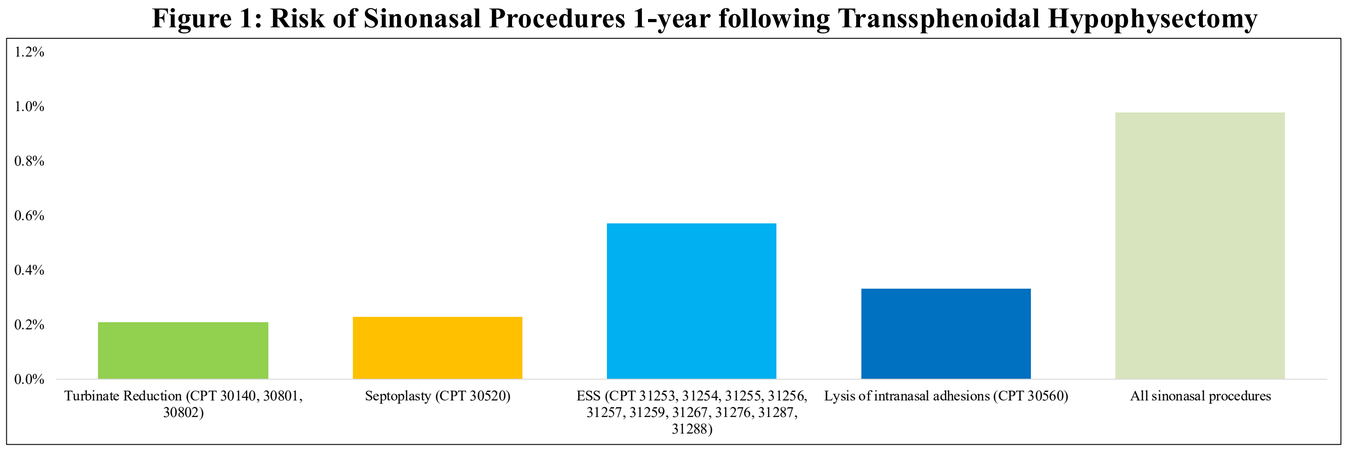


Figure 2: Risk of Sinonasal Procedures 5 years following Transsphenoidal Hypophysectomy

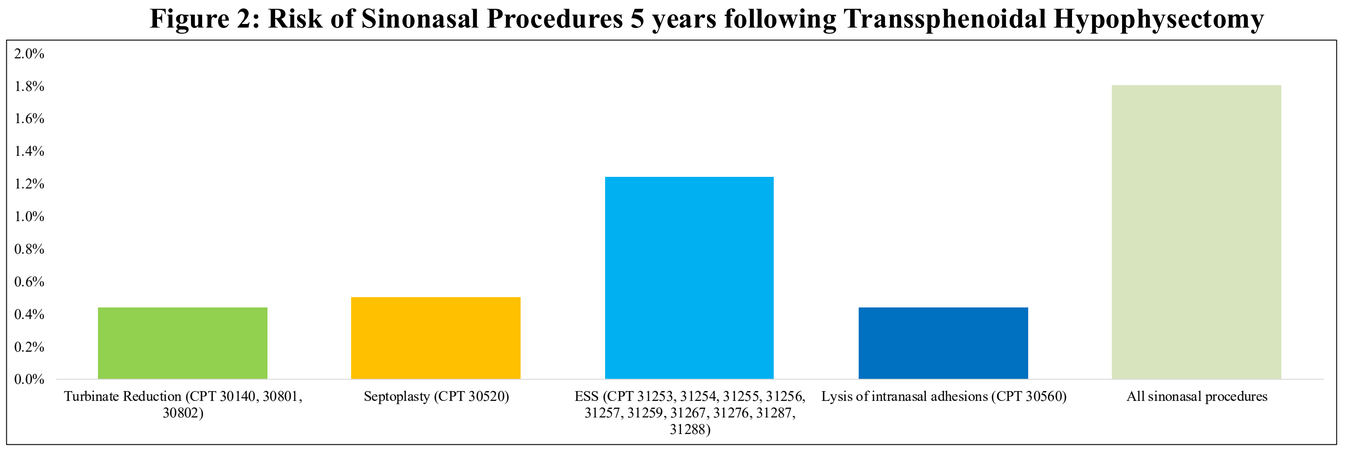


Table 1: Comparison of Sinonasal Morbidity between patients with and without prior history of TSH (Matched for age at index and Female sex)

Outcome	Cohort	Patient Total	Outcome total	Odds Ratio	95% CI	P-Value
Turbinate Reduction (Initial)	TSH	18,415	81 (0.44%)	3.7	2.3-5.8)	**< 0.0001**
	No TSH	19,164	23 (0.12%)	Reference	Reference	Reference
Septoplasty (Initial)	TSH	18,459	93 (0.50%)	4.8	2.9-7.8	**< 0.0001**
	No TSH	19,157	20 (0.10%)	Reference	Reference	Reference
Epistaxis Control (Anytime)	TSH	19,180	125 (0.65%)	4.7	3-7	**< 0.0001**
	No TSH	19,180	27 (0.14%)	Reference	Reference	Reference
ESS (Initial)	TSH	18,019	224 (1.24%)	10	6.5-15	**< 0.0001**
	No TSH	19,151	24 (0.13%)	Reference	Reference	Reference
CRS Diagnosis (New-onset)	TSH	16,869	3001 (18%)	7.7	6.9,-8.4	**< 0.0001**
	No TSH	18,136	496 (2.7%)	Reference	Reference	Reference

Figure 3: Healthcare utilization after TSH: 90-day follow-up

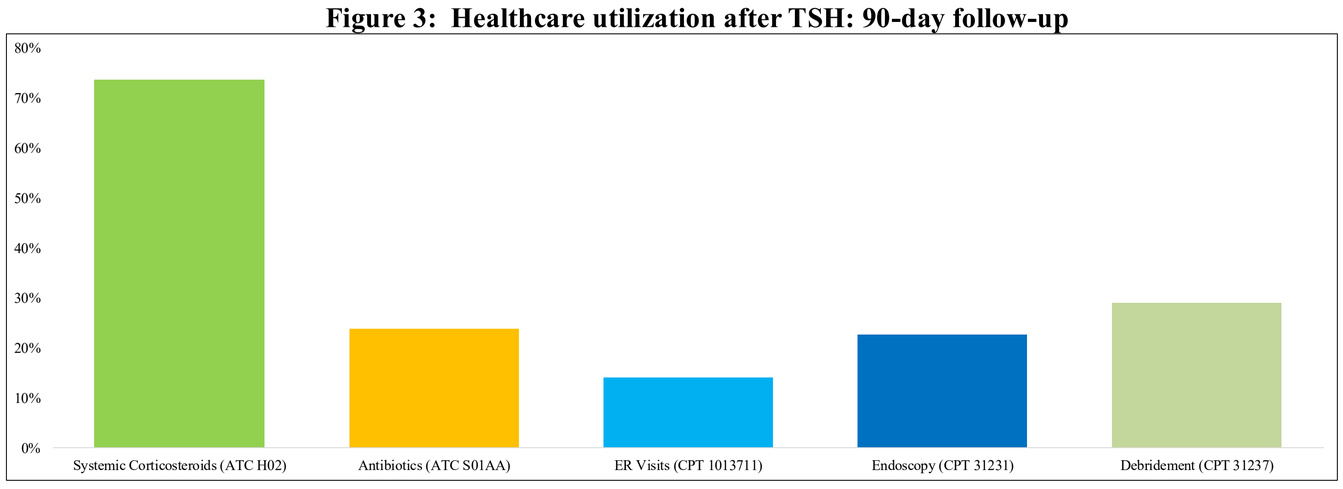
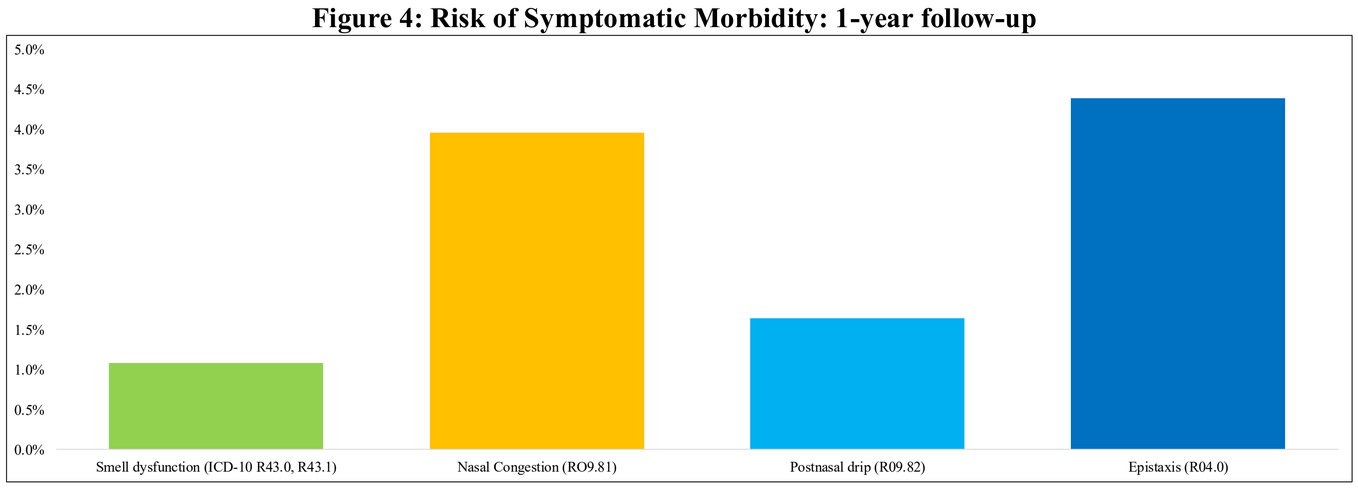


Figure 4: Risk of Symptomatic Morbidity: 1-year follow-up



Key Points

- 20,316 patients underwent TSH (mean age 51.5 years; 51% female); 20% of benign tumors were hyperfunctioning.
- Within 90 days of TSH, 72% received corticosteroids, 23% antibiotics, 22% underwent nasal endoscopy, 25% nasal debridement, and 14% had an ED visit
- Sinonasal procedures were rarely needed post-TSH, but occurred at higher rates than healthy cohort, with cumulative risk 0.96% at 1 year, 1.6% at 3 years, and 1.8% at 5 years.
- Endoscopic sinus surgery was the most common sinonasal procedure (0.6% at 1 year; 1.2% at 5 years)
- Within 1 year postop, epistaxis (4.2%), nasal congestion (3.9%), postnasal drainage (1.7%), and smell dysfunction (1.13%) were reported
- Newly diagnosed CRS post-TSH occurred at a high rate with an incidence of 14% at 1 year and 18% by 5 years.

Conclusions

- **Healthcare utilization was frequent in the early postoperative period, including the need for corticosteroids, antibiotics, nasal endoscopy, and debridements**
- **Sinonasal procedures after TSH occurred in ~2%, indicating few patients required surgical sinonasal intervention.**
- **Persistent smell dysfunction occurred in >1% of patients at 1 year**
- **New-onset CRS developed in nearly 20% of patients within 5 years after TSH**
- **TSH is associated with measurable sinonasal morbidity, though only a small proportion of patients ultimately require additional sinonasal procedures**

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