

# Post-operative endocrinological outcomes for

# patients undergoing surgery for tuberculum sellae meningiomas: case series and systematic review



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Vratko Himic MD, Jose Enrique Marino MD, Alan Ho BA, Vagif Kazimli BS, Saisavat Phommavongsa BS, Amy Wang MD, Dagoberto Ordonez-Esteviz MD PhD, Ashish H. Shah MD, Ricardo J. Komotar MD, Carolina G. Benjamin MD, **Michael E. Ivan MD, MBS**

Department of Neurological Surgery, University of Miami, Miami, FL, USA

## Introduction

The proximity of tuberculum sellae meningiomas (TSM) to the pituitary gland and the pituitary stalk confers particular risks to peri-operative endocrinological dysfunction. Given the intimate interaction of TSMs with surrounding vascular, optic and endocrinological structures, approach selection and extent of resection decisions are crucial. The burden of visual impairment and recurrence have been thoroughly studied before, with scoring systems developed; however, the rates of post-operative endocrinological dysfunction after TSM resection are less clear.

## Objective

To compare the post-operative risk of endocrine dysfunction between the endonasal (EN) and transcranial (TC) approaches to TSM across an institutional patient cohort and the wider literature.

## Methods and Materials

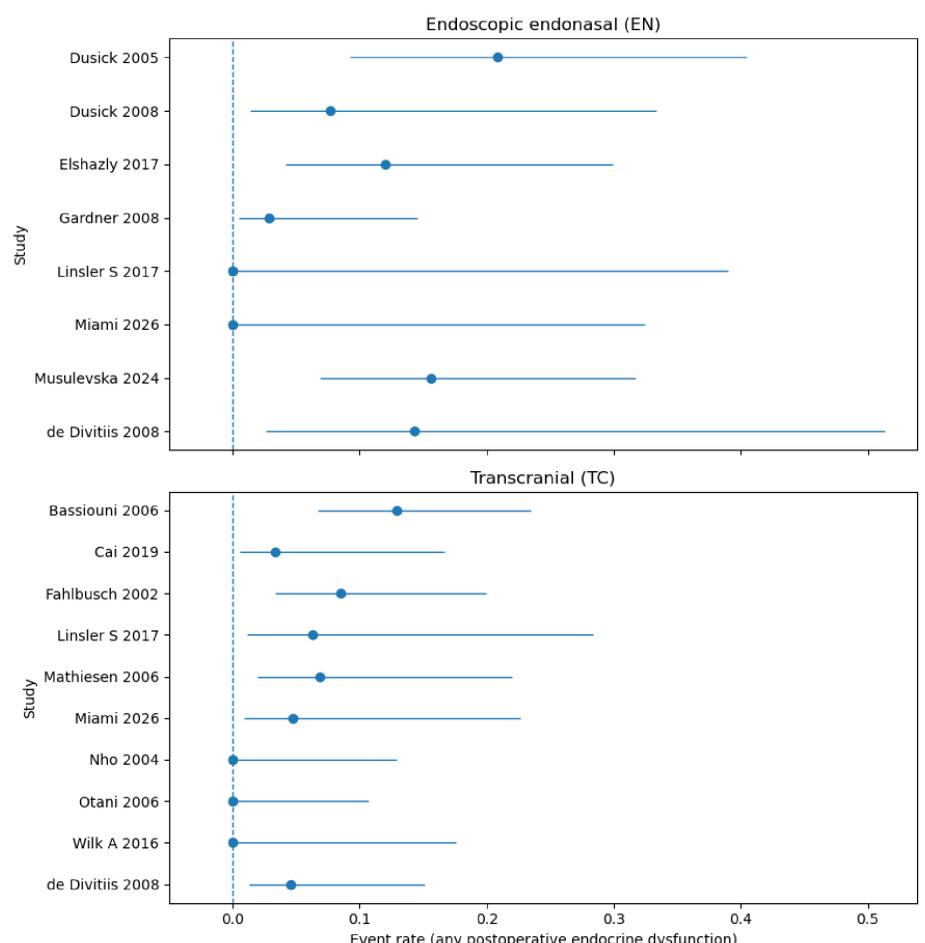
We conducted a decade-long retrospective review of TSM surgical cases in our institution, and recorded baseline pre-operative and operative characteristics, surgical approach (EN or TC) as well as pre- and post-operative endocrinological outcomes. We then searched Pubmed, Scopus and Embase databases from inception to December 2024. Studies with TSM resection and reported post-operative endocrinological outcomes were included.

Random-effects meta-regression was used to compare new post-operative neuroendocrine dysfunction between EN and TC. Continuity corrected event rates were transformed to log-odds and variances. Between-study heterogeneity was assessed by Cochran's Q and calculated between-study variance ( $\tau^2$ ) via the DerSimonian-Laird method. Random-effects weights based on total variances were used in a weighted least-squares regression comparing log-odds of neuroendocrine dysfunction between EN and TC approaches. The effect of gross total resection (GTR) was similarly evaluated.

## Results

At our institution 29 TSM (20 female, 69%) were identified from a total of 1198 meningioma cases (21 TC and 8 EN) across a decade-long period. Of these, 3 had pre-operative endocrine dysfunction (one DI, one hyperprolactinemia and one with anterior hypopituitarism), all of which resolved post-operatively. Only one patient developed new transient DI (after TC approach) (3.4% of total cohort), however, this resolved by discharge. GTR was achieved in 13/29 patients (45%).

In the systematic review, across 15 studies, there were 475 patients with a median of 30.5 patients per study (IQR:24.25-34.25). The pooled mean age was 53.75±3.85 years. Studies by approach involved six EN, six TC, and three studies combining both approaches. EN patients had **1.82 times the odds of new post-operative endocrine dysfunction compared to TC patients (95% CI:[0.012-1.190], p=0.046,  $\tau^2=0.0000$ )**. The rate of GTR did not differ statistically and did not affect the odds risk (OR) of post-operative endocrinological dysfunction. The **OR of permanent diabetes insipidus (DI) was significantly elevated in the EN cohort (OR=4.34, p=0.037,  $\tau^2=0.0000$ )**.



## Conclusions

The EN approach to TSM may be associated with an increased risk of new post-operative permanent DI compared to TC

as added as a variable, it did not R. The overall odds of new post-operative endocrine dysfunction were comparable for both approaches.

Paper	approach	n	p	95% CI
Dusick 2005	EN	24	0.0%	0.0%-13.8%
Dusick 2008	EN	13	53.8%	29.1%-76.8%
Elshazly 2017	EN	25	76.0%	56.6%-88.5%
Gardner 2008	EN	35	31.4%	18.6%-48.0%
Linsler S 2017	EN	6	83.3%	43.6%-97.0%
Miami 2026	EN	8	25.0%	7.1%-59.1%
Musulevska 2024	EN	32	87.5%	71.9%-95.0%
de Divitiis 2008	EN	7	85.7%	48.7%-97.4%
Bassiouni 2006	TC	62	90.3%	80.5%-95.5%
Cai 2019	TC	30	90.0%	74.4%-96.5%
Fahlbusch 2002	TC	47	0.0%	0.0%-7.6%
Linsler S 2017	TC	16	87.5%	64.0%-96.5%
Mathiesen 2006	TC	29	89.7%	73.6%-96.4%
Miami 2026	TC	21	47.6%	28.3%-67.6%
Nho 2004	TC	26	96.2%	81.1%-99.3%
Otani 2006	TC	32	87.5%	71.9%-95.0%
Wilk A 2016	TC	18	100.0%	82.4%-100.0%
de Divitiis 2008	TC	44	88.6%	76.0%-95.0%



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