

Introduction/Background

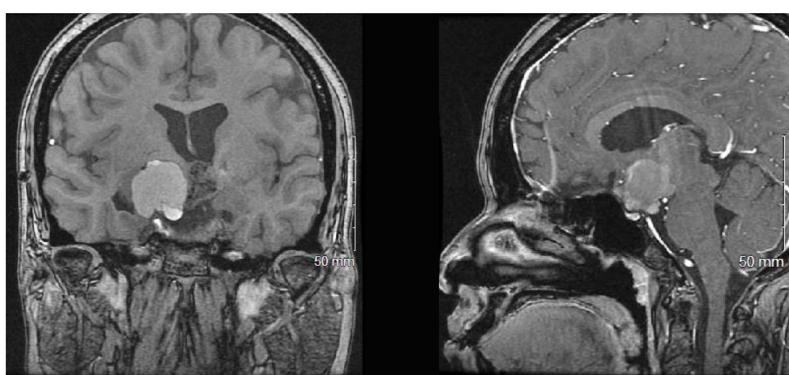
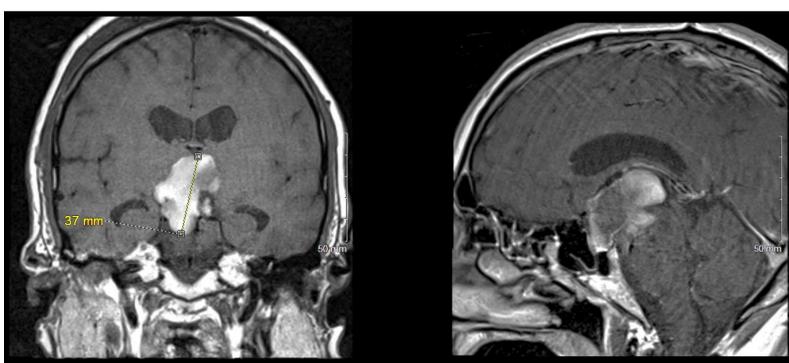
- Craniopharyngiomas are rare epithelial tumors of the sellar and suprasellar region that frequently demonstrate locally invasive behavior despite benign histology.
- Surgical management is complex due to intimate involvement with the optic apparatus, hypothalamus, pituitary stalk, and surrounding vasculature.
- Traditional management relied primarily on transcranial approaches (TCA) to access these lesions.
- Advances in endoscopic skull base surgery have expanded the use of endoscopic endonasal approaches (EEA), particularly for midline and retrochiasmatic tumors.
- Prior studies suggest that EEA offers higher rates of GTR/NTR and visual improvement at the cost of increased CSF leak risk; however, data for other complications remain mixed or inconsistently reported.

Study objective: Evaluate and compare surgical and postoperative outcomes following EEA versus TCA for craniopharyngioma resection over 15 years at our tertiary referral center.

Methods and Materials

- Retrospective single-center cohort study (March 2008 – February 2023) at a tertiary referral center.
- Included histopathology-confirmed craniopharyngiomas (primary and recurrent tumors).
- Repeat resections were analyzed independently.
- Surgical approach groups:
 - Endoscopic endonasal approach (EEA)
 - Transcranial approach (TCA)
- Baseline variables collected: age, tumor volume and composition, preoperative panhypopituitarism, hydrocephalus, and symptomatic vision complaints.
- Post-operative outcomes collected: extent of resection (GTR/NTR), visual outcomes, cranial nerve III palsy, CSF leak, transient and permanent diabetes insipidus, new-onset panhypopituitarism, ischemic stroke, hemorrhage, meningitis, intracranial infection, tumor recurrence, 90-day mortality.
- Statistics: Mann–Whitney U test for continuous variables; Fisher’s exact test for categorical variables; $p < 0.05$ considered significant.

Lesions Favorable for Transcranial Approaches



Results

- Fifty-nine resections were analyzed from 55 unique patients (30 EEA, 29 TCA), with comparable baseline characteristics between surgical approach groups.
- EEA was associated with significantly higher rates of gross or near-total resection compared to TCA, in line with prior studies.
- Visual outcomes (improved, stable, worsened) were similar between groups.
- Rates of post-operative CSF leak were similar between cohorts.
- Cranial nerve III palsy occurred exclusively following transcranial approaches.
- New-onset panhypopituitarism was more common following EEA.
- Rates of transient and permanent diabetes insipidus, infection, other complications, tumor recurrence, adjuvant radiation use, and 90-day mortality were similar between groups.

Table 1. Baseline Characteristics

| Variables | EEA (n = 30) | TCA (n = 29) | p value |
|---|------------------|------------------|---------|
| Age (years), median [IQR] | 47 [27–60] | 52 [41–59.25] | 0.622 |
| Recurrent tumor, n (%) | 5 (16.7%) | 11 (37.9%) | 0.084 |
| Tumor vol. (cm ³), median [IQR] | 4.38 [2.15-9.83] | 5.51 [2.75-7.76] | 0.904 |
| Tumor type | - | - | - |
| Cystic, n (%) | 16 (55.2%) | 13 (50%) | 0.887 |
| Mixed, n (%) | 13 (44.8%) | 12 (46.2%) | |
| Solid, n (%) | 0 (0%) | 1 (3.8%) | |
| Panhypopituitarism, n (%) | 5 (16.7%) | 4 (13.8%) | >0.999 |
| Hydrocephalus, n (%) | 2 (6.7%) | 6 (20.7%) | 0.145 |
| Reported vision loss, n (%) | 24 (82.8%) | 22 (75.9%) | 0.747 |

Table 2. Postoperative Outcomes and Complications

| Outcomes | EEA (n = 30) | TCA (n = 29) | p value |
|-------------------------------|--------------|--------------|----------------|
| NTR/GTR, n (%) | 22 (73.3%) | 9 (32.1%) | 0.003** |
| Visual outcomes | - | - | - |
| Worsened, n (%) | 5 (16.7%) | 5 (17.2%) | 0.612 |
| Stable, n (%) | 10 (33.3%) | 12 (41.4%) | 0.596 |
| Improved, n (%) | 14 (46.7%) | 10 (34.5%) | 0.430 |
| CNIII palsy, n (%) | 0 (0%) | 8 (28.6%) | 0.002** |
| CSF leak, n (%) | 6 (20%) | 2 (6.9%) | 0.254 |
| Diabetes insipidus | - | - | - |
| Transient, n (%) | 3 (10%) | 7 (28%) | 0.158 |
| Permanent, n (%) | 22 (73.3%) | 16 (57.1%) | 0.270 |
| New panhypopituitarism, n (%) | 21 (70%) | 12 (41.4%) | 0.037* |
| Ischemic stroke, n (%) | 1 (3.3%) | 2 (6.9%) | 0.612 |
| Hemorrhage, n (%) | 3 (10%) | 4 (13.8%) | 0.706 |
| Meningitis, n (%) | 2 (6.7%) | 1 (3.4%) | >0.999 |
| Intracranial infection, n (%) | 2 (6.7%) | 1 (3.4%) | >0.999 |
| Tumor recurrence, n (%) | 8 (26.7%) | 8 (27.6%) | >0.999 |
| Adjuvant radiation, n (%) | 11 (37.9%) | 12 (44.4%) | 0.786 |
| 90-day mortality, n (%) | 0 (0%) | 1 (3.4%) | >0.999 |

Discussion/Conclusion

- EEA was associated with higher rates of near-total or gross-total resection and less frequent oculomotor nerve palsy compared to TCA at our single center.
- This benefit was offset by a higher incidence of postoperative panhypopituitarism.
- Other complication rates, tumor recurrence, and 90-day mortality were similar between approaches.
- Findings are limited by a single-institution retrospective design, small sample size, and selection bias.
- Our results indicate EEA is effective, but surgical approach should be tailored and anatomy-driven in such a way that balances the extent of resection with functional preservation.

Contact

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