



Management of Adult Recurrent Craniopharyngiomas: A Single-Institution Cohort Study

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Introduction

- Craniopharyngiomas recur in 20-50% of cases [1-5].
- Recurrent tumors present unique surgical challenges: scarring from prior surgery, altered anatomy, and effects of prior radiation.
- Achieving GTR in this setting is more difficult, yet residual tumor is associated with further recurrence.
- Understanding which factors predict successful GTR could improve surgical planning and patient counseling.

Objective: Identify factors associated with GTR achievement and characterize the impact of residual tumor on recurrence in adults undergoing EEA for recurrent craniopharyngioma.

Methods and Materials

Study Design: Single-institution retrospective cohort (2008-2024) study of consecutive adult patients undergoing EEA for recurrent craniopharyngioma.

Variables Assessed:

- Prior treatments: SRS, prior surgeries, surgical approach
- Tumor characteristics: volume, location
- Patient demographics and preoperative conditions

Analyses

- GTR rates stratified by potential predictive factors (descriptive)
- Recurrence rates by resection extent (descriptive)
- GTR vs. non-GTR Group characteristics (wilcoxon; chi-squared/fisher)
- Recurrence: relative risk, absolute risk difference (95% CI)
- Time to recurrence (Wilcoxon rank-sum)

Results

Table 1A. Patient Demographics, Surgical History, and Preoperative Conditions (N=28 cases, 24 patients)

Characteristic	Value
Demographics	
Age, years (median, IQR)	49.5 (25-63.2)
Male	12 (42.9%)
Prior Treatments	
Prior SRS	15 (53.6%)
Prior EEA	19 (67.9%)
Prior craniotomy	14 (50%)
Preoperative Conditions	
Visual disturbances	26 (92.9%)
Diabetes insipidus	11 (39.3%)
Panhypopituitarism	12 (42.9%)

Table 1B. Tumor Characteristics

Characteristic	Value
Volume, cm ³ (median, IQR)	2.9 (1.1-6.9)
Infundibular location	10 (41.7%)
Sellar invasion	10 (41.7%)
Optic chiasm involvement	18 (75%)
Optic tract involvement	14 (58.3%)
Hypothalamic invasion	13 (54.2%)
Pathology	
Adamantinomatous	22 (84.6%)
Papillary	4 (15.4%)

Table 2. Assessed Predictors of GTR in Recurrent Craniopharyngioma

Predictor	Group	GTR Rate	p-value
Sex	Male	50%	0.459
	Female	33.3%	
Age, years (median, IQR)	GTR	45 (33.2-58.5)	0.816
	Non-GTR	49 (41.2-59.2)	
Tumor volume, cm ³ (median, IQR)	GTR	5.2 (2.8-7.4)	0.605
	Non-GTR	7.9 (5.3-12.3)	
Preoperative visual disturbance	Yes	38.5%	0.175
	No	100%	
Prior craniotomy	Yes	57.1%	0.252
	No	28.6%	
Infundibular location	Yes	60%	0.408
	No	35.7%	
Preoperative DI	Yes	33.3%	0.414
	No	54.5%	

Results

Table 3. Resection Outcomes, Effect on Recurrence and Endocrine Morbidity

Measure	GTR (N=12)	NTR (N=11)	STR (N=5)
Recurrence			
Recurrence rate	33.3% (4/12)	36.4% (4/11)	80.0% (4/5)
Time to recurrence, mo (median, IQR)	29.2 (23.8–34.8)	21.0 (16.2–24.8)	57.0 (44.0–82.5)
OR (Fisher p)*	—	1.14 (p=1.000)	8.00 (p=0.131)
RR (95% CI)*	—	1.09 (0.36–3.34)	2.40 (0.96–5.98)
ARD (95% CI)*	—	3.0% (–36.0% to 42.0%)	46.7% (2.6% to 90.7%)
Complications			
Any complication	50.0% (6/12)	9.1% (1/11)	20.0% (1/5)
Endocrine Morbidity (new / at-risk)			
New DI	2/5 (40.0%)	3/5 (60.0%)	0/2 (0%)
New AI	4/4 (100.0%)	3/5 (60.0%)	1/1 (100%)
New Panhypopit	1/5 (20%)	2/6 (33.3%)	0/1 (0%)

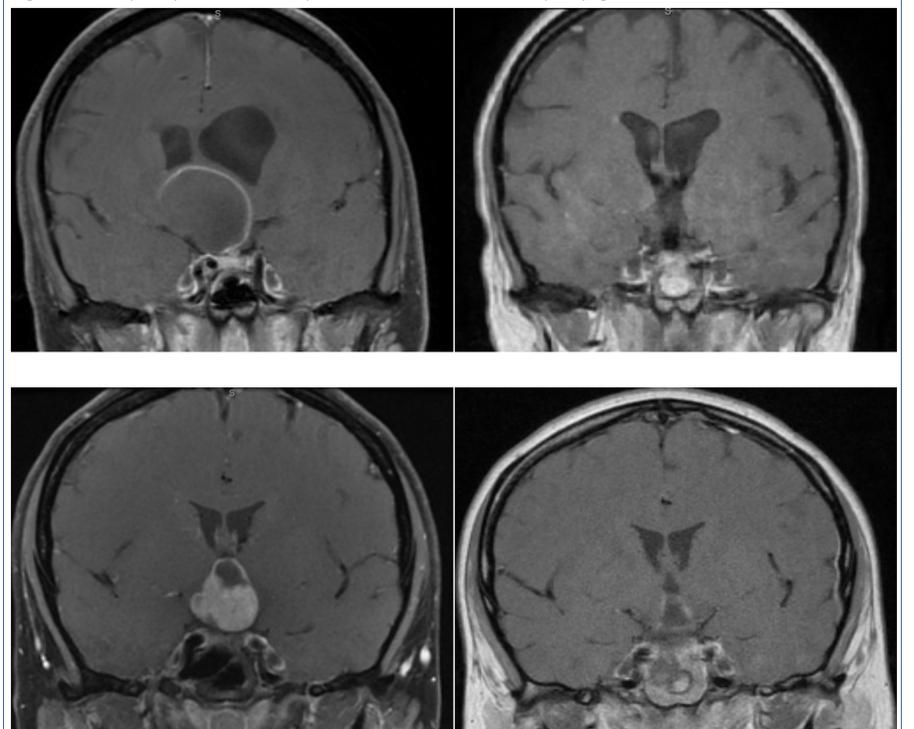
*OR, RR, and ARD calculated relative to GTR (reference group). Time to recurrence reported among patients who recurred.

Table 4. Intraoperative Residual Tumor Location

Residual Location	N (%)*
Optic apparatus (chiasm/nerve/tract/genu)	8 (61.5%)
Hypothalamus	3 (23.1%)
Vascular (cavernous sinus, clinoidal carotid, frontopolar artery)	3 (23.1%)
Stalk / intrasellar	2 (15.4%)

*Some cases had residual at multiple structures; percentages sum to >100%. Of 16 NTR/STR cases, 13 had documented intraoperative residual left to avoid damage to critical neurovascular structures (blindness, stroke, hypothalamic injury).

Figure Pre and postoperative MRIs of patients with Recurrent Craniopharyngioma



Discussion

1. GTR achieved in 42.9%; no preop factors predicted GTR
2. Recurrence rate following NTR (36.4%) is comparable to GTR (33.3%, OR 1.14, p=1.000)
3. Residual was left at critical neurovascular structures in all documented cases (optic apparatus 62%, hypothalamus 23%, vascular 23%)
4. STR had 0% new DI, 0% new panhypopituitarism, and highest rate of recurrence (80%). This likely reflects surgical planning to leave residual tumor in order to preserve endocrine function with the expected tradeoff of increased risk of recurrence.
5. Limitations: retrospective, small N (STR n=5), single institution

Conclusions

GTR is achievable in a meaningful proportion of recurrent craniopharyngiomas via EEA, though no preoperative factors predict its attainment. NTR confers equivalent recurrence risk to GTR, suggesting pursuit of resection beyond near-total may not be warranted. STR trades higher recurrence for lower endocrine morbidity, warranting multi-institutional validation.

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