

Jillian Plonsker MD^{1,2}, Danielle Levy MD⁵, Michael Brandel MD¹, Robert Rennert MD³, John Crawford MD^{2,4}, Vijay Patel MD^{1,2}, Michael Levy MD PhD^{1,2}
 UC San Diego¹, Rady Children's Health², University of Utah³, UC Irvine⁴, St. George University SOM⁵

Abstract

Craniopharyngioma is a rare disease in pediatric patients and while disease or treatment related mortality is low, it introduces significant morbidity both in the natural history of disease and all described treatment options. It is commonly postulated that aggressive surgical resection should be avoided due to perceived elevated risk of hypothalamic injury from surgical manipulation and tumor subpial invasion.

At our high-volume center, we tend to favor complete surgical resection. We postulate that craniopharyngioma does not invade the hypothalamus even in cases that expand into the third ventricle. To better examine this hypothesis, we analyzed our population of large and giant craniopharyngiomas managed with gross total resection to report on hypothalamic morbidity and recurrence.

Introduction

We present a single institutional series of large and giant pediatric craniopharyngioma in patients who underwent endoscopic endonasal approaches (EEA) over a six-year period to evaluate clinical outcomes, rates of recurrence and location of recurrence. We sought to evaluate the locations of recurrence given the nature of our EEA.

Methods and Materials

Of 22 consecutive patients with large ($\geq 3\text{cm}$) or giant ($\geq 5\text{cm}$) who were treated with EEA resection between 2016 – 2022 at our institution, 9 had a total of 18 recurrences following EEA. Data was collected via retrospective chart review.

All patients diagnosed with craniopharyngioma between 2016 and 2026 at a single institution
 n=87

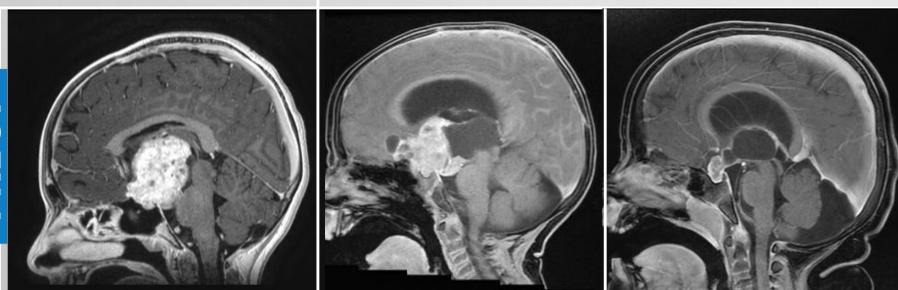
Surgery performed at outside institution (n=46)

Patients with history of open or endoscopic craniotomy for brain tumor resection
 n=45

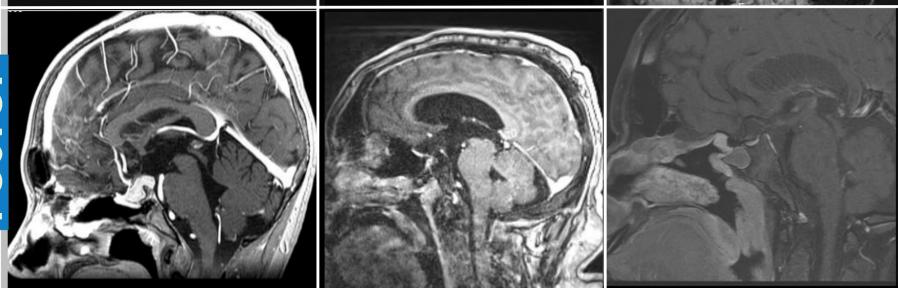
Patients with large ($\geq 3\text{cm}$) or giant ($\geq 5\text{cm}$) tumors on first presentation
 n=22

Patients with tumor recurrence after resection
 n=9 (18 recurrences)

PREOP



POSTOP



Results

Nine children presenting with Large or Giant craniopharyngioma met inclusion criteria (3 males, age 9.9 years, range 5.1-13.5 years). Tumor size (mean 4.7 +/- 1 cm) was classified as large ($\geq 3\text{ cm}$, n=5) or giant ($\geq 5\text{ cm}$, n=4). Overall, 20 patients had GTR (91%). There was a total of 18 recurrences with 9 undergoing 1, 8 undergoing 2, and 1 undergoing 3 surgeries respectively. Four received proton beam (44%) with 2 additionally receiving Avastin at 27 + 13.4 months. Eight (89%) had panhypopituitarism following surgery. One patient with normal pre-operative BMI had a BMI > 98% following surgery. Seven patients who presented with normal BMI remain unchanged following surgery. One with BMI > 98% remained unchanged. In 2 patients presenting with bitemporal hemianopsia, 1 improved and 1 remained unchanged. 2 patients presenting with normal exams remained unchanged. In 3 patients presenting with unilateral visual loss 2, remained unchanged and 1 had worse vision. 2 patients presenting with abnormal visual field exams improved.

Two patients had lumbar drains placed prophylactically, one of which required surgery for a CSF leak. All patients had tumor extension through the hypothalamus. **Of 5 intrasellar recurrences, 2 involved the Lateral walls, 2 involved the floor and Lateral walls, and 1 involved the floor, lateral wall, and inferior chiasm. Of 4 suprasellar recurrences, 3 involved the optic nerves and 1 involved the cavernous sinus.**

INTRASELLAR RECURRENCES

SUPRASELLAR RECURRENCES

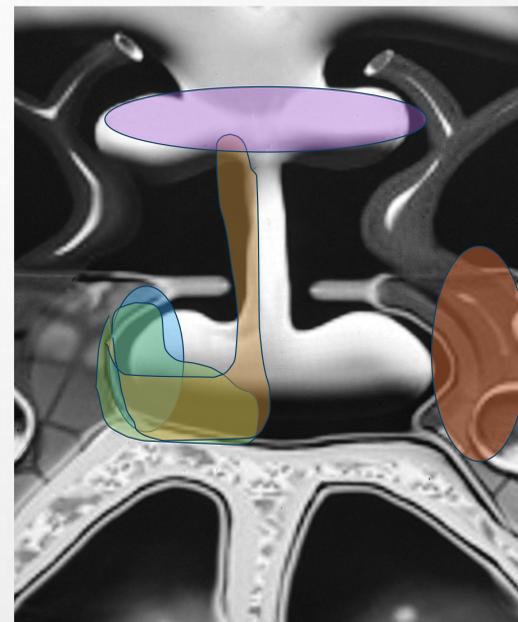
LATERAL WALL (2)

OPTIC NERVES (3)

FLOOR AND LATERAL WALL (2)

CAVERNOUS SINUS (1)

FLOOR, LATERAL WALL, INFERIOR CHIASM (1)



Discussion

Despite hypothalamic involvement in all patients, hypothalamic morbidity was minimal. Our approach is based upon the consideration that tumor perforating the Lamina Terminalis/hypothalamus is exophytic in nature. Residual calcification and abnormal appearing tissue is not addressed. Despite visualization that suggests local tumor invasion, our experience has failed to document hypothalamic tumor recurrence to date following aggressive initial resection via EEA.

Conclusions

The hypothalamus is rarely the site for tumor recurrence, suggesting that there is less cellular invasion than previous thought. This may allow for more aggressive surgical resection with the right experience and technique.

Contact

Jillian Plonsker, MD
 UC San Diego / Rady Children's Health
 7910 Frost St. San Diego CA 92123
 jplonsker@heath.ucsd.edu