

# Contemporary multi-corridor approaches to complex paediatric skull base pathologies over a 5-year period: need for specialist paediatric skull base expertise

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## Abstract

We present a 5-year retrospective experience from a tertiary multidisciplinary skull base centre evaluating contemporary multi-corridor approaches for complex paediatric skull base pathology.

Thirty-two patients (mean age 9 years) underwent surgery using endoscopic endonasal, transorbital, open cranial and combined approaches, with craniopharyngioma representing the most common pathology (52%). The endoscopic endonasal approach was the primary strategy for craniopharyngiomas (76.9%), achieving excellent visual outcomes with no hypothalamic morbidity. Multi-corridor strategies were increasingly required for complex disease with low complication rates (2 iatrogenic CSF leaks, 1 MCA vasospasm with full recovery).

These findings support the need for specialised multidisciplinary paediatric skull base teams within high-volume centres.

## Results

32 procedures were performed in 25 paediatric patients. EEA was the most common approach (65.6%), followed by extended pterional (15.6%) and transorbital (9.4%) (Fig. 2).

Adamantinomatous CPG was the predominant pathology (52%) (Fig. 3). In this subgroup, EEA was used in 76.9%, achieving GTR in 100% of primary and 75% of recurrent cases previously treated either surgically or with adjuvant therapy. Radiotherapy was used in 15.4% pre-operatively and 30.8% post-operatively; 53.8% required surgery alone. Pre-operative pituitary dysfunction was present in 60% of primary and 88% of recurrent cases. **No hypothalamic injuries occurred.**

Complications included two early CSF leaks and one MCA vasospasm after an extended pterional approach with no long-term sequelae.

## Introduction

Craniopharyngiomas (CPGs) are rare ( $\approx 1-2$  per million/year) but account for 5–10% of paediatric brain tumours<sup>4</sup>. Although histologically benign, their proximity to the hypothalamus, pituitary and optic apparatus makes them locally aggressive, and many children present with visual disturbance and pituitary dysfunction at diagnosis. The disease manifestation can be indolent with non-specific symptoms and endocrine abnormalities<sup>1</sup>. Radiotherapy adjuvants are known to have delayed endocrine and visual dysfunction. The high recurrence drives lifelong endocrine, visual and cognitive morbidity and radiotherapy<sup>2</sup>. Paediatric anatomical nuances with sphenoid sinus pneumatization, ICA configuration, chiasm location, dorsum sella height and pituitary stalk position are crucial for endonasal corridors vs open corridor planning<sup>3</sup>.



Fig 1. Case examples managed endoscopically with pre- and post-operative imaging. 1a case of CPG in 6yo with visual deterioration. 1b. EEA for odontoidectomy in a 14yo with radiotherapy induced clival hypoplasia post posterior fossa ependymoma

## Methods and Materials

Retrospective review of paediatric patients (age 2–17 years; mean 9 years) undergoing surgery for complex skull base pathology at a tertiary multidisciplinary skull base centre between 2019–2025.

Data collected: Demographics and diagnosis, Surgical approach and use of combined corridors, Extent of resection, Visual and pituitary outcomes Recurrence and complications

All procedures were performed by the senior author within a multidisciplinary team including paediatric neurosurgery, ENT skull base and oculoplastic surgery. Surgical strategies were classified as: Endoscopic endonasal (EEA), transorbital, open cranial, or combined multi-corridor approaches.

Distribution of Surgical Approaches (n=32)

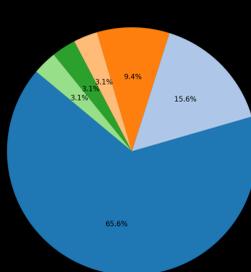


Fig 2. Distribution of surgical approaches

Distribution of Diagnoses (n=25 patients)



Fig 3. Distribution of diagnoses

## Contact

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