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## Introduction

Middle fossa craniotomy (MFC) with exposure of the internal auditory canal and/or petrous apex (anterior petrosectomy) is an uncommon operation in the pediatric population. We report our institution's experience and surgical outcomes with pediatric MFC.

## Methods

We conducted a retrospective review for MFC with exposure of the internal auditory canal and/or petrous apex performed at our institution from 2018-2024 in patients aged 18 and under.

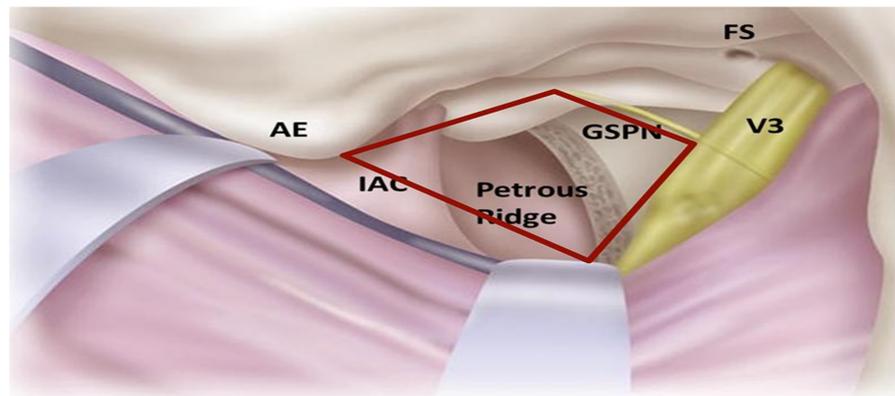


Figure 1. Extended middle fossa anatomy.<sup>1</sup>

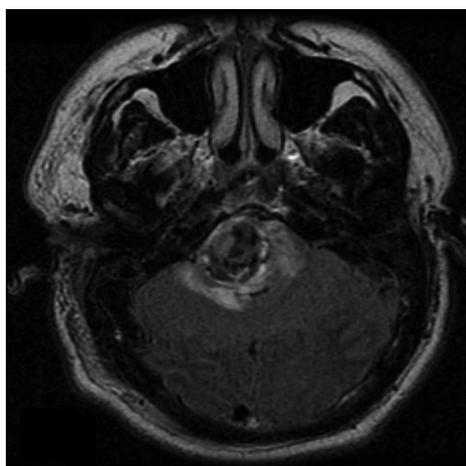


Figure 2. 3yoM with cavernous malformation with hemorrhage and associated mass effect and edema.

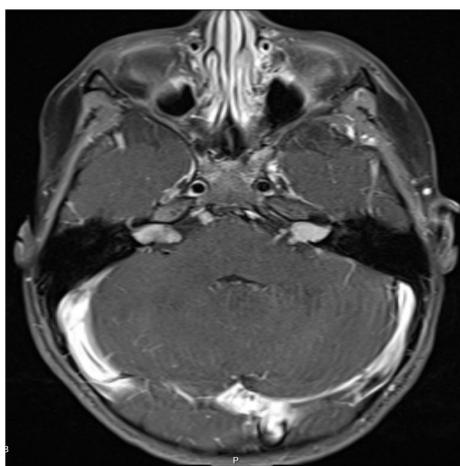


Figure 3. 5yoM with NF2 and growing vestibular schwannomas.

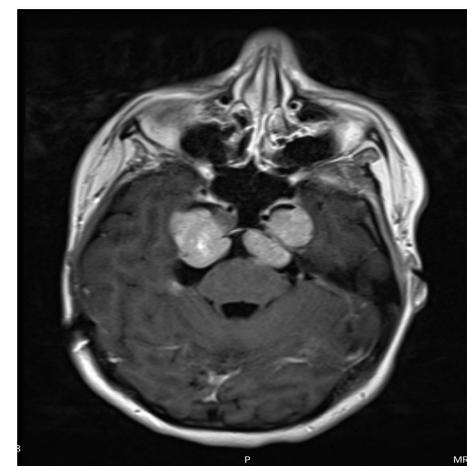


Figure 4. 18yoF with growing clear cell meningiomas.

## Results

There were 16 patients who met our inclusion criteria. Median age was 12 years (range 1-18), 10 (63%) were male.

The pathology treated was: 9 (56%) VS, of which 7 were neurofibromatosis 2 (NF2); and 1 (6%) each of grade I meningioma, clear cell meningioma, epidermoid cyst, cavernous malformation, atypical teratoid rhabdoid tumor (ATRT), anaplastic ependymoma, prepontine abscess.

On preoperative MRI, median tumor size was 12.5 mm (range 3-63). Gross total resection was achieved in 11 (69%) cases, near total in 1 (6%), and subtotal in 4 (25%). Median length of stay was 3 days. Sixth nerve palsy was sustained in 3 (19%) cases. There was 1 (6%) case of CSF leak.

Facial nerve outcomes were favorable: of 11 patients with preoperative House-Brackmann (HB) I, 10 (91%) maintained HB1 postoperatively.

For VS, hearing outcomes were evaluated: Preoperatively, all patients had class A hearing. At first postoperative follow-up (median 8 days), 5 (56%) maintained class A hearing and 4 (44%) were class D. At latest follow-up (median 678 days), of the 5 patients with preserved hearing, 4 maintained class A hearing, and the other one progressed to class B.

On follow-up MRI (median 172 days), 7 (50%) had no evidence of disease, 1 (7%) had linear enhancement, and 6 (43%) had nodular enhancement. Of the 6 with nodular enhancement, 5 had NF2.

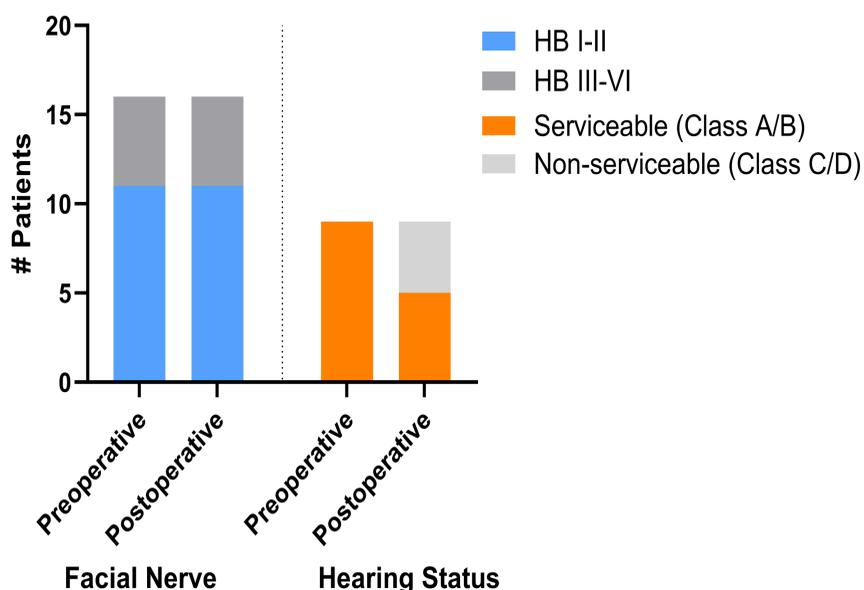


Figure 5. Pre- and Postoperative pediatric MFC facial nerve and hearing outcomes.

## Discussion

Despite significant differences in skull base anatomy, lateral skull base surgery can be performed safely by experienced teams in pediatrics.<sup>2</sup>

Almost all NF2 patients are at great risk of profound hearing loss.<sup>3</sup> An advantage of the MFC approach in pediatrics is the ability to preserve facial nerve function and hearing comparable to adult outcomes, which can significantly affect social interactions and long-term quality of life. The extent of tumor resection should be balanced with functional preservation.<sup>4,5</sup>

A few considerations should be taken, including diligent hemostasis due to low tolerance in children for blood loss; co-surgery with experienced skull base neurosurgeon, neurotologist, and pediatric anesthesiologist.<sup>2,6</sup> Furthermore, postoperative surveillance with MRI remains of paramount importance.

## Conclusions

Pediatric MFC can be used to approach a variety of intracranial pathologies. VS in NF2 is the most common indication and has favorable facial nerve outcomes and hearing preservation rates similar to those observed in adult NF2.

## Contact

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