Pediatric Middle Fossa Craniotomy

Institutional Experience and Surgical Outcomes

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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.

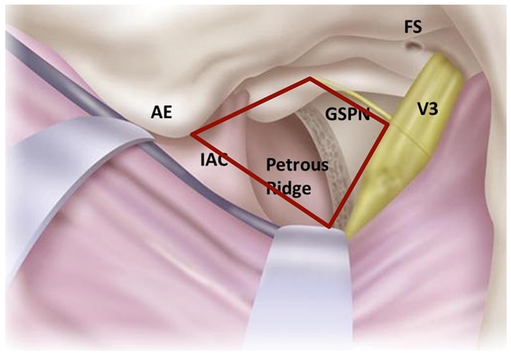

Figure 1. Extended middle fossa anatomy.[1]

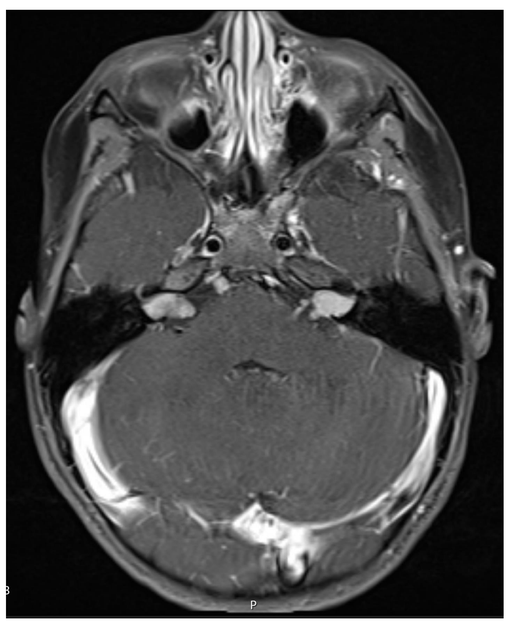

Figure 2. 5yoM with NF2 and growing vestibular schwannomas.

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.

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 in adult NF2.[2]

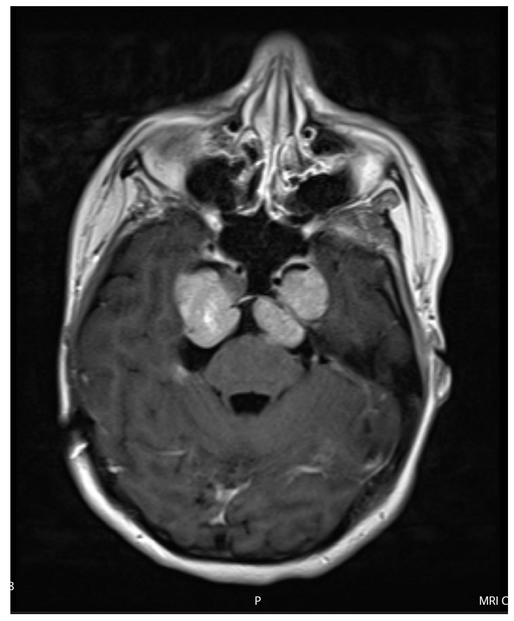

Figure 3. 18yoF with growing clear cell meningiomas.

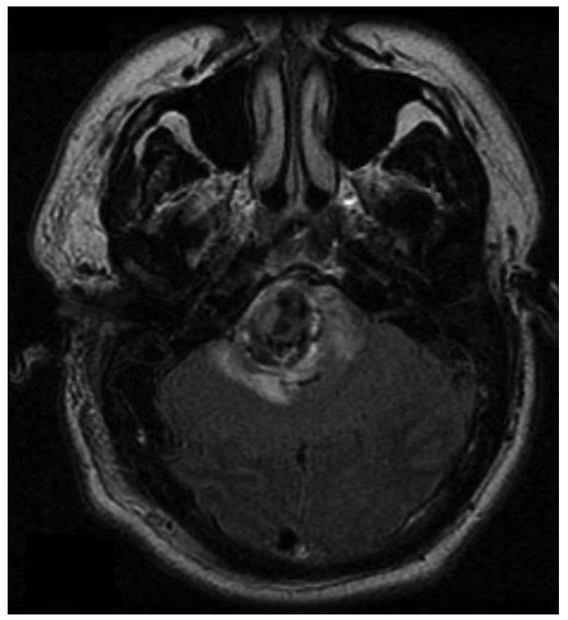

Figure 4. 18yoM with cavernous malformation with hemorrhage and associated mass effect and edema.

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References

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2. Slattery WH, Brackmann DE, Hitselberger W. "Hearing preservation in neurofibromatosis type 2." The American journal of otology. 1998 Sep;19(5):638-43.