Posterior fossa tumor diagnosis

- Integrating Radiomics and Lesion Mapping for Cerebellar Mutism Syndrome Prediction
- Neuropsychological outcome in pediatric brain tumor survivors treated with proton radiation prior to age 4 years
- Robust molecular subgrouping and reference-free aneuploidy detection in medulloblastoma using low-depth whole genome bisulfite sequencing
- Volumetric predictors for shunt-dependency in pediatric posterior fossa tumors
- Lymphoid enhancer-binding factor 1 (LEF1): a reliable immunohistochemical predictive marker for WNT-activated medulloblastoma
- Leptomeningeal hemangioblastoma: illustrative case
- Endocrine Comorbidities in Survivors of Childhood Brain Tumors: Insights from the Slovenian National Cohort
- Diagnostic Accuracy of MRI and CT Scan Features in Differentiation of Pediatric Ependymoma from Medulloblastoma

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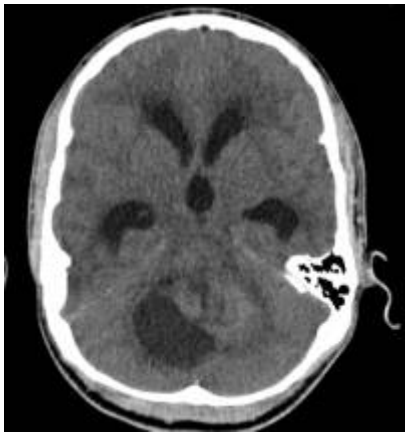
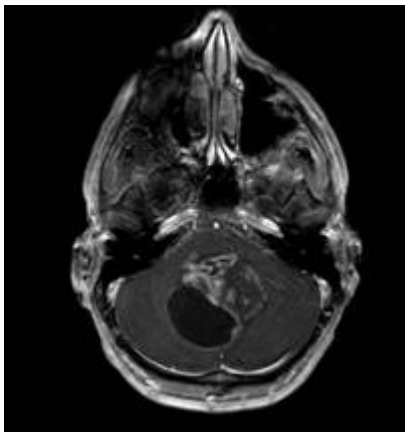
Head computed tomography



MRI



Conventional T1- and T2-weighted magnetic resonance imaging (MRI) is essential for diagnosis and evaluation of tumor location, extent, and involvement of eloquent brain regions, but does not reliably differentiate between the various tumor grades and types [1].

Several studies have shown that the diffusion characteristics may be helpful in narrowing down the preoperative diagnosis [2] [3] [4].

In pediatric patients with a posterior fossa tumor, an MRI of the lumbar spine should be done pre-op to rule out drop mets (post-op there may be an artifact from blood).

In adults, most intraparenchymal posterior fossa tumors will be metastatic, and work-up for a primary should be undertaken.

Posterior fossa ring-enhancing lesion

Posterior fossa ring-enhancing lesions (PFREL) in the adult immunocompetent hosts pose a diagnostic challenge. Van Boxstael et al. aimed to evaluate the spectrum of PFREL etiologies and propose a diagnostic algorithm.

This study involved a retrospective analysis of PFREL cases from our institution (January 2023 to April 2024) and a systematic literature review conducted using Embase and PubMed databases following the PRISMA 2020 guidelines. Clinical and radiological features from these cases formed the basis of a diagnostic algorithm, which was further refined via an additional comprehensive literature review, and finally validated on an independent set of PFREL cases.

The systematic review (467 studies, 56 selected after inclusion/exclusion criteria) revealed that PFREL etiology was infectious in 52%, tumoral in 38% and inflammatory in 2% of cases. At initial presentation, mean age was 48 years and 36% of patients had multiple PFREL. Headache was the most common symptom (46%). Among those with reported outcomes, 36% showed complete resolution of symptoms, 29% showed improvement with residual symptoms, and 16% died. The diagnostic algorithm was created from a total of 116 PFREL cases (10 from our institutional series, 56 from the systematic literature review and 50 supplementary cases found in the literature) and included 29 possible PFREL etiologies. In the validation set (16 patients), the algorithm provided the correct diagnosis in each case.

PFREL in immunocompetent adults encompass a broad differential diagnosis. The algorithm integrates clinical and radiologic data to assist in identifying the underlying cause of PFREL, potentially reducing the need for neurosurgical biopsy. This approach aims to enhance diagnostic accuracy, leading to better treatment decisions and improved patient outcomes [5].

1)
Poretti A, Meoded A, Cohen KJ, et al. Apparent diffusion coefficient of pediatric cerebellar tumors: a biomarker of tumor grade? Pediatr Blood Cancer 2013;60:2036–41.
2)
Jaremko JL, Jans LB, Coleman LT, et al. Value and limitations of diffusion-weighted imaging in grading and diagnosis of pediatric posterior fossa tumors. AJNR Am J Neuroradiol 2010;31:1613–6.
3)
Schneider JF, Confort-Gouny S, Viola A, et al. Multiparametric differentiation of posterior fossa tumors

in children using diffusionweighted imaging and short echo-time 1H-MR spectroscopy. J Magn Reson Imaging 2007;26:1390–8.
4)
Rodriguez Gutierrez D, Awwad A, Meijer L, et al. Metrics and textural features of MRI diffusion to improve classification of pediatric posterior fossa tumors. AJNR Am J Neuroradiol 2014;35:1009–15
5)
Van Boxstael E, de Hennin A, Vigneul E, Scoppettuolo P, El Sankari S, Bocchio AP, Borrelli S, Lolli V, van Pesch V, Slootjes SM, Finet P, Rovira À, Reich DS, Maggi P. Posterior fossa ring-enhancing lesions in the adult immunocompetent host: illustrative cases, systematic review, and proposed diagnostic algorithm. AJNR Am J Neuroradiol. 2025 Jan 29:ajnr.A8677. doi: 10.3174/ajnr.A8677. Epub ahead of print. PMID: 39880690.