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Posterior fossa ring-enhancing lesions in the adult immunocompetent host: illustrative cases, systematic review, and proposed diagnostic algorithm

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Abstract

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

Methods: 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.

Results: 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.

Conclusion: PFREL in immunocompetent adults encompass a broad differential diagnosis. Our 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.

Abbreviations: ADEM = acute disseminated encephalomyelitis; CLL = chronic lymphocytic leukemia; CSF = cerebrospinal fluid; DLBCL: diffuse large B cell lymphoma; FLAIR = fluid attenuated inversion recovery; MeSH = medical subject headings; MRI = magnetic resonance imaging; NIHSS = National Institutes of Health Stroke Scale; NMOSD = neuromyelitis optic spectrum disorder; PFREL = posterior fossa ring enhancing lesion; PRISMA = Preferred Reporting Items for Systematic reviews and Meta-Analyses; SUV max = maximum standardized uptake value.

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