Ring-enhancing lesion

The differential for peripheral or ring enhancing cerebral lesions includes:

cerebral abscess

tuberculoma

neurocysticercosis

metastases

glioblastoma

subacute infarct / haemorrhage / contusion

demyelination (incomplete ring)

tumefactive demyelinating lesion (incomplete ring)

radiation necrosis

postoperative change

lymphoma - in the immunocompromised patient

A helpful mnemonic is MAGIC DR

Radiographic features

No single feature is pathognomonic, although a cystic lesion that markedly restricts centrally (the fluid component) on DWI should be considered an abscess until proven otherwise.

Many features of the lesion as well as clinical presentation and patient demographics need to be taken together to help narrow the differential. Helpful rules of thumb include:

enhancing wall characteristics

thick and nodular favours neoplasm

thin and regular favours abscess

incomplete ring often opened toward the cortex favours demyelination

intermediate to low T2 signal capsule favours abscess

restricted diffusion of enhancing wall favours Glioblastoma or demyelination

surrounding oedema

extensive oedema relative to lesion size favours abscess

increased perfusion favours neoplasm (metastases or primary cerebral malignancy)

central fluid / content

restricted diffusion favours abscess

number of lesions

similar sized rounded lesions at grey white matter junction favour metastases or abscesses

irregular mass with adjacent secondary lesions embedded in the same region of 'oedema' favours Glioblastoma

small (<1-2cm) lesions with thin walls especially if other calcific foci are present suggest neurocysticercosis.

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 [1)].

1)
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.