Posterior fossa lesion

Etiology

Etiologies of infratentorial masses:

1. vascular: brainstem infarction (including basilar artery occlusion), cerebellar infarction or cerebellar hemorrhage

2. inflammatory: cerebellar abscess, central pontine myelinolysis, brainstem encephalitis.

3. neoplasms: primary or metastatic, see posterior fossa tumor

4. traumatic: epidural hematoma or subdural hematoma.

Clinical findings

Symptoms: 1. sensory a) craniocervical pain: usually a nearly symptom, commonly in neck and occiput.Aching nature. ↑with head movement

b) sensory findings: usually occur later.Numbness and tingling of the fingers

2. motor

a) spastic weakness of the extremities:weakness usually starts in the ipsilateral UE,then the ipsilateral LE, then the contralateral LE, and finally the contralateral UE (“rotating paralysis”).

Signs: 1. sensory

a) dissociated sensory loss:loss ofpain and temperature contralateral to lesion with preservation of tactile sensation b) lossofpositionandvibratorysense,greaterintheupperthanthelowerextremities

2. motor a) spastic weakness of the extremities

b) atrophy of the intrinsic hand muscles:a lower motor nerve finding

c) cerebellar findings may rarely be present with extensive intracranial extension

3. long tract findings

a) brisk muscle stretch reflexes(hyperreflexia,spasticity)

b) loss of abdominal cutaneous reflexes

c) neurogenic bladder: usually a very late finding.

4. ipsilateral Horner syndrome: due to compression of cervical sympathetics

5. nystagmus: classically downbeat nystagmus but other types can occur It had been postulated that

long tract findings were due to direct compression at the cervicomedullary junction, and that lower motor nerve findings in the upper extremities were due to central necrosis of the gray matter as a result of compression of arterial blood supply. Anatomic study suggests that it is actually venous infarction at lower cervical levels (C8–1) that is responsible for the lower motor neuron findings.

Differential diagnosis

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)].

Van Boxstael et al. provide a valuable diagnostic framework for posterior fossa ring-enhancing lesions in immunocompetent adults. Their systematic review and algorithm development offer an important step toward reducing invasive procedures and improving diagnostic accuracy. However, the study has limitations in dataset size, radiological detail, and external validation, which must be addressed before widespread clinical adoption. Future work should expand prospective validation, integrate advanced imaging techniques, and refine the algorithm with machine learning to enhance its applicability in real-world settings.

Complications

Hydrocephalus

Infratentorial masses can produce obstructive hydrocephalus by compressing the Sylvian aqueduct and/or fourth ventricle

Upward cerebellar herniation

see Upward cerebellar herniation.

Tonsillar herniation

see Tonsillar herniation.

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.