# Primary central nervous system lymphoma diagnosis

- Clinically probable paraneoplastic vasculitic peripheral neuropathy in primary central nervous system lymphoma: a case report
- Outcomes at a single institution with MTR induction and consolidation in the management of primary CNS lymphoma
- Uncommon Non-MS Demyelinating Disorders of the Central Nervous System
- Molecular diagnosis of vitreoretinal lymphoma
- Plasmablast-like lymphoma cells as a distinct subpopulation confers multidrug resistance in PCNSL
- Diffusion-weighted imaging and susceptibility-weighted imaging in differentiating ring-enhancing primary central nervous system lymphoma from infections
- Primary central nervous system lymphoma: A 7 years single-center experience
- Rare Case of Primary Bone Lymphoma

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## Diagnostic molecular marker

The myeloid differentiation primary response gene 88 (MYD88) L265P mutation is a disease-specific mutation of primary central nervous system lymphoma (PCNSL) among the central nervous system tumors. Accordingly, this mutation is considered a reliable diagnostic molecular marker of PCNSL. As the intra-operative diagnosis of PCNSL is sometimes difficult to achieve using histological examinations alone, intra-operative detection of the MYD88 L265P mutation could be effective for the accurate diagnosis of PCNSL.

Yamaguchi et al. aimed to develop a novel rapid genotyping system (GeneSoC) using real-time polymerase chain reaction (PCR) based on microfluidic thermal cycling technology. This real-time PCR system shortened the analysis time, which enabled the detection of the MYD88 L265P mutation within 15 min. Rapid detection of the MYD88 L265P mutation was performed intra-operatively using GeneSoC in 24 consecutive cases with suspected malignant brain tumors, including 10 cases with suspected Primary central nervous system lymphoma before surgery. The MYD88 L265P mutation was detected in eight cases in which tumors were pathologically diagnosed as PCNSL after the operation, while wild-type MYD88 was detected in 16 cases. Although two of the 16 cases with wild-type MYD88 were pathologically diagnosed as PCNSL after the operation, MYD88 L265P could be detected in all eight PCNSL cases harboring MYD88 L265P. The MYD88 L265P mutation could also be detected using cell-free DNA derived from the cerebrospinal fluid of two PCNSL cases. Detection of the MYD88 L265P mutation using GeneSoC might not only improve the accuracy of intra-operative diagnosis of PCNSL but also help the future pre-operative diagnosis through liquid biopsy of cerebrospinal fluid [1)]

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The histopathological specimens of PCNSL patients should be obtained as safely and comprehensively as possible by multimodal tomography-guided biopsy or minimally invasive surgery. Corticosteroids should be withdrawn from, or not be administered to, patients with suspected PCNSL before biopsy if

the patient's status permits. MRI (enhanced and DWI) should be performed for diagnosing and evaluating PCNSL patients where whole-body PET-CT be used at necessary time points. Patients with suspected primary vitreoretinal lymphoma (PVRL) should be diagnosed by vitreous biopsy Mini-mental status examination can be used to assess cognitive function in the clinical management [2)]

A stereotactic biopsy followed by histopathology is the diagnostic standard. However, limited material is available from CNS biopsies, thus impeding an in-depth characterization of PCNSL. Malignant B cells in PCNSL show transcriptional and spatial intratumor heterogeneity. T cell exhaustion is frequent in the PCNSL microenvironment, co-localizes with malignant cells, and highlights the potential of personalized treatments [3)]

# Liquid biopsy for Primary central nervous system lymphoma diagnosis

Liquid biopsy for Primary central nervous system lymphoma diagnosis.

# Radiographic features

▶ Findings are common to CT/MRI. On imaging (CT or MRI) 50–60% occur in one or more cerebral lobes (in gray or white matter). 25% occur in deep midline structures (septum pellucidum, basal ganglion, corpus callosum). 25% are infratentorial. 10–30% of patients have multiple lesions at the time of presentation. In contrast, systemic lymphomas that spread to the CNS tend to present with leptomeningeal involvement instead of parenchymal tumors [4)]

Almost all PCNSLs enhance (except only 1.1% in immune intact, and 3.2% in immune-compromised [5)]

Non–AIDS-related cases tend to enhance homogeneously, whereas AIDS-related cases are more likely to be ring-enhancing (necrotic center) and multifocal [6)] [7)].

Non–AIDS-related cases: CNS lymphomas should be suspected with homogeneously enhancing lesion(s) in the central gray or corpus callosum. 75% are in contact with ependymal or meningeal surfaces (this together with dense enhancement may produce a “pseudomeningioma pattern”; however, lymphomas lack calcifications and are more likely to be multiple).

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The most helpful imaging pattern presents mainly in untreated non-immunocompromised patients is of a CT hyperdense avidly enhancing mass, with MRI T1 hypointense, T2 iso- to hypointense, vivid homogeneous gadolinium-enhancing lesion/s with restricted diffusion, subependymal extension, and crossing of the corpus callosum. Unfortunately, this pattern is not always present.

Typically PCNSL are supratentorial (75-85%) and appear as a mass or multiple masses (11-50%) that are usually in contact with the subarachnoid/ependymal surfaces. Crossing the corpus callosum is not infrequently seen. Enhancement on both CT and MRI is pronounced and usually homogeneous. Even with larger lesions, there is little mass effect for size and limited surrounding vasogenic oedema.

Low-grade tumours differ from the more common high-grade PCNSL in several ways:

Deep locations and spinal involvement is more common

Contrast enhancement is absent, irregular or only mild

Disseminated meningeal/intraventricular disease is uncommon, it is seen in ~5% (range 1-7%) of cases at presentation and usually in high-grade cases.

It should be noted that in patients who are immunocompromised (typically HIV/AIDS or post-transplant) appearances are more heterogeneous, including central non-enhancement/necrosis and haemorrhage, although the latter is still uncommon

## CT

Most lesions are hyperattenuating (70%)

Shows enhancement

Haemorrhage is distinctly uncommon

There are often multiple lesions in patients with HIV/AIDS

## MRI

see Primary central nervous system lymphoma MRI.

## Scintigraphy

Thallium 201

Shows increased uptake

C11 Methionine PET

Shows increased uptake [8].

## References

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