Turkish Journal of Neurology

Turk J Neurol 2026;32(4):309-313
Doi: 10.55697/tnd.2026.641

SHORT COMMUNICATION

Steroid-responsive lesion involving the diencephalon and brainstem mimicking inflammatory demyelinating disease: A case report of primary central nervous system diffuse large B-cell lymphoma

Nuri Tuğra Uslucan, Anıl Yakut, Fikret Bademkıran

Department of Neurology, Ege University Faculty of Medicine, İzmir, Türkiye

ABSTRACT

Primary central nervous system lymphoma (PCNSL) may present with atypical clinical and radiological features and can demonstrate a dramatic response to corticosteroid therapy, leading to diagnostic delay. Herein, we reported a 31-year-old male patient with a steroid-responsive lesion involving the diencephalon and brainstem initially mimicking an inflammatory demyelinating disorder, who was ultimately diagnosed with primary central nervous system diffuse large B-cell lymphoma. The patient presented with progressive hypersomnolence, diplopia, and left-sided hemiparesis. Brain magnetic resonance imaging revealed a contrast-enhancing T2/Fluid-Attenuated Inversion Recovery (FLAIR) hyperintense lesion extending from the right basal ganglia and thalamus to the brainstem. Extensive infectious, autoimmune, paraneoplastic, and demyelinating work-up, including cerebrospinal fluid analysis and flow cytometry, was unremarkable. The patient showed a marked clinical and radiological response to high-dose intravenous methylprednisolone. However, neurological relapse occurred during steroid tapering, again with transient steroid responsiveness. Repeated cerebrospinal fluid examinations remained nondiagnostic. Stereotactic brain biopsy ultimately revealed CD20-positive diffuse large B-cell lymphoma, consistent with PCNSL. This case highlights that a dramatic corticosteroid response should not exclude PCNSL from the differential diagnosis, even in young patients with deep gray matter and brainstem lesions.

Keywords: Brainstem lesion, demyelinating disease mimic, diffuse large B-cell lymphoma, primary central nervous system lymphoma, steroid responsiveness.

Primary central nervous system lymphoma (PCNSL) is a rare and aggressive extranodal non-Hodgkin lymphoma, most commonly of diffuse large B-cell histology, confined to the brain, spinal cord, leptomeninges, or eyes. Although PCNSL classically presents with contrast-enhancing periventricular or deep gray matter lesions, its clinical and radiological spectrum is broad.[1]

One of the most challenging aspects of PCNSL is its marked sensitivity to corticosteroids. Steroid-induced apoptosis of lymphoma cells may lead to rapid clinical and radiological improvement, potentially mimicking inflammatory or demyelinating disorders and resulting in delayed diagnosis. Cerebrospinal fluid (CSF) cytology and flow cytometry have limited sensitivity, and repeated negative results do not exclude the disease.[2]

Herein, we presented a young adult with a steroid-responsive lesion involving the diencephalon and brainstem, initially interpreted as an inflammatory demyelinating process, in whom the definitive diagnosis of primary central nervous system (CNS) diffuse large B-cell lymphoma was established only after relapse and brain biopsy.

Correspondence: Nuri Tuğra Uslucan, MD. Ege Üniversitesi Tıp Fakültesi, Nöroloji Anabilim Dalı, 35100 Bornova, İzmir, Türkiye.
E-mail: tugra.uslucan@gmail.com
Received: January 12, 2026 **Accepted:** March 13, 2026 **Published online:** May 27, 2026
Cite this article as: Uslucan NT, Yakut A, Bademkıran F. Steroid-responsive lesion involving the diencephalon and brainstem mimicking inflammatory demyelinating disease: A case report of primary central nervous system diffuse large B-cell lymphoma. Turk J Neurol 2026;32(4):309-313. doi: 10.55697/tnd.2026.641.

© Copyright 2026 by the Turkish Neurological Society. This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (CC BY-NC-ND 4.0). To view a copy of this license, visit https://creativecommons.org/licenses/by-nc-nd/4.0/

CASE REPORT

A 31-year-old male patient with no significant past medical history was admitted with a two-month history of progressive fatigue and excessive daytime sleepiness. The patient subsequently developed binocular horizontal diplopia and left-sided weakness one month prior to presentation. There was no history of recent infection, vaccination, toxin exposure, or systemic symptoms. The patient had a 5 to 6 pack-year smoking history and no alcohol use.

Neurological examination revealed horizontal diplopia accentuated on right gaze, left-sided hemiparesis (Medical Research Council grade 4/5), and left hemisensory hypoesthesia. Consciousness was preserved, but prominent hypersomnolence was noted.

Initial brain magnetic resonance imaging (MRI) demonstrated a T2/Fluid-Attenuated Inversion Recovery (FLAIR) hyperintense lesion involving the right basal ganglia and thalamus, extending caudally into the right cerebral peduncle and

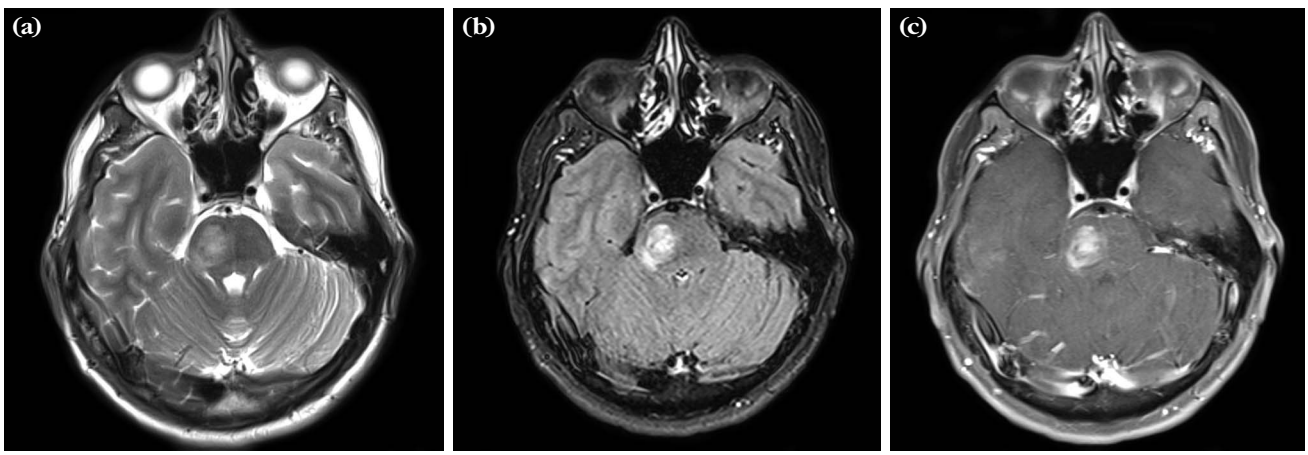


Figure 1. Axial brain MRI obtained at symptom onset. T2-weighted **(a)** and FLAIR **(b)** sequences show a hyperintense lesion in the right pontine region. Contrast-enhanced T1-weighted sequence **(c)** demonstrates focal enhancement. Imaging features were initially interpreted as more suggestive of an inflammatory or demyelinating lesion.
MRI, magnetic resonance imaging; FLAIR, Fluid-Attenuated Inversion Recovery.

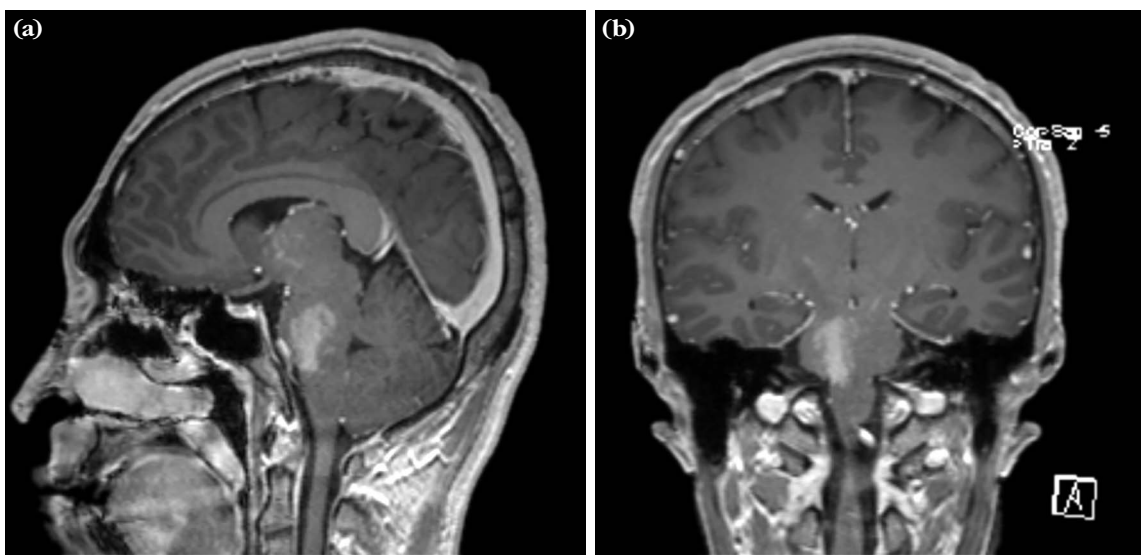


Figure 2. Sagittal and coronal contrast-enhanced T1-weighted brain magnetic resonance imaging obtained at symptom onset. Sequences show an enhancing lesion involving the diencephalic and brainstem regions. Based on the lesion location and enhancement pattern, inflammatory vasculitic etiologies, including neuro-Behçet disease, were considered in the initial differential diagnosis.

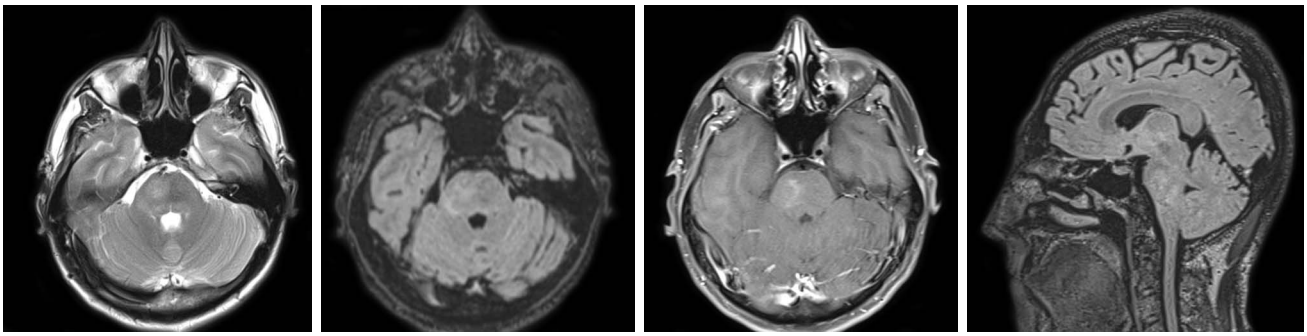


Figure 3. Axial and sagittal brain magnetic resonance imaging obtained after high-dose intravenous methylprednisolone treatment. Follow-up imaging shows significant radiological improvement, including decreased lesion size and reduced contrast enhancement within the diencephalic and brainstem regions.

pons, with contrast enhancement (Figures 1, 2). No significant diffusion restriction or increased perfusion was observed. Magnetic resonance spectroscopy was also performed at the initial evaluation and did not show findings suggestive of malignancy or lymphoma. The radiological appearance was considered more suggestive of an inflammatory or demyelinating process rather than a high-grade neoplasm (Figures 1, 2). Given this interpretation, corticosteroid therapy was initiated before tissue diagnosis.

Given the concern for a space-occupying lesion, lumbar puncture was initially deferred. Extensive laboratory evaluation, including infectious, autoimmune, vasculitic, paraneoplastic, and demyelinating markers, was unremarkable. Serum and CSF testing for aquaporin-4 and myelin

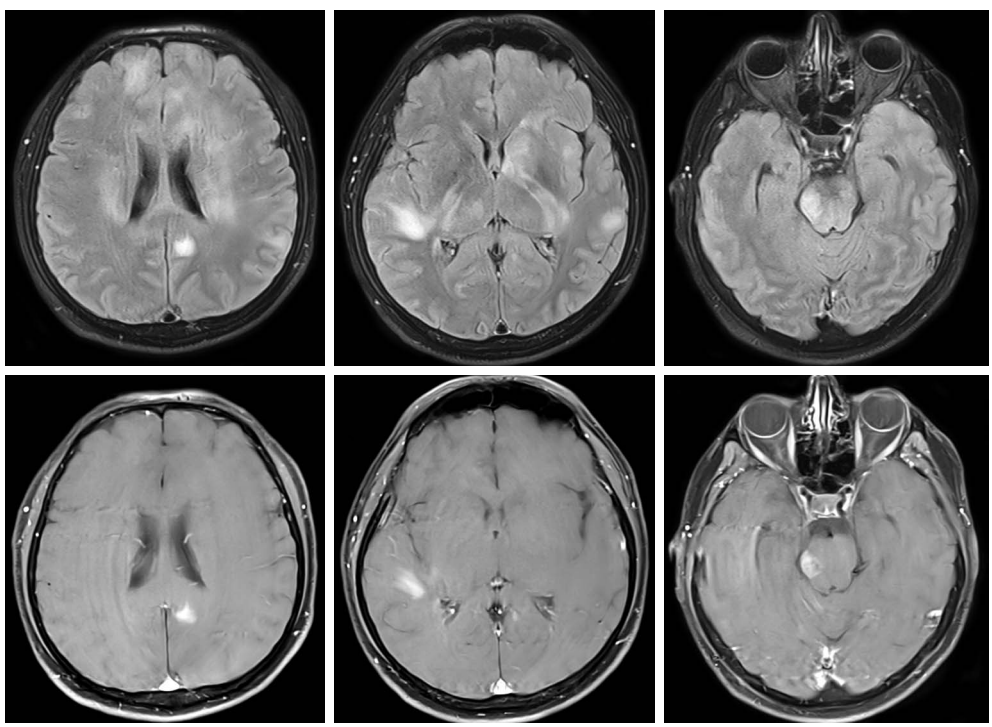


Figure 4. Axial brain magnetic resonance imaging obtained during clinical relapse while the patient was receiving prednisolone and azathioprine (introduced as a steroid-sparing agent during follow-up). Fluid-attenuated inversion recovery sequences reveal increased lesion burden compared to prior imaging, with corresponding contrast enhancement on T1-weighted sequences. These findings coincided with recurrent neurological symptoms, including behavioral changes and paresis.

oligodendrocyte glycoprotein (MOG) antibodies (live cell-based assay) were negative. Additional workup for inflammatory mimics, including serum angiotensin-converting enzyme level, pathergy testing, HLA-B51 (Behçet-associated HLA) testing, and chest computed tomography, was normal. Neuro-Behçet disease was considered; however, pathergy testing and HLA-B51 were negative, and no supportive systemic findings were identified. Whole-body computed tomography, positron emission tomography, bone marrow biopsy, scrotal ultrasonography, and ophthalmological examination revealed no evidence of systemic lymphoma, other systemic malignancy, or inflammatory disease.

High-dose intravenous methylprednisolone (1 g/day) was initiated. The patient showed rapid and marked clinical improvement, with complete resolution of diplopia and hemiparesis by day three. Follow-up MRI demonstrated regression of contrast enhancement and partial reduction in lesion size (Figure 3). Lumbar puncture performed after steroid therapy revealed normal CSF cell counts and biochemistry; oligoclonal bands and immunoglobulin G (IgG) index were negative. Cerebrospinal fluid flow cytometry showed a mature T-cell population without blast cells.

The patient was discharged on oral prednisone. Approximately two months later, while receiving a tapering dose of corticosteroids, the patient was readmitted with recurrent diplopia. Repeat MRI showed radiological progression compared to the poststeroid imaging (Figure 4). Repeated CSF analyses, including flow cytometry, again failed to demonstrate malignant cells. Because neurological symptoms recurred when the prednisone dose was tapered to 40 mg/day, the clinical course was considered steroid-dependent. Azathioprine was subsequently initiated as a steroid-sparing agent to facilitate further corticosteroid tapering.

Given the relapsing course, steroid dependence, and persistent radiological lesion, stereotactic brain biopsy was performed. Histopathological examination revealed diffuse infiltration of large atypical lymphoid cells with high nuclear-to-cytoplasmic ratio. Immunohistochemistry showed strong CD20 positivity and a high Ki-67 proliferation index, consistent with diffuse large B-cell lymphoma. Systemic evaluation remained negative, confirming the diagnosis of primary CNS diffuse large B-cell lymphoma. A written informed consent was obtained from the patient.

DISCUSSION

This case illustrates several well-recognized but clinically challenging features of PCNSL. First, although PCNSL typically affects older individuals, it can occur in young adults and should not be excluded based on age alone. Second, involvement of the basal ganglia, thalamus, and brainstem, while characteristic,[3] may overlap with inflammatory or demyelinating conditions, particularly when perfusion and spectroscopy findings are nonspecific.

The dramatic clinical and radiological response to corticosteroids (Figure 3) represents a major diagnostic pitfall. Steroid-induced tumor regression may transiently obscure imaging findings and significantly reduce the diagnostic yield of both CSF studies and brain biopsy.[4] In our patient, repeated CSF examinations, including flow cytometry, were nondiagnostic, consistent with the low sensitivity of CSF-based diagnostics in PCNSL.[5]

Relapse during steroid tapering, steroid dependence, and incomplete or transient radiological resolution should raise strong suspicion for lymphoma, even in the absence of systemic disease or positive CSF findings. Early consideration of brain biopsy is crucial to avoid prolonged diagnostic delay and inappropriate long-term immunosuppressive therapy.

At the initial presentation, the differential diagnosis included inflammatory, demyelinating, and neuroimmunologic disorders that may have mimicked PCNSL on MRI, particularly in deep gray matter and brainstem locations. These included multiple sclerosis, MOG antibody-associated disease, neurosarcoidosis, and neuro-Behçet disease, as well as other inflammatory/infectious mimics (e.g., acute disseminated encephalomyelitis, autoimmune glial fibrillary acidic protein astrocytopathy, and CNS vasculitis) depending on the clinical context. In our patient, negative aquaporin-4/MOG antibody testing (live cell-based assay), normal angiotensin-converting enzyme level, negative pathergy test, negative HLA-B51 testing, and normal chest computed tomography reduced the likelihood of several inflammatory mimics. However, the marked initial steroid responsiveness remained misleading.

In conclusion, primary CNS diffuse large B-cell lymphoma may closely mimic inflammatory demyelinating disease and demonstrate striking steroid responsiveness.[6] A dramatic clinical or

radiological response to corticosteroids should not exclude lymphoma from the differential diagnosis, even in young patients with deep gray matter or brainstem involvement.

Author Contributions: F.B.: Idea/concept, design, control/supervision, literature review, critical review; T.U.: Data collection and/or processing, writing the article, table preparation; T.U., F.B.: Analysis and/or interpretation; F.B.: References and fundings; A.Y.: Materials, figure preparation.

Conflict of Interest: The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding: The authors received no financial support for the research and/or authorship of this article.

AI Disclosure: The authors declare that artificial intelligence (AI) tools were not used, or were used solely for language editing, and had no role in data analysis, interpretation, or the formulation of conclusions. All scientific content, data interpretation, and conclusions are the sole responsibility of the authors. The authors further confirm that AI tools were not used to generate, fabricate, or 'hallucinate' references, and that all references have been carefully verified for accuracy.

REFERENCES

1. Ferreri AJM, Calimeri T, Cwynarski K, Dietrich J, Grommes C, Hoang-Xuan K, et al. Primary central nervous system lymphoma. Nat Rev Dis Primers 2023;9:29. doi: 10.1038/s41572-023-00439-0.
2. Roschewski M, Hodson DJ. Diffuse large B-cell lymphoma involving the central nervous system: Biologic rationale for targeted therapy. Haematologica 2024;109:388-400. doi: 10.3324/haematol.2021.278613.
3. Ali A, Haki C, Atalay FO, Yalcin R. Primary central nervous system lymphoma: diffuse large B-cell lymphoma. Turk J Neurol 2019;25:239-42.
4. Loser V, Segot A, de Leval L, Bisig B, Brouland JP, Hewer E, et al. Primary diffuse large B-cell lymphoma of the central nervous system identified with CSF biomarkers. BMC Neurol 2024;24:250. doi: 10.1186/s12883-024-03761-6.
5. Kaji FA, Martinez-Calle N, Sovani V, Fox CP. Rare central nervous system lymphomas. Br J Haematol 2022;197:662-78. doi: 10.1111/bjh.18128.
6. Chua BJG, Low CE, Yau CE, Tan YH, Chiang J, Chang EWY, et al. Recent updates on central nervous system prophylaxis in patients with high-risk diffuse large B-cell lymphoma. Exp Hematol Oncol 2024;13:1. doi: 10.1186/s40164-023-00467-2.