Eosinophilic Meningitis Caused by Primary Angiitis of the Central Nervous System

Kazuoki Hirano¹, Jiro Fukae¹,², Sotaro Hieda³, Motoki Fujimaki¹, Hisato Ishii⁴, Yoshio Tsuboi², Mitsuru Kawamura³, Hajime Arai⁴ and Nobutaka Hattori¹

Abstract

Eosinophilic meningitis is defined as the presence of 10 eosinophils/mm³ in the cerebrospinal fluid (CSF) or eosinophils accounting for more than 10% of CSF leukocytes. A 76-year-old man who developed cognitive dysfunction and consciousness disturbance had eosinophilic meningitis (his CSF contained 19.0% eosinophils). Because the etiology was unknown, we performed a brain biopsy. The pathological findings showed inflammatory infiltration in the small-sized arteries of the meninges. The patient was ultimately diagnosed as having primary angiitis of the central nervous system (PACNS). Eosinophilic meningitis occurring in a patient with PACNS is extremely rare, and this is the first report of this condition in Japan.

Key words: eosinophilic meningitis, brain biopsy, PACNS, cerebrovascular amyloid angiopathy, β-amyloid, allergic reaction

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Introduction

Eosinophilic meningitis is defined as the presence of 10 eosinophils/mm³ in the cerebrospinal fluid (CSF) or eosinophils accounting for more than 10% of CSF leukocytes (1). Primary angiitis of the central nervous system (PACNS) is an uncommon and serious vasculitis that is limited to the brain and spinal cord (2-5). In most patients with PACNS, pleocytosis is observed in the CSF and reflects the presence of an inflammatory process within the CNS. The pleocytosis observed in the CSF of patients with PACNS usually reflects increased lymphocytes and neutrophils (2, 4-10). We herein report the case of a 76-year-old man who developed cognitive dysfunction and consciousness disturbance caused by PACNS with eosinophilic meningitis.

Case Report

A 76-year-old man noticed a headache in February 2008. He gradually developed cognitive dysfunction and began to repeat the same behaviors. He was admitted to the hospital due to consciousness disturbance in November 2008. His past medical history included hyperlipidemia, lumbar disc herniation and prostatic hyperplasia. He had no allergies or skin diseases. A physical examination performed on admission showed no signs or symptoms suggesting systemic vasculitis, such as lymphadenopathy or rashes. The patient was somnolent and had neck stiffness.

Routine hematological and biochemical tests were within the normal limits. Viral serology (anti-herpes simplex virus IgM, anti-herpes zoster virus IgM and human T-cell lymphotropic virus type 1) was negative. Immunologic studies for autoimmune disorders, including tests for antinuclear (ANA), anti-SSA, anti-SSB, proteinase (PR)3-anti-neutrophil cytoplasmic antibody (ANCA) and myeloperoxidase (MPO)-ANCA antibodies, were negative. The levels of angiotensin-converting enzyme and the complement components C3 and C4 were within the normal ranges. The vitamin B1 and B12 levels were also within the normal ranges. The levels of tumor markers, such as carcinoembryonic antigen (CEA), squamous cell carcinoma (SCC) CA19-9 and soluble IL-2...
β-candida antigens were negative. The level of receptor, were within the normal limits. Aspergillosis and loides stercoralis (ELISA) for 13 parasite antigens (bacterial growth. An enzyme-linked immunosolvent assay proteins. Cytology of the CSF revealed pleocytosis with the ap- eosinophils), 71 mg/dL of glucose and 320 mg/dL of pro- to an almost alert state one week after the administration of dexamethasone (36 mg/day) and acyclovir (1,500 mg/day) consciousness disturbance progressed to a state of coma, consciousness disturbance progressed to a state of coma, and diffuse β-amyloid, numerous β-amyloid depositions were seen in the vessel walls, and diffuse β-amyloid plaques were contained in the cerebral cortex (Fig. 2B). Therefore, we ultimately diagnosed the patient as having PACNS cerebrovascular amyloid angiopathy (CAA). Although steroid therapy was continued
There are no specific symptoms associated with eosinophilic meningitis, personality changes and hemiparesis (14, 15). The only way to diagnose eosinophilic CNS vasculitis is to perform a brain biopsy. The common histopathological findings of these patients are as follows: predominantly eosinophilic infiltrates of medium-sized leptomeningeal arteries without granulomas or giant cells (14, 15). β-amyloid is absent in the cortex and vessel walls (14, 15). In our patient, the histopathological findings revealed vasculitis with granulomas and giant cells. There were numerous β-amyloid depositions in the cortex and vessel walls. These two findings were different from the typical findings of eosinophilic CNS vasculitis.

PACNS is an uncommon type of vasculitis that is limited to the CNS (2-10). The inflammatory infiltration observed in patients with PACNS occurs in medium- and small-sized arteries with skipped lesions. Inflammatory infiltration in PACNS includes lymphocytes with variable numbers of plasma cells, histiocytes, neutrophils and eosinophils. Eosinophil infiltration is rarely seen. The typical characteristic histopathological findings include segmental granulomatous vasculitis with variable numbers of Langhans or foreign-body multinucleated giant cells. Some PACNS cases are complicated by CAA (6-10). According to the pathological findings of the tissue biopsy performed in this case, our patient was ultimately diagnosed with PACNS with CAA. Eosinophilic meningitis occurring in a patient with PACNS is extremely rare. To our knowledge, there is only one previous case report of eosinophilic meningitis occurring in a patient with PACNS (6). A 66-year-old man who manifested aphasia and anopia as initial symptoms was diagnosed with PACNS with CAA based on a brain biopsy. His CSF exhibited eosinophilic pleocytosis (WBC: 41/μL, including 40% eosinophils), while a complete blood count (CBC) was normal, including the peripheral eosinophil count. Because the patient did not have systemic eosinophilia, the increased level of eosinophils in the CSF suggested an allergic reaction against the intracerebral vessels (6). Although the target antigen of such allergic reactions is unknown, β-amyloid may be a candidate antigen for allergic reactions that induce eosinophilic meningitis because β-amyloid was positive in the vessel walls in both the previous patient and our patient.

The standard treatment for PACNS with CAA is steroid therapy with/without cyclophosphamide (6-10). The outcomes for patients with PACNS with CAA vary from full recovery to death (6-10), suggesting that the response to immunosuppression therapy differs between patients. Our patient showed no response to steroid or intravenous pulse cyclophosphamide therapy. In PACNS with CAA patients, arterial stenosis and occlusion with thrombi in the intravascular space occur due to inflammation (6-8). These changes induce focal subcortical infarctions that cause irreversible changes in the brain. Indeed, the brain MRI images obtained in our patient revealed multiple small infarctions in the subcortical white matter.

We herein reported a patient with eosinophilic meningitis caused by PACNS with CAA. Although PACNS is rare dis-
ease, eosinophilic meningitis should be considered in the differential diagnosis of PACNS.

The authors state that they have no Conflict of Interest (COI).

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References

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