



## Case Report

# A Patient with Tonsillar Lymphoma with Invasive Listeriosis Imitating Acute Ischemic Stroke

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## Abstract

Prior cytotoxic chemotherapy and the long-term use of prednisone can impair immunity. *Listeria monocytogenes* can cause invasive infections in these immunocompromised patients with a lower number of microorganisms. This can lead to central nervous system infections which may have similar initial clinical presentations to ischemic stroke.

**Keywords:** Brain abscess, *Listeria monocytogenes*, lymphoma, stroke

## INTRODUCTION

*Listeria monocytogenes* is a virulent foodborne pathogen which causes life-threatening meningoencephalitis and septicemia.<sup>[1]</sup> The severity of the disease depends on the immune status of an infected person. *L. monocytogenes* infections must be investigated in all patients with cellular immunosuppression who present with febrile symptoms.

## CASE REPORT

A 71-year-old woman presented with a history of sicca syndrome and polymyositis, for which she had been treated with hydroxychloroquine, azathioprine, pilocarpine, and prednisolone since 2015. She complained of a sore throat for months. Tonsillar diffuse large B-cell lymphoma (DLBCL) stage IV (lymphoma involvement in bilateral tonsils, mediastinum, spleen, liver, and bilateral inguinal regions) was

diagnosed in May 2016. She received two cycles of rituximab, doxorubicin, vincristine, cyclophosphamide, and prednisolone regimen, but with poor tolerance due to grade IV neutropenia. The treatment regimen was shifted to rituximab-bendamustine and finished the fourth cycle in December 2016. She was in complete remission but had suffered from chronic diarrhea since then.

The patient was regularly followed up at the rheumatology department after the therapy and at the oncology outpatient department. On April 6, 2019, she was admitted to the emergency room for chills and high fever. No significant infection focus was detected. Laboratory tests showed leukocytosis ( $11.25 \times 10^3/\mu\text{L}$ )

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with neutrophil predominance (76.8%), lactate dehydrogenase 382 IU/L, and high C-reactive protein 22.34 mg/dl. A stool culture for toxigenic *Clostridium difficile* was negative. Computed tomography (CT) of her abdomen showed no evidence of intra-abdominal infection. Proteinuria was noted, but there were no microbiological findings. At the same time, sudden right limb paralysis occurred on hospital day 3. Emergency brain CT [Figure 1a and b] revealed two low-density areas over the subcortical and deep white matter of the left frontal and right temporoparietal regions. Ischemic infarcts were suspected. Although no obvious enhancing mass lesions in these areas were noted, brain metastasis with perifocal edema could not be totally excluded. A blood culture on April 6, 2019, revealed two sets of *L. monocytogenes*. Brain magnetic resonance imaging [Figure 1c and d] was arranged on hospital day 7 which revealed cerebritis in the left frontal and right temporoparietal lobes with minimal pus accumulation in the bilateral occipital horns. It could not be drained as it was not liquefied. The limb paralysis gradually resolved after adjustment antibiotic treatment (ampicillin with gentamicin). Serial brain CT showed that the brain abscess gradually resorbed. She continued with the antibiotic treatment for 8 weeks [Figure 1e and f], and she was finally discharged on June 18, 2019 (hospital day 73), in a conscious and oriented state [Figure 1g and h] with walking aids.

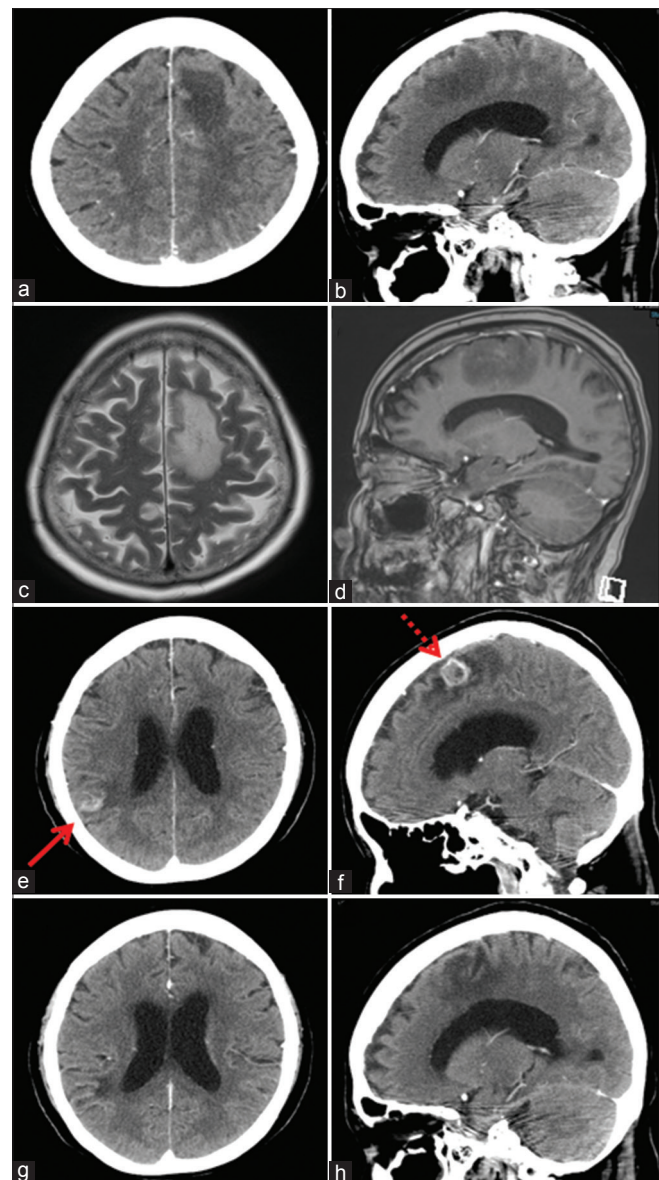
## DISCUSSION

*Listeria* infection is mainly caused by eating contaminated food or water. People with normal immunity are not susceptible to it and usually only have gastrointestinal symptoms such as diarrhea, nausea, and vomiting after infection. Invasive listeriosis mainly occurs in high-risk groups, such as the elderly, immunocompromised populations, pregnant women, fetuses, and newborns.

Neuroinfection commonly affects the meninges, but it may also affect brain parenchyma. Subcortical areas, thalamus, pons, and medulla are the usual targets.<sup>[2]</sup> Abscess formation is rare among neuroinfection presentations and is often related to immunosuppression.

A heterogeneous group of nonvascular conditions including seizures, syncope, hypoglycemia, migraine with aura, brain tumors, diverse encephalopathies (hypertensive, toxic, metabolic, and infectious), and acute confusional state mimicking stroke have been reported.<sup>[3,4]</sup> Neuroinfection may manifest in humans as meningitis and meningoencephalitis, which are the most common presentations, followed by brain abscesses and brainstem infection.<sup>[5,6]</sup> Our patient had a gradual course of fever with right-sided weakness, which was congruent with a central nervous system abscess rather than meningitis.

We can only hypothesize that the chronic diarrhea after chemotherapy in the present case was due to *L. monocytogenes* because of the prolonged duration of diarrhea and two sets of positive blood cultures for *L. monocytogenes* without other infection focus.



**Figure 1:** Brain computed tomography on April 9, 2019: (a) Axial contrast-enhanced view and (b) sagittal contrast-enhanced view: Two low-density areas over the subcortical and deep white matter of the left frontal and right temporoparietal regions. Brain magnetic resonance imaging on April 12, 2019: (c) Axial contrast-enhanced T2-weighted magnetic resonance imaging and (d) sagittal contrast-enhanced T1-weighted magnetic resonance imaging: Cerebritis in the left frontal and right temporoparietal lobes without abscess formation. Brain computed tomography on May 6, 2019: (e) Axial contrast-enhanced view: Two rim-enhanced lesion with perifocal edema and a highly amorphous density component in the right temporoparietal lobe (1.0 cm) —→; (f) Sagittal contrast-enhanced view: Left frontal lobe (1.8 cm) ---→. Brain computed tomography on May 31, 2019: (g) Axial contrast-enhanced view and (h) sagittal contrast-enhanced view: Regressive change of brain abscesses in the left frontal lobe and right temporoparietal lobe

Cell-mediated immunity was severely impaired by prior cytotoxic chemotherapy and low-dose prednisolone. High-risk populations may develop invasive listeriosis with a lower number of microorganisms. Invasive listeriosis

occasionally affects patients with underlying hematologic malignancies. Long-term exposure to corticosteroids can also reduce cell-mediated immune responses. The entry of *L. monocytogenes* into the host is also an important factor.<sup>[1]</sup>

Our patient initially presented with no evidence of recent cytotoxic chemotherapy, but she had long-term immunosuppressive treatment. These findings may have at least in part contributed to immune suppression and caused her chronic diarrhea with *Listeria* infection at a lower threshold. We suggest that *L. monocytogenes* infections must be investigated in all patients with cellular immunosuppression and gastrointestinal symptoms who present with febrile symptoms. Early brain abscess is an important differential diagnosis in immunocompromised patients presenting with a history of fever and neurological symptoms.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name

and initial will not be published and due efforts will be made to conceal the identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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