

Case Report

Rhombencephalitis by *Listeria Monocytogenes* in Two Diabetic Patients

Bahareh Bazooyar MD¹**Abstract**

Brainstem involvement is a characteristic feature and accounts for the high mortality associated with listeriosis especially in immunosuppressed patients. We report two cases of rhombencephalitis infection by *Listeria monocytogenes* in a 65 and 63-year-old men with diabetes. They were referred to a neurologist due to fever and drowsiness after 3 weeks. The 65-year-old man had vertigo, diplopia, ataxia, bidirectional nystagmus and the 63-year-old man complained of perioral numbness, dysphagia and dysarthria. Treatment with ampicillin (12 g/day) was started empirically and modified when the culture results were available. The CSF cultures were positive to *Listeria monocytogenes* and brain MRI findings were suggestive of rhombencephalitis. Despite delays in treatment, they had a complete clinical recovery with resolution of MRI abnormalities. In contrast to our results, in most reports, a bi-phasic illness has been described and late treatment was associated with unfavorable courses or long lasting sequelae.

Keyword: Brainstem, listeria monocytogenes, rhombencephalitis

Cite this article as: Bazooyar B. Rhombencephalitis by *listeria monocytogenes* in two diabetic patients. *Arch Iran Med.* 2015; **18(9)**: 613 – 615.

Introduction

Listeria monocytogenes (LM) is a gram-positive rod affecting primarily pregnant women, newborns, and adults with cell immunity disturbance.¹ LM is typically a fecal-borne organism. It can be isolated from water, soil and decaying vegetation. The most common clinical manifestation is diarrhea.²

CNS infection may manifest as meningitis, meningoencephalitis or abscess.³ *Listeria* has a predilection for the brain parenchyma especially the brain stem and the meninges. Brain abscesses account for 10% of CNS infection often located in thalamus, pons, and medulla. This uncommon complication is accounted for high mortality.⁴ Non-perinatal cases of invasive listeriosis have an estimated worldwide incidence ranging from 0.1 – 1.1 cases per 10⁵ population. CNS infections are present, on average, in 47% of infected patients with an average case-fatality rate of 36%.⁵ Diagnosis of LM encephalitis, is very challenging due to complicated clinical symptoms, especially absence of meningeal sign and altering the patients' level of consciousness, so its prevalence is underestimated. In the context of reported increase in LM infection and its sensitivity to specific long-term antibiotic treatment, listeriosis has an important impact on public health given, that it is responsible for the highest hospitalization and mortality rates among food-borne infections, especially in immunocompromised patients.^{6,7,8} However, in various European countries its prevalence has been increased in the last few years.^{9–13} One should always suspect listerial encephalitis in the presence of acute onset brainstem symptoms, fever, cerebrospinal fluid (CSF), and leukocytosis with normal glucose level. Two cases happened in February and April 2014 in Babol. We described two diabetic

men with brainstem encephalitis due to LM, who showed a favorable clinical course.

Case Report**Case 1**

A 60-year-old diabetic man presented with progressive headache, vertigo and diplopia when he traveled to Iraq. The patient had low-grade fever, dysarthria and drowsiness. There was no meningeal signs, weakness in the limbs, bulbar muscles, or respiratory difficulty nor any sensory complaints. The patient had bilateral gaze-evoked nystagmus; there was mild restriction of the eye movements in all gazes. A tentative diagnosis of the brain stem encephalitis was made with aforementioned clinical background. The other possible differential diagnosis was demyelinating diseases (acute demyelinating encephalomyelitis, multiple sclerosis), primary or secondary vasculitis affecting the brain stem was also considered.

Vasculitis tests were negative, CSF analysis showed 85 white blood cells, a protein of 126 mg/dL and glucose of 90 (blood glucose was 120). CSF culture for bacteria, fungi and acid-fast bacillus were negative. Magnetic resonance imaging (MRI) of brain showed symmetrical bilateral hypersignal T2 lesions in brain stem, thalamus, medial of temporal and cerebellum without enhancement (Figure 1).

The treatment was started with ampicillin (2 gram every 4 hours). After two days of treatment, fever was stopped, and after 5 days, neurological signs and symptoms improved gradually. After 10 days of treatment, dramatic improvement of cerebral lesions was observed in control MRI of brain (Figure 2). The treatment was continued for 4 weeks, when no lesion was detected in the control brain MRI and the patient was symptom free.

Case 2

A 63-year-old diabetic man was admitted to hematology ward with drowsiness, headache, vertigo and intermittent fevers. He

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Accepted for publication: 24 March 2015

had a history of multiple myeloma from 5 years ago and was in remission. He progressed dysphagia, perioral numbness and ataxia, so neurology consult was requested after 3 weeks. The patient appeared ill and febrile. Meningeal signs were negative. The 9th, 10th, and 5th cranial nerves were involved prominently. The MRI of the head revealed bilateral hypersignal T2 infiltrative lesions in pons, midbrain and cerebellar peduncles. Postcontrast T1-weighted magnetic resonance imaging of the cranium revealed ring contrast enhancement and microabscess (Figure 3). CSF showed WBC count 80 mm³, RBC count 0 mm³, total protein 148 mg/dL, glucose 100 mg/dL, blood glucose 130 mg/dL as well as negative Gram stain and cytology. Treatment was started empirically with ampicillin 2 gr IV every 4 hour. *LM* was isolated from CSF cultures. Ampicillin was continued for a total of 4 weeks of therapy. After 5 days in the hospital, the patient became afebrile, and during the 10th day the patient was fully alert with no residual neurologic dysfunction. Full recovery was achieved after 3 weeks. MRI performed on days 30 and documented the resolution of abnormalities.

Discussion

LM has been linked to sporadic episodes as well as large outbreaks of infections worldwide.^{9,10,14,15} The vast majority of human listeriosis cases occurs following consumption of contaminated food.⁷ Listeriosis has an important impact on public health given that it is responsible for the highest hospitalization and mortality rates amongst foodborne.¹⁶ *LM* was remarkably tenacious against numerous food-processing and food-preserving procedures and thus hazardous for the food industry.^{17,18} In listeriosis, the fatality rate ranges from 24% to 52% despite adequate antimicrobial treatment.¹⁹ *LM* neuro-infection generally develops as meningitis, and meningoencephalitis.²⁰ Less common central nervous system manifestations include abscesses in the cerebrum or cerebellum as we mentioned in the second case and up to 24% of the patients encephalitis targets the brainstem like mentioned cases.²¹⁻²³ In contrast to meningitis, brain microabscess appears to occur predominantly in previously healthy patients without any predisposing conditions.²⁴ In contrast to cases above, encephalitis is biphasic and fatal if not treated during the early stages. Like our cases, listerial infection is often misdiagnosed due to prodromal symptoms and meningeal signs, which are nonspecific and uncommon respectively. The CSF in listerial infection typically reveals an increased leukocyte count, increased protein and normal glucose levels which is related to our cases. Due to the fact that *LM* is only sensitive to certain antibiotics, it is important to establish an early microbiological diagnosis. The early performance of MRI in the course of the disease would strongly support listerial rhombencephalitis in conjunction with the CSF results, which is essential in choosing the appropriate antibiotic treatment while awaiting culture confirmation. Early treatment can decrease the morbidity and mortality of this pathogen. listerial rhombencephalitis is a rare and severe infection of the brainstem that is reported to have high mortality and frequent serious sequelae.²⁵⁻²⁹

In conclusion, Encephalitis due to *LM* remains as an important public health issue, particularly in the elderly, infants, immunosuppressed, and those with malignancies. For patients with a clinical diagnosis of rhombencephalitis and acute bacterial meningitis, recognition of the symptoms caused by listerial infection plays a vital role in allowing early diagnosis, treatment.

An urgent MRI brain scan is indicated for patients with progressive disabling brainstem signs, being the imaging study of choice. Studies of CSF often only reveal mild abnormalities. Ampicillin with or without an aminoglycoside remains the best treatment for meningitis caused by *LM*.

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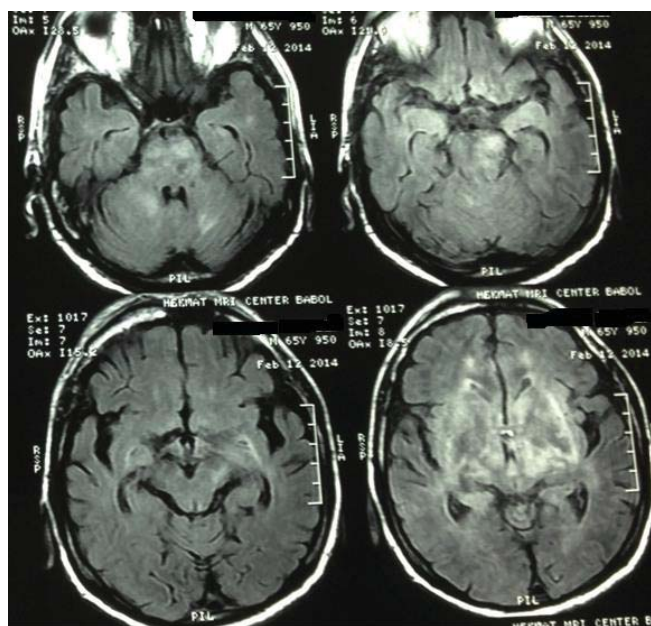


Figure 1. Magnetic resonance imaging of the brain revealed bilateral infiltrative lesions in brainstem, basal ganglia, medial temporal and cerebellum.

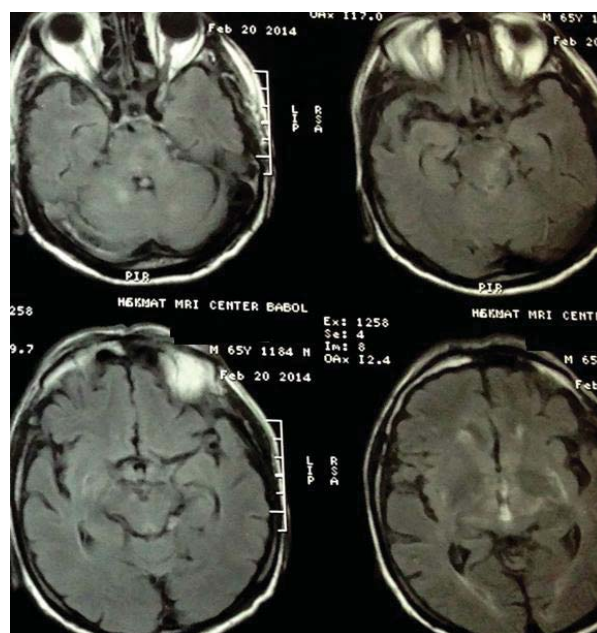


Figure 2. Magnetic Resonance Imaging revealed improvement of lesions after treatment



Figure 3. Magnetic Resonance Imaging with contrast revealed microabscess formation in inferior cerebellar peduncles

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