



## LISTERIA MONOCYTOGENES MENINGITIS IN IMMUNOCOMPETENT ADULT

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### ABSTRACT

Listeria monocytogenes is a gram-positive bacillus that causes numerous infections particularly central system infections with high morbidity and mortality. This report discusses a case of a 18 year old patient admitted with meningitis due to listeria monocytogene. The purpose of our work is to highlight the possibility, even rare, of the presence of this pathogenic germ in an immunocompetent individual. Therefore, it is a diagnosis that should not be overlooked regardless of the patient, in order to promptly establish an optimal management.

**KEYWORDS:** Listeria monocytopenia, meningitis, immunocompetent patient.

### INTRODUCTION

Listeria monocytogenes (L. monocytogenes) is a gram-positive bacillus that is ubiquitously present in food. It causes numerous infections in humans and animals. Listeriosis is characterized by two main signs: bacteremia and central nervous system infections (meningitis, encephalitis), which result in high morbidity and significant mortality (20-30%).<sup>[1]</sup> It is particularly observed in vulnerable individuals such as infants under one month old, pregnant women, and people over 60 years old.<sup>[2]</sup>

The purpose of our work is to highlight the possibility, even rare, of the presence of this pathogenic germ in an immunocompetent individual. Therefore, it is a diagnosis that should not be overlooked regardless of the patient, in order to promptly establish an optimal management.

### MEDICAL REPORT

This report discusses a case of a 18-year-old patient without any significant medical history, admitted due to fever-induced meningitis. The patient had experienced severe headaches and projectile vomiting six days prior to admission, in a context of fatigue and fever unresponsive to antibiotics. Upon admission, neurological examination revealed a stiff neck among other symptoms.

Initial lab results showed a high white blood cell count with a significant number of neutrophils. The C-reactive protein levels were also elevated. However, liver, kidney tests and chest X-ray were normal. Lumbar puncture findings indicated increased protein and normal glucose levels in the cerebrospinal fluid (CSF), which appeared

cloudy with a high count of neutrophils. Various tests for potential pathogens returned negative results, and the CSF culture was sterile.

The patient was started on a probable antibiotic regimen of ceftriaxone twice daily for six days, along with dexamethasone. Clinical improvement was seen with decreased fever and disappearance of neck stiffness, but these symptoms reappeared on the fifth day, accompanied by damage to the left eleventh cranial nerve. The control lumbar puncture showed a decrease in leukocytes, very low glucose levels, increased protein levels, and the presence of a gram-positive bacillus in the CSF.

The patient was then switched to ampicillin six times daily for 21 days in conjunction with gentamicin for five days. A series of tests were conducted to detect prior infectious damage or immune deficiency, but results were negative. The patient's condition improved with the disappearance of the meningeal symptoms and full recovery without any neurological aftereffects.

### DISCUSSION

The report highlights that L. monocytogenes, a bacterium often transmitted through contaminated food, can infect even immunocompetent individuals. In this case, the source of the infection was likely food-related, specifically deli meats. The case underlines the public health concerns posed by listeriosis.<sup>[3]</sup>

The report also discusses the pathophysiology of L. monocytogenes infections, noting that the bacterium can multiply within most tissue cells of the infected host,

except neutrophils. The bacteria spread from the enterocytes to the lymph nodes, and then enter the bloodstream. A robust immune response, involving CD8 cytotoxic lymphocytes, is key in controlling the infection. However, if the initial bacterial load is high, or in patients with compromised immunity, the infection can spread to the central nervous system and the placenta.

In this case, given the patient's competent immune system, the theory of a massive initial bacterial inoculum is proposed. Therefore, the control of listeriosis contamination depends on both the innate and acquired immune system. *L. monocytogenes* infection in a competent individual without any immunodeficiency is rare and likely due to a failure in one or both of these systems or a massive initial bacterial inoculum.(2)

Early diagnosis of neurolisteriosis is a challenge due to the non-specificity of clinical symptoms. In the presence of clinical signs such as febrile meningitis associated with rhombencephalitis and/or cerebellar syndrome and indirect signs of listeriosis infection, the patient should be treated as having listeriosis until proven otherwise. However, some cases, like this one, can present deceptively. In such cases, it's essential to identify the pathogen in the CSF or to perform multiple blood cultures. PCR testing could appear to be a particularly useful test in this regard (2). New recommendations, taking these factors into account, should establish a new therapeutic algorithm. Additionally, a new multiplex PCR has demonstrated its effectiveness in detecting bacterial meningitis (3). The latest French recommendations advocate for the systematic investigation of listeriosis and tuberculosis in patients with bacterial meningitis that does not respond to antibiotic treatment (1).

*L. monocytogenes* is highly susceptible to antibiotics, particularly penicillin (such as ampicillin), as well as aminoglycosides (such as gentamicin) and trimethoprim-sulfamethoxazole, while it is resistant to third-generation cephalosporins (C3G). In the case of our patient, we assume that they were previously treated with an antibiotic effective against *L. monocytogenes* (the undocumented antibiotic) for two reasons: firstly, the initial culture of the cerebrospinal fluid came back sterile, and secondly, the clinical improvement of the patient cannot be attributed to the administration of C3G antibiotics. This argument is even more valid considering that the patient's condition subsequently deteriorated under C3G treatment. The recommended treatment for neuroinvasive listeriosis is a combination of ampicillin and an aminoglycoside, in the absence of contraindications. In adults, ampicillin is administered intravenously at a dose of 200 mg/kg/day. The duration of treatment should be a minimum of 15 days (2).

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