**Listeria monocytogenes** meningitis in an immunocompetent 18-year-old patient as a possible diagnostic and therapeutic problem

Meningitis prouzrokovan bakterijom *Listeria monocytogenes* kod imunokompetentnog 18-godišnjeg bolesnika kao moguć dijagnostički i terapijski problem

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**Abstract**

**Introduction.** *Listeria monocytogenes* is the third most frequent cause of bacterial meningitis in adults. It commonly affects persons with defective cell-mediated immunity or advanced age, and only a few patients with no underlying predisposition have been reported. **Case report.** We presented an previously healthy, 18-year-old man with typical clinical features of meningitis. On the account of earlier treatment with ceftriaxone and cerebrospinal fluid finding, an assumption of partialy treated bacterial meningitis was made. The initial treatment with vancomycin and ceftriaxone, substituted on day 4 with meropenem, did not produce any clinical effect. On day 6 *Listeria monocytogenes* was isolated and, even as late as that, the administration of ampicillin was followed by complete recovery of the patient. **Conclusion.** In younger, immuno-competent individuals, in spite of the existent diagnostic and therapeutic problems, the subacute course of *Listeria monocytogenes* meningitis provides enough time for appropriate treatment and favorable disease outcome.

**Key words:** meningitis; listeria monocytogenes; diagnosis; therapeutics; anti-bacterial agents.

**Listeria monocytogenes** meningitis is a Gram-positive intracellular bacterium widespread in the natural environment. Nevertheless, it is not common human pathogen. It commonly causes infections in neonates and patients with defective cell-mediated immunity due to hematologic malignancy, organ transplantation, pregnancy, chronic corticosteroid therapy, alcoholism and/or cirrhosis, renal diseases, advanced age, AIDS etc. Listeriosis in adults usually presents as meningitis (in over 30%) or meningoencephalitis (especially as rhombencephalitis) and occasionally as isolated cerebritis. It is the third most common cause of acute bacterial meningitis, after *Streptococcus pneumoniae* and *Neisseria meningitidis*, with the frequency of 4% to 12% in different countries of the Northern hemisphere. However, among the immunocompetent persons below 50 years of age, *L. monocytogenes* meningitis is rare and has been reported only in a few patients, but never in Serbia and neighboring countries.
Case report

A previously healthy 18-year-old man with a 3-day history of fever, severe headache and vomiting was admitted to the clinic. For two days before, he was treated with ceftriaxone (2 g IV q24 h).

On examination, he was febrile (38.4°C), adynamic, dehydrated, with heart rate of 95/min. There were neck stiffness, and positive signs of Kernig’s and Brudzinski’s. Other physical findings were normal. Initial laboratory investigations showed an elevated white blood cells (WBC) count of 21,600/mm³ with 85% neutrophils and elevated C-reactive protein (CRP) content of 126.3 mg/L. Additional blood data were unremarkable.

On the admission day, the analysis of slightly turbid cerebrospinal fluid (CSF) showed pleocytosis (WBC were 21,600/mm³ with 85% neutrophils and elevated C-reactive protein (CRP) content of 126.3 mg/L. Blood data were unremarkable.

The patient was initially treated with ceftriaxone (2 g IV, q12 h) and vancomycin (1 g IV, q12 h). On day 4 after admission the patients was still febrile. Marked meningeal syndrome was present, and computed tomography (CT) scan showed diffuse cerebral edema, in spite of already administered dexamethasone and mannitol. Ceftriaxone was replaced with meropenem (2 g IV, q8 h), without any significant clinical improvement in the next two days.

At the same time, the initial CSF was inoculated onto Columbia agar, chocolate agar and MacConkey agar plates and tube of thioglycolate broth. After incubation, only thioglycolate broth culture was positive. Broth was subcultured to Columbia and chocolate agar plates and bacterial growth was seen on both media. Gram stain of the isolate demonstrated Gram-positive rods with coryneform appearance. The microorganism was identified as L. monocytogenes. Latex agglutination antigen test (Pastorex™, Bio-Rad, France) was negative for Neisseria meningitidis serogroups A, C, Y/W135, Neisseria meningitidis serogroup B/E. coli K1, Streptococcus pneumoniae, and Haemophilus influenzae b.

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The presented patient was a student, with nonsignificant medical history, with excluded HIV infection or any other apparent reason for immune suppression. As usual, there were no epidemiologic clues suggesting L. monocytogenes infection, which was mostly sporadic and food-borne by numerous types of food.

In these circumstances, the derived CSF finding (fewer WBC, lower percentage of polymorphonuclear leukocytes, lower protein concentrations and less hypoglycorrhachia), although suggestive of L. monocytogenes meningitis, was interpreted as the result of bacterial meningitis previously partially treated with ceftriaxone. Such a miscalculation in patient management could have been expected, in view of a longer prodromal phase and subacute disease course.

The treatment was initiated with cefepime (to which L. monocytogenes was innately resistant) and vancomycin (with proven ineffectivity in vivo against listeriosis). Favorable results were not obtained either after the replacement (though for a short period of time) of...
cephalosporin with meropenem, as a possible therapeutic alternative for *L. monocytogenes* meningitis, though with a variable clinical experience. Moreover, cerebral edema has been reported as a possible serious complication, and an important cause of death in bacterial meningitis.

Even with appropriate antibiotic therapy, as a predominant infection of older and immunocompromised patients, mortality due to *L. monocytogenes* meningitis is among the highest (28%) of all causes of acute bacterial meningitis. However, in the case here reported, previously healthy, immunocompetent 18-year-old patient was successfully cured with ampicillin (the medicament of choice in the treatment of *L. monocytogenes* meningitis), although its administration was significantly delayed to the moment of microbiologic identification of the causal pathogen.

### Conclusion

*L. monocytogenes* is one of the most common causes of bacterial meningitis in immunocompromised or elderly patients. In younger, previously healthy individuals, the infection is extremely rare, and presents a diagnostic and therapeutic challenge. However, in these circumstances (as in the presented case), the subacute course of *L. monocytogenes* meningitis provides enough time for the initial treatment correction and favorable disease outcome.

### REFERENCES
