Nosocomial Leuconostoc Pseudomesenteroides Meningitis: A Case Report and Review of the Literature

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ABSTRACT

Leuconostoc spp, a member of the Streptococci family, was found to cause infection in humans in 1985. These infections have been reported in patients who had received vancomycin to treat their underlying diseases. Nosocomial meningitis caused by Leuconostoc spp. was diagnosed in our patient. An extraventricular drainage system catheter was used due to the presence of a thalamic hematoma with ventricular extension. Central nervous system infections due to Leuconostoc spp. are rare. To our knowledge, our case is the sixth case worldwide and the second case reported from Turkey. This case is reported here to draw attention to a rare infectious agent with a high mortality risk.

Key Words: Chloramphenicol, leuconostoc, meningitis, nosocomial

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Case Report

A 52-year-old male was admitted to the emergency department with the complaint of altered mental status. He had a Glasgow Coma Scale score of 13 and his neurological examination revealed confusion, disorientation, limited cooperation, and first motor neuron type left hemiparesis involving the face. His cranial computed tomography (CT) demonstrated a 4 cm thalamic hematoma in the right cerebral hemisphere, which had collapsed into both the right lateral ventricle and the 3rd and 4th ventricles (Figure 1A). His medical history revealed hypertension. Neurological parameters were closely monitored with EVDS in the neurological intensive care unit (Figure 1B). The control cranial CT performed on the 19th day after admission showed resorption of the hemorrhage and the EVDS catheter was removed (Figure 1C). The CSF culture performed on the 16th day after admission (3 days prior to catheter removal) was negative. On the 28th day after admission, he had new onset fever (38.5°C) and headache. He was lethargic, but other system examinations were normal. Laboratory findings revealed a leukocyte count of 8,600/mm³, 215,000 platelets/mm³, aspartate transaminase (AST) of 68 IU/ml, and alanine transaminase (ALT) of 179 IU/ml. Other laboratory findings were unremarkable. A lumbar puncture (LP) was performed to eliminate nosocomial meningitis as a possible fever focus in the patient. Microscopic examination of the CSF revealed 180 leucocytes/mm³ (70% polymorphonuclear leukocytes, 30% lymphocytes) and biochemical tests indicated elevated protein (70 mg/dl) and normal glucose (53 mg/dl; accompanying serum glucose, 118 mg/dl). There was no microorganism on the CSF gram stain. Empirical therapy with intravenous vancomycin (1 g/12 h) and meropenem (2 g/8 h) was started with the putative diagnosis of nosocomial meningitis. The CSF and blood cultures obtained during the fever episode produced *Leuconostoc pseudomesenteroides* with a negative EVDS catheter culture. *Leuconostoc pseudomesenteroides* was confirmed using the Phoenix System™ (NMIC/ID-5 panel, Becton Dickson, Sparks, MD, USA). The isolate was also determined to be sensitive to amoxicillin, levofloxacin, rifampicin, and tetracycline. Antimicrobial susceptibility tests were performed using both the Phoenix...
System™ and the Kirby-Bauer disc diffusion method, which was made and set up according to Clinical and Laboratory Standards Institute standard protocol (4). Intravenous vancomycin and meropenem were replaced with intravenous chloramphenicol (1g/ 8h) and ciprofloxacin (400 mg/12h) because of the natural resistance of the bacteria. Repeated LPs were performed on days 5, 15, 18, and 30 of the therapeutic regimen of chloramphenicol and ciprofloxacin. The microscopic examination of the CSF obtained from these LPs revealed no cells and the CSF was negative for culture only in the LPs performed on the 18th and 30th days of the treatment. Intravenous chloramphenicol was stopped on the 19th day of this treatment. The patient was discharged with stable vital signs and motor neuron-type left hemiparesis of 4/5 muscle strength.

Discussion

Bacteremia, meningitis, breast abscess, peritonitis, abdominal and brain abscesses, and odontoid and urinary tract infections with Leuconostoc spp. have been reported (2, 5). In the literature, there are six cases, including ours, of CNS infection due to Leuconostoc spp. Four of these were diagnosed as meningitis, one was a brain abscess, and the other one was nosocomial ventriculitis. Clinical features of the cases are summarized in Table 1 (3, 6-9).

Leuconostoc spp. usually found on vegetables and food products, are not a member of the usual human flora, but have been isolated from vaginal and stool samples (3). The source of the isolate has been debated in the literature since these organisms are not considered part of the normal human flora. Some have suggested skin as a possible portal; others have raised the possibility of access to the bloodstream through the gastrointestinal tract (GIT) (1). Nosocomial transmission may be via contaminated hands; urinary catheterization may also play a role in the development of Leuconostoc septicemia (2, 10). Three of the reported cases support the nosocomial transmission theory because they developed infection after an invasive intervention involving the CNS; whereas, one of the cases that developed infection after colostomy supports the theory of translocation from the GIT (7-9).

Leuconostoc infections occur more frequently in patients being treated for underlying diseases with vancomycin therapy, although these infections have also been documented in otherwise healthy patients (2, 6). Our patient had not received vancomycin therapy before the detection of Leuconostoc spp. as shown by the negative CSF and blood cultures obtained before treatment. Three of the six cases with prior steroid therapy before infection differ greatly from the remaining cases (3, 9). Prior treatment with steroids seems to predispose patients to CNS infections with Leuconostoc spp. (3).

Penicillin is an antibiotic commonly used to treat Leuconostoc spp. infections. In catheter-associated infections, removal of the catheter is the priority (1). Identification of the bacteria is very important because of its resistance to vancomycin (1). We preferred intravenous chloramphenicol to treat our patient because of its good CNS penetration, its reported success in the treatment of Leuconostoc meningitis, and the sensitivity of the bacteria to chloramphenicol (6). Cephalexin-

Table 1. Clinical features of the central nervous system infections due to Leuconostoc spp (3, 6-9)

<table>
<thead>
<tr>
<th>Reported Date</th>
<th>Age</th>
<th>Sex</th>
<th>Symptoms/Findings</th>
<th>Diagnosis</th>
<th>Invasive Intervention</th>
<th>Prior Steroid Use</th>
<th>Treatment (Duration-Day)</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987¹</td>
<td>16 y</td>
<td>F</td>
<td>Altered mental status, headache, vomiting, neck stiffness, Kernig’s sign, Brudzinski’s sign, leukocytosis</td>
<td>Meningitis</td>
<td>None</td>
<td>No</td>
<td>P(14)+CHL(5)</td>
<td>Recovery</td>
</tr>
<tr>
<td>1990²</td>
<td>1 mo</td>
<td>F</td>
<td>Irritability, increased tonus, brisk reflexes, bulging fontanelle, anemia, leukocytosis</td>
<td>Meningitis</td>
<td>Colostomy</td>
<td>No</td>
<td>P(NK)+CFX(NK); P(NK)+CFX(NK)+CHL(NK)+GEN(NK) (IVT)</td>
<td>Death</td>
</tr>
<tr>
<td>2003³</td>
<td>50 y</td>
<td>M</td>
<td>Altered mental status, fever, leukocytosis</td>
<td>Ventriculitis</td>
<td>Ventricular shunt</td>
<td>No</td>
<td>VA(NK)+CFX(NK); CFX(NK)+LIN(NK); MEM(NK); GAT(NK); GAT(14)+P(14)</td>
<td>Recovery</td>
</tr>
<tr>
<td>2006²</td>
<td>61 y</td>
<td>F</td>
<td>Hemiparesis, headache, anemia</td>
<td>Brain abscess</td>
<td>None</td>
<td>Yes</td>
<td>CFX(NK); P(42)+AMP(42); AMX (42)</td>
<td>Recovery</td>
</tr>
<tr>
<td>2008⁴</td>
<td>57 y</td>
<td>F</td>
<td>Altered mental status, fever</td>
<td>Meningitis</td>
<td>LP</td>
<td>Yes</td>
<td>CFT(NK)+VA(NK); LIN(14)</td>
<td>Recovery</td>
</tr>
<tr>
<td>2009¹</td>
<td>52 y</td>
<td>M</td>
<td>Altered mental status, fever</td>
<td>Meningitis</td>
<td>EVDS</td>
<td>Yes</td>
<td>VA(7)+MEM(7); CHL(14)+CIP(10)</td>
<td>Recovery</td>
</tr>
</tbody>
</table>

rin, gentamicin, gatifloxacin, ampicillin, amoxicillin, and linezolid are also options for a successful treatment, as stated in the literature (3, 7-9).

Infections with *Leuconostoc* spp. are rare. We report our case as the sixth case worldwide and the second case from Turkey in order to raise awareness of CNS infection with *Leuconostoc* spp. that may have a high mortality and morbidity risk.

**Conflict of Interest**

No conflict of interest was declared by the authors.

**References**


