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Case report

Postpartum listeria meningitis

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ABSTRACT

Listeria monocytogenes is a small Gram positive, intracellular bacillus known to cause a foodborne disease in immunocompromised patients and other high-risk groups. The infection that usually is asymptomatic or resembles a mild influenza like disease, in some risk groups can cause meningitis and brain abscesses. In pregnant women, *L. monocytogenes* may lead to abortion or delivery of an acutely ill infant. We describe a case of *L. monocytogenes* meningitis occurred in a young puerpera without immunological disorders or other risk factors. We think that because the puerperium is accompanied by the same physiological changes in immune response that features pregnancy, a higher infectious risk should be considered during this period of woman's life. Therefore, an empiric antimicrobial therapy also for listeriosis should be promptly started in meningitis that arises in post-partum period so to achieve the best outcome of the infection.

Introduction

Listeria monocytogenes is a small Gram positive, facultative, intracellular bacillus known to affect immunocompromised patients and other high-risk groups such as neonates, elderly (> 55 yrs), cancer patients and those with cirrhosis. Many types of food can transmit *Listeria* and sporadic cases as well as outbreaks have been reported. In immunocompetent host, the infection is usually asymptomatic or resembles a mild influenza-like disease or enteritis. In immunocompromised patients, it may cause endocarditis, meningitis, meningoencephalitis, cerebritis, rhombencephalitis, and intracranial abscesses. Listeriosis during pregnancy is considered a risk for the newborn and may lead to abortion, stillbirth, or delivery of an acutely ill infant. The puerperium is not considered as risk factor for invasive listeriosis [1,2].

We describe a case of a severe *L. monocytogenes* meningitis occurred during puerperium in a young woman without immunological disorders or other risk factors.

Case report

In November 2019 a previously healthy 28-year-old woman was transferred forty – two days after delivery to the Infectious Diseases Unit of the University Hospital of Palermo, Italy, from Emergency Department of another city hospital because of high grade fever, malaise and headache that had begun twelve hours before. Her medical history included only a cesarean delivery in the first week of October 2019 without complications. On physical examination the patient appeared seriously ill, with decreased level of consciousness and marked agitation. Nuchal rigidity, bilateral Lasègue and constrained lying position with retired legs and opisthotonus were present. There were no focal neurological signs, pupils were symmetrical but sluggish to react, the speech was incomprehensible and her Glasgow Coma Scale was seven (eyes 1, verbal 2, motor 4). The patient's blood pressure was 110/50 mmHg, body temperature 40 °C, respiratory rate 40 breaths per minutes, heart rate 83 beats per minutes and qSOFA 2.

Laboratory tests results revealed neutrophilic leukocytosis (WBC 19800 cells/μL with 90.6% neutrophils) and increased C - reactive protein (279 mg/L, normal value < 5). Glucose levels, electrolytes, urea, creatinine, aspartate aminotransferase (AST), alanine aminotransferase (ALT), coagulations tests and lactate levels were within normal range. Blood cultures, rectal and vaginal swab resulted negative. Electrocardiogram (ECG) showed normal sinus rhythm. A chest x –ray and an abdominal computed tomography scan did not reveal pathological findings. A brain computed tomography scan showed no structural abnormalities,

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no mass and no ischemic or hemorrhagic lesions so a lumbar puncture was performed obtaining a cloudy cerebrospinal fluid (CSF) with increased pressure and leukocyte count of 1150 cells/μL (59.2 % neutrophils), low glucose level (40 mg/dL) and elevated protein level (587 mg/dL).

According to the current meningitis guidelines an empiric treatment with intravenous (IV) vancomycin, ceftriaxone and dexamethasone was started based on the patient's age and on the clinical presentation. Patient remained febrile and her clinical conditions did not improve. Meanwhile, on cerebrospinal fluid examination a positive polymerase chain reaction for *L. monocytogenes* was obtained and afterwards confirmed by CSF culture. Ceftriaxone, vancomycin and dexamethasone were stopped and intravenous ampicillin (2 g every four hours) and gentamicin (320 mg once daily) started. On day 2 after ampicillin and gentamicin initiation, the patient was completely afebrile, less lethargic and more collaborative and complained nausea, blurred vision, photophobia and diplopia. Nuchal rigidity ameliorated. A brain magnetic resonance imaging scan showed mild meningeal enhancement without any sign of parenchymal involvement. She gradually recovered and was discharged after 28 days in good conditions and without any neurologic sequelae. Ampicillin and gentamicin were administered for a total of 28 days and 14 days respectively.

Discussion

L. monocytogenes is a very uncommon cause of bacterial meningitis in immunocompetent adults [2]. Infection with *L. monocytogenes* is likely to be a very common event given the ubiquitous distribution of the bacteria and the high frequency of contamination of raw and industrially processed foods. The incidence of the human disease is very low, normally around 2–8 sporadic cases annually per million population in Europe and the United States [1,2]. The host susceptibility plays a major role in the presentation of clinical disease [1,3]. Listeriosis usually is a mild disease but can progress rapidly and may be associated with severe complications of the central nervous system [1]. The clinical presentation of listeria meningitis is not different from that caused by other agents [2].

Current guidelines for suspected bacterial meningitis recommend adding ampicillin to ceftriaxone and vancomycin as first line empiric treatment only in neonates, patients aged > 50 years old and with risk factors (malignancies, corticosteroid use, cirrhosis or alcoholism, diabetes, kidney disease, organ transplantation and collagen diseases). Pregnancy and puerperium are not listed among the categories at risk of invasive listeria disease [4]. Normal pregnancy is accompanied by changes in immune response, mainly by a decrease in cellular immunity and a proportional increase in humoral immunity, which may in part account for the successful growth and delivery of the fetus. These physiological events could result in an increase in the risk for infections sustained by some infectious agents whose immunity is based on a T-helper 1 predominant response such as *Leishmania infantum* and *Mycobacterium tuberculosis* [5,6]. The post-partum may reflect aspects of pregnancy associated alterations for an unknown period of time. Return to a normal immune state is not well characterized and may take as long as one year after the birth [7]. On the other hand, reversal of the immunosuppressive state during the post-partum period may be associated with inflammatory response that amplifies disease expression [8]. Our patient was healthy before admission to hospital and denied any risk factor for listeria meningitis so ampicillin had not been included at first. Her clinical conditions worsened in spite of treatment and only after unexpected polymerase chain reaction and culture positive for *L. monocytogenes* a proper antimicrobial association with ampicillin ant gentamicin was administered and patient recovered.

To our knowledge, *L. monocytogenes* meningitis in young previously healthy adults has been reported only in anecdotal observations and a review of related publications failed to identify any reports of listeria meningitis during puerperium [2,9,10]. Because of prompt diagnosis is essential so that adequate antimicrobial treatment can be started and the best outcome achieved, on the grounds of our experience, we suggest to consider *L. monocytogenes* as a possible cause of meningoencephalitis in post-partum that could be considered as a transitory underlying immunosuppressive condition.

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