

[CASE REPORT]

Perianal Abscess Caused by *Listeria monocytogenes*

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Abstract:

Listeria monocytogenes can cause gastrointestinal infections in healthy children and adults, but they tend to be mild and self-limiting. It can, however, cause serious potentially lethal infections, such as meningitis and bacteremia, to those with underlying conditions. A woman in her 60s with liver cirrhosis developed abdominal pain and a fever, and she turned out to have a perianal abscess caused by *L. monocytogenes*. Perianal abscess is a rare complication of *L. monocytogenes*, but a recent epidemiological study revealed that the presence of cirrhosis might also be a risk factor for the development of invasive disease.

Key words: perianal abscess, listeria monocytogenes, pathophysiology

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Introduction

Listeria monocytogenes is a facultative anaerobe characterized by Gram-positive rods with rounded edges. It was first described in 1926 as the cause of an outbreak among laboratory animals and was first recognized as a human pathogen in 1929 (1). For healthy children and adults, it causes relatively nonsevere gastrointestinal diseases that are usually self-limiting. However, it characteristically causes severe disease, such as meningitis and bacteremia, among patients with underlying risk factors (2).

Neonates, pregnant women, the elderly, people with human immunodeficiency virus (HIV) infection, and those receiving immunosuppressants, including biological agents, such as tumor necrosis factor (TNF)-alpha inhibitors, are at particular risk of severe infections caused by *L. monocytogenes* (3-7). *L. monocytogenes* can cause focal invasive infections, such as abscesses, but they occur rarely.

We herein report a case of perianal abscess caused by this organism in a patient with cirrhosis.

Case Report

A woman in her 60s with a medical history of cirrhosis and treated hepatocellular carcinoma caused by non-

alcoholic steatohepatitis complicated by esophageal varices, presented to us with a fever, dyspnea, and abdominal pain. Nine days prior to the presentation, the patient started to have abdominal pain with tenesmus. She took an over-the-counter unknown stomach medicine to no avail. One day prior to the presentation, the patient developed a fever and dyspnea. She presented to the emergency department on the following day.

She denied any consumption of unprocessed cheese or uncured ham, but she admitted to eating uncooked vegetables and strawberries on a regular basis. She denied travel abroad, and none of her family members had similar symptoms.

On a physical examination, she appeared ill generally. Her blood pressure was 100/65 mmHg, pulse rate was 100/minute, respiratory rate was not measured, and body temperature was 37.9°C. Her abdomen was soft, but there was mild abdominal distension that was not tender to touch. No apparent mass or ascites was noted. The rest of the physical examination was unremarkable.

Blood tests revealed white blood cell counts of 10,800/ μ L, with 82.7% neutrophils, hemoglobin level of 12.2 g/dL, and platelet count of 170,000/ μ L. Total bilirubin and direct bilirubin were elevated to 2.6 mg/dL and 1.4 mg/dL respectively. The serum albumin level was 2.0 g/dL, aspartate aminotransferase (AST) and alanine aminotransferase (ALT)

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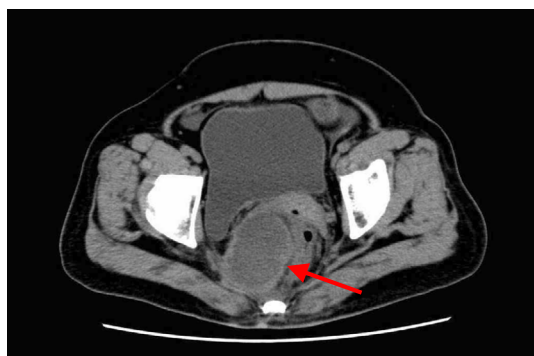


Figure 1. Computed tomography (CT) without contrast showing perianal abscess (arrow).

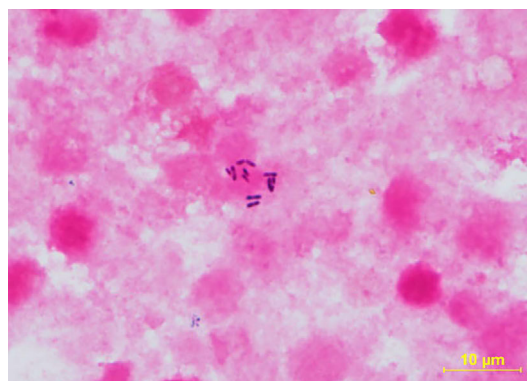


Figure 2. Gram staining of the drained abscess. Multiple short, Gram-positive rods are seen at the center of the figure.

levels were 28 U/L and 21 U/L, respectively. The lactose dehydrogenase (LDH) level was 205 U/L, sodium was 128 mmol/L, potassium was 4.4 mmol/L, blood urea nitrogen (BUN) was 13 mg/dL, and creatinine was 1.00 mg/dL with an estimated glomerular filtration rate of 43.3 mL/min/1.73 m². Computed tomography of the chest and abdomen revealed a perianal abscess with a diameter of 63 mm (Fig. 1) with massive pleural fluid. Thoracentesis was performed and pleural fluid was found to be transudate.

Cefmetazole intravenously was started without drainage of the abscess. Blood cultures, urine cultures, and pleural fluid culture upon admission were negative. The fever persisted, and the antibiotic was switched to piperacillin/tazobactam on day 12 after admission. On day 16 after admission, drainage of the abscess was performed, and Gram-staining revealed multiple Gram-positive rods (Fig. 2). The antibiotic was changed to intravenous ampicillin/sulbactam. Culture of the drained abscess showed *L. monocytogenes* using the BD BBL Crystal GP system (Becton, Dickinson, and Company, Franklin Lakes, USA), as it found motile, short, Gram-positive rods that tested positive on the catalase test and showed hydrolysis of hippuric acid and weak beta hemolysis (8, 9). The antibiotic was again changed to ampicillin intravenously on day 18 after admission.

Her body temperature normalized shortly thereafter, the drainage tube was removed on day 26, and the antibiotic was changed to oral amoxicillin/clavulanic acid on day 29 for 2 weeks. She was discharged home without recurrence.

Discussion

Focal invasive infections, such as abscess formation, are rare complications of *L. monocytogenes* infection (10). Perianal abscess is even rarer, and we were able to find only several cases of perianal abscess caused by the organism (11-13). Duarte et al. described a patient in Portugal who had diabetes mellitus (11). Chavata et al. presented a case series of *Listeria* infections in Australia, and one out of three patients had perianal abscess, although the details of the case were not shown (12). Carvajal et al. also presented a case series of *Listeria* infections in Denmark, and 2 of the 30 cases had perianal abscess (13). Our report is, as far as

our literature search could determine, the first to describe a case occurring in Asia.

Since Gram-staining revealed only a single Gram-positive rod, which turned out to be *L. monocytogenes*, we consider this perianal abscess to be a mono-organism infection rather than an abscess caused by mixed bacteria, although we cannot exclude the possibility that the Gram staining was affected by the history of antimicrobial therapy and was, in fact, polymicrobial infection with false negative staining/culture aside from *Listeria*. We are not sure why the patient had pleural effusion, which was transudate, but it might have been associated with his underlying liver cirrhosis.

Why did the patient develop such a rare disease? We identified uncooked food as a potential source of transmission, although there was no apparent outbreak surrounding the patient. Since *L. monocytogenes* does not tend to cause diseases among healthy immunocompetent people, a large number of outbreaks often seen in foodborne diseases caused by other pathogens are less likely to occur. Once ingested, a certain proportion of the organism can pass through the stomach and duodenum and can reach the intestinal wall. It can then invade both phagocytic and nonphagocytic cells. As an intracellular organism, *L. monocytogenes* can move from one cell to another by avoiding the extracellular humoral immune system (2). *L. monocytogenes*, therefore, was able to invade the epithelial cells of the rectum and form an abscess in the perianal area, which explains the reason for the lack of bacteremia.

A recent case-control study on *Listeria* meningitis in South Korea showed that age ≥ 50 years old and chronic liver disease were independent risk factors associated with the disease (14). Although the present patient did not have classic risk factors associated with invasive diseases, such as HIV infection or cellular immunity impairment, and was not a neonate or pregnant (2), and her age being in her 60s was marginally a potential risk factor to develop the disease, the patient's liver cirrhosis may have contributed to the development of this rather rare focal invasive condition, although she may have had other risk factors that we were not able to identify. The presence of portal hypertension suggested to be present by her esophageal varices may have increased the

risk of extraintestinal invasion of the organism (15).

In conclusion, we reported a rare form of perianal abscess caused by *L. monocytogenes*. The presence of cirrhosis may have contributed to the development of this condition.

The authors state that they have no Conflict of Interest (COI).

References

1. Gray ML, Killinger AH. *Listeria monocytogenes* and listeric infections. *Bacteriol Rev* **30**: 309-382, 1966.
2. Johnson JE, Mylonakis E. *Listeria monocytogenes*. Bennett, John E., Dolin, Raphael, Blaser, Martin J. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases E-Book (Kindle Location 2257). Elsevier Health Sciences. Kindle Edition.
3. Teixeira AB, Lana AMA, Lamounier JA, Pereira da Silva O, Eloi-Santos SM. Neonatal listeriosis: the importance of placenta histological examination - a case report. *AJP Rep* **1**: 3-6, 2011.
4. Janakiraman V. Listeriosis in pregnancy: diagnosis, treatment, and prevention. *Rev Obstet Gynecol* **1**: 179-185, 2008.
5. Muñoz P, Rojas L, Bunsow E, et al. Listeriosis: an emerging public health problem especially among the elderly. *J Infect* **64**: 19-33, 2012.
6. Kales CP, Holzman RS. Listeriosis in patients with HIV infection: clinical manifestations and response to therapy. *J Acquir Immune Defic Syndr* **3**: 139-143, 1990.
7. Bowie VL, Snella KA, Gopalachar AS, Bharadwaj P. *Listeria* meningitis associated with infliximab. *Ann Pharmacother* **38**: 58-61, 2004.
8. Gasanov U, Hughes D, Hansbro PM. Methods for the isolation and identification of *Listeria* spp. and *Listeria monocytogenes*: a review. *FEMS Microbiol Rev* **29**: 851-875, 2005.
9. Uh Y, Hwang GY, Jang IH, et al. Identification results of aerobic gram-positive bacteria isolated from blood cultures using BBL crystal GP ID system. *Korean J Clin Microbiol* **4**: 22-27, 2016.
10. Al-Khatti AA, Al-Tawfiq JA. *Listeria monocytogenes* brain abscess in a patient with multiple myeloma. *J Infect Dev Ctries* **4**: 849-851, 2010.
11. Duarte F, Pinto SM, Trigo AC, et al. A rare presentation of *Listeria monocytogenes* infection: perianal abscess associated with lumbar spine osteitis. *IDCases* **15**: e00488, 2019.
12. Chavada R, Keighley C, Quadri S, Asghari R, Hofmeyr A, Foo H. Uncommon manifestations of *Listeria monocytogenes* infection. *BMC Infect Dis* **14**: 641, 2014.
13. Carvajal A, Samuelsson S, Rothgardt NP, Frederiksen W. The treatment of *Listeria monocytogenes* septicaemia. *Acta Microbiol Hung* **36**: 165-168, 1989.
14. Lim S, Chung DR, Kim Y-S, et al. Predictive risk factors for *Listeria monocytogenes* meningitis compared to pneumococcal meningitis: a multicenter case-control study. *Infection* **45**: 67-74, 2017.
15. Garcia-Tsao G, Albillos A, Barden GE, West AB. Bacterial translocation in acute and chronic portal hypertension. *Hepatology* **17**: 1081-1085, 1993.

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