

## Listeriosis in Pregnancy: A Case Report of Intrauterine Fetal Death and Maternal Complications

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### Abstract

This case report presents a 28-year-old pregnant woman diagnosed with listeriosis at 24.6 weeks of gestation. Initial presentations included mild cough and fatigue, progressing to fever, decreased fetal movements, and eventual intrauterine fetal demise (IUID). Despite broad-spectrum antibiotics and supportive care, the patient developed acute pulmonary embolism, necessitating intensive care. Blood cultures confirmed *Listeria monocytogenes* infection. Following appropriate antimicrobial therapy and anticoagulation, the patient stabilized and was discharged. This case underscores the critical importance of early recognition and intervention in listeriosis during pregnancy to prevent severe maternal and fetal outcomes.

**Keywords:** Listeriosis; Pregnancy; Intrauterine Fetal Demise; *Listeria monocytogenes*; Pulmonary Embolism; Maternal Complications; Foodborne Illness; Antenatal Care; Empirical Antibiotic Therapy; Obstetric Complications

### Introduction

Listeriosis, caused by the gram-positive bacterium *Listeria monocytogenes*, is a severe foodborne infection with significant implications for pregnant women and their fetuses. This bacterium, encompassing approximately 13 serotypes, is implicated in numerous human listeriosis outbreaks and sporadic cases [1]. Serventi, *et al.* highlighted its resilience to environmental factors, enabling proliferation across a wide temperature range (0.4 - 45°C) in various raw foods, including milk, vegetables, frozen corn, French-style cheese, poultry, and fish products [2]. Effective disinfection methods include chlorine-containing agents or direct sunlight exposure [2].

Listeriosis manifests in invasive and noninvasive forms. Wadhwa Desai and Smith noted that the noninvasive form does not penetrate the gastrointestinal barrier [3]. Outbreaks are predominantly identified in higher-income countries due to advanced diagnostic, strain typing via whole-genome sequencing, and surveillance programs [4]. Although rare, listeriosis poses significant risks during pregnancy, with a higher infection likelihood-up to 18 times more-compared to the general population [1]. Following ingestion of contaminated food, the incubation period ranges from 24 hours to 70 days [2].

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In immunocompromised individuals, including pregnant women, *Listeria* can disseminate through the bloodstream, causing febrile bacteremia, which may present as influenza-like illness, gastroenteritis, neurolisteriosis, sepsis, or meningitis with potential brain abscesses [5,6]. Pregnant women are particularly susceptible during the second or third trimesters, although first-trimester infections are possible [7]. Charlier, *et al.* emphasized that vertical transmission to the fetus can occur transplacentally or during birth through an infected vaginal canal [2]. The infection poses severe risks for the fetus, potentially leading to abortion, stillbirth, or delivery of an infant with central nervous system damage [2,5]. The perinatal fatality rate is approximately 20 - 30% [8].

Maternal symptoms commonly include fever, cough, abdominal or pelvic pain, myalgias, and arthralgias [8]. When symptomatic, maternal listeriosis most commonly presents as a mild febrile illness, with myalgias and possible gastrointestinal symptoms [1,9]. In severe cases, listeriosis during pregnancy can result in miscarriage, intrauterine fetal death, or neonatal meningitis and sepsis. The outcomes for fetal and neonatal health are well documented, prompting the development of evaluation and treatment algorithms detailed in both obstetrics and pediatrics literature [10-12].

Most reported cases of listeriosis occur in the immunocompromised, the elderly, and neonates. Pregnant women are also a susceptible population, with one in seven cases of reported listeriosis occurring in this group [3]. Jackson, *et al.* estimated the incidence of pregnancy-related listeriosis at 3 - 4 cases per 100,000 births [13]. Maternal infection during the first trimester carries a miscarriage risk of approximately 65%, while infection in the second or third trimester is associated with a 26% risk of fetal demise [14]. Although fetal loss is more common than neonatal death, surviving newborns with fetal infection face high risks of long-term morbidity, including neurological deficits and physical disabilities, with a fatality rate as high as 20% [15-17]. Maternal mortality associated with *Listeria* infection is rare, with most women recovering postpartum [18].

Despite well-documented fetal and neonatal morbidities, the overall maternal morbidity risk attributable to *Listeria* infection in pregnancy remains incompletely described in the literature. Therefore, evaluating and describing the maternal and obstetric outcomes associated with *Listeria* infection in pregnancy is crucial.

### Case Report

The patient is a 28-year-old woman of Middle Eastern descent, employed at Sharjah Airport, and residing in Sharjah, UAE. Her medical history is notable for uterine fibroids, but she has no other significant medical conditions. She comes from a non-consanguineous marriage and has a history of two previous full-term vaginal deliveries. She was receiving regular antenatal care at Al Qassimi Hospital.

Her initial presentation to the emergency department at our facility university hospital Sharjah on October 11, 2023, included mild cough and generalized fatigue, but she did not have a fever. Clinical examination and initial investigations at that time were normal, and she was discharged with symptomatic treatment. On October 15, 2023, she returned with fever, generalized fatigue, and mild upper respiratory symptoms. Laboratory investigations revealed a hemoglobin level of 10.5 g/dl, a total white cell count of  $7.5 \times 10^9/L$ , and an elevated C-reactive protein of 38 mg/L. Tests for influenza A/B, RSV, and Covid-19 were negative. She was admitted, given symptomatic treatment, and discharged in stable condition after two days.

The patient presented again on October 21, 2023, with high-grade fever and reported decreased fetal movements for the past three days. At this time, she was 25.5 weeks pregnant. Ultrasound examination confirmed intrauterine fetal demise (IUGD). She was admitted to the hospital, and empirical broad-spectrum antibiotics were initiated. Blood and urine cultures, as well as a high vaginal swab (HVS), were collected for culture. Further diagnostic tests included an ultrasound, which confirmed the non-viable fetus with no cardiac activity, a longitudinal lie, and cephalic presentation. Fetal biometry was consistent with 25 weeks and 4 days gestation.

For the IUFD, labor was induced using Cytotec (misoprostol) as per the hospital's protocol. The patient delivered a female baby weighing 920 grams with no obvious congenital anomalies on October 22, 2023. The placenta was sent for histopathology, which later revealed severe acute necrotizing chorioamnionitis and placentitis. Family refused to do postmortem examinations.

On the night after delivery and while she was on empirical antibiotics, she was still febrile, start to be tachycardic, tachypneic and hypotensive. Medical and infectious diseases physician reviewed her as well as the cardiologist, investigations were ordered.

A CT pulmonary angiography revealed intraluminal filling defects in the right inferior pulmonary artery, indicative of acute pulmonary embolism. Additional imaging, including a chest X-ray and abdominal ultrasound, showed no pulmonary consolidation but did reveal splenomegaly and gallbladder wall edema.

Patient was shifted directly to ICU and treatment was started promptly for thromboembolism.

The diagnostic procedures revealed a positive blood culture for *Listeria monocytogenes*, confirming the diagnosis of listeriosis.

Upon confirming the diagnosis of listeriosis, the patient was started on broad-spectrum antibiotics. Given her high-grade fever, generalized fatigue, and the confirmed intrauterine fetal demise (IUFD), the initial treatment included intravenous antibiotics to target *Listeria monocytogenes*.

The antibiotic regimen was adjusted upon receiving the blood culture results, which confirmed listeriosis. The infectious disease consultant recommended switching to high-dose intravenous Ampicillin for a duration of two weeks to specifically target the *Listeria* infection. Additionally, the patient was managed for her acute pulmonary embolism with therapeutic doses of low molecular weight heparin (Clexane).

The rationale behind the chosen treatment plan was to aggressively manage the listeriosis infection with appropriate antibiotics while also addressing the life-threatening complication of pulmonary embolism. The combination of antimicrobial therapy and anticoagulation was essential to stabilize the patient's condition and prevent further complications.

The patient response to treatment was closely monitored. After the initiation of high-dose intravenous Ampicillin, her fever gradually subsided, and her clinical condition improved. The patient remained in the ICU for close observation and management of her pulmonary embolism. She received therapeutic Clexane and supportive care.

Once stabilized, the patient was transferred to the general ward. She continued on oral anticoagulation therapy with warfarin for three months to manage the pulmonary embolism. Follow-up appointments were scheduled with her gynecologist, pulmonologist, and hematologist to ensure comprehensive care and monitoring of her recovery.

During her hospital stay, the patient was extensively counseled about listeriosis, including the association with food. She admitted to consuming unpasteurized cheese, which was identified as the likely source of her infection. Educational support was provided to prevent future occurrences.

While the patient was in the ICU with embolism, her 20-year-old nephew was admitted to the medical ward with convulsions and fever. After being informed that his aunt had a listerial infection, the medical team performed a lumbar puncture (LP) on the nephew, which confirmed he also had *Listeria* infection.

The patient's nephew, who was also diagnosed with listeriosis, responded well to treatment following the lumbar puncture that confirmed the same infection. Both the patient and her nephew were discharged in stable condition with appropriate follow-up care.

No significant complications or side effects were noted during the course of the treatment. The patient and her family were provided with psychological support and counseling to cope with the loss and the health ordeal they experienced.

The primary diagnosis for this patient was listeriosis in pregnancy, complicated by intrauterine fetal demise (IUFD) at 25.5 weeks gestation. Secondary to the infection, she also developed an acute pulmonary embolism. This case highlights the severe fetal and maternal complications that can arise from listeriosis, underscoring the importance of early recognition and prompt intervention in pregnant women presenting with nonspecific symptoms that may suggest this infection. Furthermore, the case demonstrates the potential for familial transmission of *Listeria*, as evidenced by the concurrent infection in the patient's nephew.

### Discussion

This case of listeriosis in a pregnant woman resulting in intrauterine fetal demise (IUFD) and complicated by an acute pulmonary embolism is both rare and significant. The incidence of listeriosis in pregnancy is up to 18 times higher than in the general population [1]. Pregnant women account for a substantial proportion of *Listeria* infections, highlighting the vulnerability of this population to severe complications [1,7]. Madjunkov, *et al.* [1] noted that listeriosis during pregnancy often results in severe outcomes, including fetal loss and preterm labor, which aligns with our case where the patient experienced IUFD. Similarly, Serventi, *et al.* [2] discussed cases where the consumption of unpasteurized cheese led to listeriosis, as seen in our patient's history. The rapid progression from mild symptoms to severe complications, including pulmonary embolism, further underscores the potential severity of listeriosis during pregnancy, a progression also noted by Wadhwa Desai and Smith [3].

In the study by Juno, *et al.* [4], the outbreak of listeriosis in South Africa demonstrated how foodborne transmission could lead to widespread infection. This case similarly highlights the importance of food safety, particularly in pregnant women. Additionally, Luo, *et al.* [8] reported maternal-neonatal listeriosis in Sichuan, China, where early diagnosis and treatment were crucial in managing the infection. Our case supports this finding, emphasizing the importance of prompt and accurate diagnosis.

The significance of this case lies in its demonstration of the potential for rapid progression and severe complications in maternal listeriosis. The case highlights the importance of prompt diagnosis and treatment to mitigate adverse outcomes. The concurrent infection in the patient's nephew underscores the potential for familial transmission and the need for heightened awareness and preventive measures within affected families.

One unique aspect of this case is the development of acute pulmonary embolism, a complication not commonly reported in listeriosis cases. This added complexity required a multidisciplinary approach involving infectious disease specialists, obstetricians, and pulmonologists. The refusal of the family to permit postmortem examination of the fetus presented a challenge in fully understanding the extent of the infection and its impact.

The patient's admission to the ICU and the subsequent diagnosis of her nephew with listeriosis further highlight the complexity of managing such cases within a familial context. The necessity for extensive counseling and education regarding food safety and listeriosis prevention was a critical component of the management plan.

Diagnosing listeriosis can be challenging due to its nonspecific symptoms, as demonstrated in this case. Early blood culture and targeted antibiotic therapy with high-dose intravenous Ampicillin were crucial in managing the infection. The use of empirical broad-spectrum antibiotics initially was aligned with best practices until specific pathogens were identified [1,2,4].

The patient's response to treatment was positive, with resolution of fever and stabilization of her condition. The management of her pulmonary embolism with therapeutic Clexane and subsequent oral anticoagulation was effective in preventing further complications.

The extensive counseling provided to the patient and her family regarding the source of infection and preventive measures was vital in preventing future occurrences. The successful treatment of her nephew further underscores the importance of prompt diagnosis and treatment within a familial context.

### Conclusion

This case report highlights the significant risks and severe complications associated with listeriosis during pregnancy. The patient's journey from mild initial symptoms to severe outcomes, including intrauterine fetal demise (IUID) and acute pulmonary embolism, underscores the critical need for prompt diagnosis and intervention. The concurrent infection of the patient's nephew also demonstrates the potential for familial transmission, emphasizing the importance of comprehensive screening and preventive measures. The key points and findings:

- Listeriosis in pregnancy can rapidly progress from mild, nonspecific symptoms to severe complications, including IUID and pulmonary embolism.
- Early diagnosis and targeted antibiotic therapy, specifically high-dose intravenous Ampicillin, are crucial in managing listeriosis effectively.
- Multidisciplinary management is essential for addressing the various complications that may arise, such as the need for anticoagulation therapy in cases of pulmonary embolism.
- Familial transmission is a potential risk, highlighting the need for awareness and preventive education regarding food safety.

### Implications for clinical practice and further research

Clinicians should maintain a high index of suspicion for listeriosis in pregnant patients presenting with nonspecific flu-like symptoms, especially if there is a history of consuming high-risk foods. Prompt diagnostic testing, including blood cultures, is essential for early detection. Empirical broad-spectrum antibiotics should be initiated until specific pathogens are identified, with adjustments made based on culture results.

Educating patients about the risks of consuming unpasteurized or contaminated foods is crucial, particularly for pregnant women. Counseling on food safety and preventive measures can significantly reduce the incidence of listeriosis.

Further research is needed to better understand the risk factors and mechanisms of listeriosis transmission within families. Studies focusing on the development of rapid diagnostic tests for early detection of listeriosis in pregnant women could improve outcomes. Additionally, research into the optimal management strategies for complications associated with listeriosis, such as pulmonary embolism, would provide valuable insights for clinical practice.

### Ethical Considerations

In this case, direct consent from the patient for publication was not obtained. However, the data were collected and processed in a manner that ensures the protection of her identity and the omission of any identifying information. All ethical guidelines concerning confidentiality were strictly followed, and all personal details were removed to safeguard the patient's privacy. This case report was conducted in accordance with the ethical standards set by the hospital's ethics committee.

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### Author Contributions

Dr. Jullia M. Nageeb played the major role as the primary author for this case report, taking the lead in gathering, organizing, and drafting the case report. Her contributions were instrumental in ensuring the comprehensive and detailed presentation of the case. She was supported by the valuable assistance of Rania E. Belal and Dr. Sabiha Shafi, who provided significant input in the preparation and writing process. Dr. Nagla Elhadi Abdalla, as the primary treating consultant and the main responsible physician (MRP) for the case, supervised the clinical management and provided oversight throughout the report's creation especially in the final stages, Dr. Nagla thoroughly reviewed and revised the manuscript, ensuring accuracy and clarity. All authors have read and approved the final version of the manuscript.

### Conflicts of Interest

The authors declare no conflicts of interest related to this case study.

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### Data Availability Statement

The data that support the findings of this case report are available from the corresponding author upon reasonable request. The patient's clinical data, including diagnostic tests, medical history, and treatment details, were collected and analyzed in compliance with institutional privacy policies and ethical guidelines. However, due to privacy and ethical considerations, certain personally identifiable information has been redacted to maintain patient confidentiality.

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