

# *Listeria monocytogenes* bacteremia in a twin pregnancy with differential outcome: fetus papyraceus and a full-term delivery

Jaffar A Al-Tawfiq

Internal Medicine Services Division, Dhahran Health Center,  
Saudi Aramco Medical Services Organization, Saudi Aramco, Dhahran, Saudi Arabia

Received: October 9, 2007 Revised: November 15, 2007 Accepted: January 28, 2008

A 41-year-old Saudi woman, gravida 7, para 5, aborta 1 with sickle cell disease at week 12 of gestation of diamniotic dichorionic twin pregnancy was admitted with fever. Blood cultures grew *Listeria monocytogenes*. She was treated with intravenous ampicillin and had death of one of the fetuses after 10 days. An ultrasound at 19 weeks of gestation showed a normal intrauterine gestation and the presence of significantly collapsed second twin gestational sac consistent with fetal papyraceus. At 37 weeks of gestation, she had a cesarean section and a full-term baby was delivered. We describe the case and review the literature on pregnancy-associated listeriosis.

**Key words:** Diseases in twins; Fetal death; *Listeria*; *Listeria monocytogenes*; Pregnancy complications, infectious

## Introduction

*Listeria monocytogenes*, a Gram-positive bacterium, is the causative organism of human listeriosis. The organism causes gastroenteritis, materno-fetal infections, and meningoenzephalitis through its ability to cross the intestinal, placental, and blood-brain barriers, respectively [1]. Listeriosis in pregnancy usually occurs during the third trimester, secondary to a major decline in cell-mediated immunity [2]. However, listeriosis has been rarely observed during the first trimester [3]. In addition, listeriosis during pregnancy rarely spares the fetus or the neonate [4]. Here, we present an unusual case of *L. monocytogenes* infection during the first trimester in a twin pregnancy resulting in demise of one fetus and subsequent delivery of a full-term second fetus.

## Case Report

A 41-year-old Saudi lady, gravida 7, para 5, aborta 1, with sickle cell disease and a twin pregnancy at 12

weeks was admitted with fever. She had a 4-day history of fever, chills and generalized fatigability. The patient had no urinary, gastrointestinal or respiratory symptoms and no skin rash. Physical examination revealed a temperature of 38°C and no other abnormalities. White blood cell count was 2800/mm<sup>3</sup>, hemoglobin 9.1 g/dL, platelets 165,000/mm<sup>3</sup>, and neutrophils 75%. Blood cultures grew *L. monocytogenes*. Intravenous ampicillin 2 g 4-hourly was started. Initial ultrasound at 12 weeks of gestation showed a gravid uterus with diamniotic dichorionic twin live pregnancy with normal amniotic fluid (Fig. 1). Ten days after admission, one of the fetuses died. However, the patient had no abdominal pain, no vaginal bleeding, and no symptoms referable to sickle cell disease. The patient received intravenous ampicillin for 2 weeks, and was subsequently discharged home. An ultrasound at 19 weeks of gestation showed a normal intrauterine gestation and the presence of significantly collapsed second twin gestational sac containing a dead fetus. Both the head and body appeared completely disorganized and were consistent with fetal demise (Fig. 2).

At 37 weeks of gestation, the patient was admitted for induction of labor for severe oligohydramnios. However, the fetus showed severe variable decelerations and thus an emergency cesarean section was done. A baby girl was delivered weighing 2150 g with

Corresponding author: Dr Jaffar A Al-Tawfiq, MD, FACP, FCCP, PO Box 76, Room A-420B, Building 61, Internal Medicine Services Division, Dhahran Health Center, Saudi Aramco Medical Services Organization, Saudi Aramco, Dhahran 31311, Saudi Arabia.  
E-mail: jaffar.tawfiq@aramco.com; jaltawfi@yahoo.com

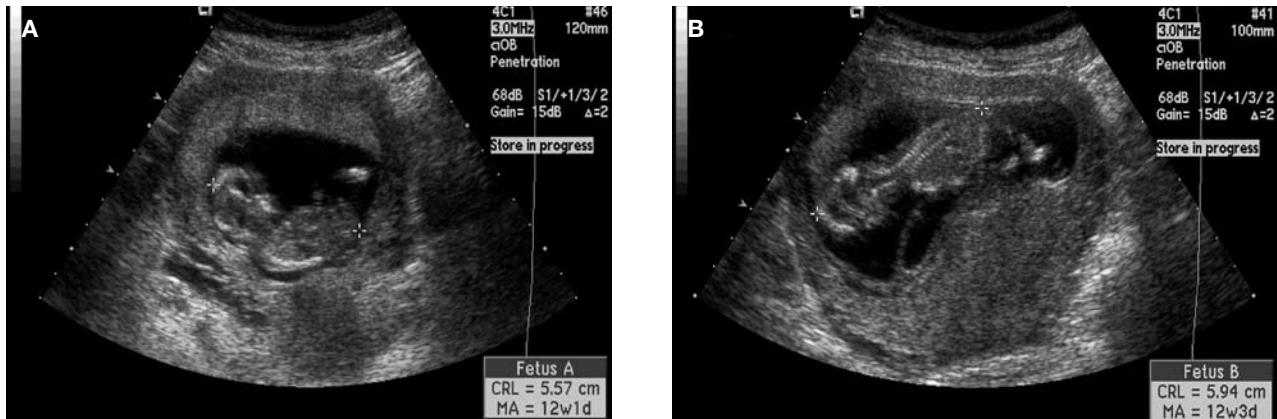


Fig. 1. Initial ultrasound at 12 weeks of gestation shows normal viable intrauterine twin pregnancy. (A) Twin A. (B) Twin B.

an Apgar score of 9 at 1 and 5 minutes. The patient had a smooth postoperative course and was discharged home in excellent condition.

### Pathological findings

The placenta showed an umbilical cord with 2 arteries and 1 vein. Fetal mesenchymal and epithelial remnants, including immature cartilage, bone and muscle with foci of necrosis and calcifications, were present. Scattered hemosiderin-laden macrophages were also present. The microscopic features were consistent with sclerotic atrophic placenta with fetus papyraceus, indicating second trimester intragestational fetal loss in a twin pregnancy.

### Discussion

*L. monocytogenes* infections can be life-threatening in neonates, pregnant women, elderly persons, and all

immunosuppressed patients [2]. The majority of cases of listeriosis are food-borne through contamination of raw vegetables, raw milk, fish, poultry, and beef by *L. monocytogenes* [5]. Infection with *L. monocytogenes* in pregnancy usually occurs during the third trimester, as the result of the reduction in cell-mediated immunity [2]. In addition, *L. monocytogenes* may rarely cause disease in the second trimester [6]. Similar to the present case, listeriosis has been reported in the first trimester [3,7]. The clinical presentation of listeriosis in pregnancy may be an isolated episode of fever in 48% of patients, or a flu-like syndrome in 61% of cases [8]. In the third trimester, pregnant women present with a nonspecific acute febrile illness and may have myalgias, arthralgias, headache and gastrointestinal symptoms [9]. In a study of 11 pregnant women with listeriosis, 9 patients were in the third trimester and 2 patients in the 17th and 18th week of gestation, respectively [8]. The latter 2 pregnancies ended in a spontaneous abortion in one and early death of a preterm delivered baby in the other [8]. The patient in the current report is interesting since there was a differential outcome of the fetuses. While one fetus died in utero during the 13th week of gestation, the other fetus achieved a full term and was born without evident damage. The risk of listeriosis in pregnant women with multiple gestations is higher than in women with singleton pregnancies. In a study of 301 perinatal listeriosis, 12 cases (4.0%) occurred in pregnant women with multiple gestations. The rates of listeriosis in pregnant women per 100,000 live births and fetal deaths were 19.8 for singleton and 74.9 for multiple gestations (risk ratio, 3.8; 95% confidence interval [CI], 2.1-6.8). Greater risk of listeriosis was observed in pregnancies with triplet gestations (risk ratio, 38.4; 95% CI, 9.6-153.3) than in those with twin



Fig. 2. Ultrasound at 19 weeks of gestation shows normal intrauterine live gestation (A) and the presence of a significantly collapsed and completely disorganized second twin gestational sac containing a dead fetus (B).

gestations (risk ratio, 3.2; 95% CI, 1.7-6.0) [10]. In addition, the patient in the present report was 41 years of age and was gravida 7. In one study, listeriosis was more likely in patients over 35 years (risk ratio, 13.6) and 36% of the affected women had a gravidity of  $\geq 5$  (risk ratio, 2.9) [10].

The most important complications of listerial infections in pregnancy include fetal distress, abortion, premature birth, fetal or neonatal death, as well as the listerial infection of the neonate [11,12]. *L. monocytogenes* has a particular predilection to the placenta and the central nervous system, and seeding of these sites occurs during the bacteremic phase of the disease [2]. Perinatal listeriosis results in stillbirth or neonatal death in 22% of cases [8,13]. The present case is interesting since the infection occurred in the first trimester and death resulted in only one of the fetuses. The exact reason for this differentiation in the outcome of the fetuses could not be determined.

In a previous study of listeriosis in multiple gestations, 67% of cultures (8/12) were discordant for infection [10]. Such a discordant outcome is also observed in viral infections, such as herpes simplex virus, rubella and cytomegalovirus [10]. *L. monocytogenes* uses the villous syncytiotrophoblast to cross the materno-fetal barrier [14]. Once transplacental migration of the organism occurs, *L. monocytogenes* may cause villous necrosis and microabscesses and may result in direct infection of the fetus, with subsequent fetal death [15]. Transplacental migration of *L. monocytogenes* can lead to disseminated granulomatous lesions of the newborn [16]. Fetus papyraceus is a rare condition and a differential outcome with intrauterine fetal death of one twin due to blunt maternal trauma was described in the second trimester of pregnancy [17]. However, we are not aware of any previous reports of fetus papyraceus and the delivery of a second twin in relation to *L. monocytogenes* infection.

Almost all strains of *L. monocytogenes* are susceptible to most common antibiotics. However, the cure rate is only approximately 70% [18]. The most effective therapeutic agents are combination of an aminopenicillin (amoxicillin or ampicillin) plus an aminoglycoside [18]. However, pregnant women with isolated listerial bacteremia can be treated with ampicillin alone (2 g intravenous every 4 h). Patients who are allergic to penicillin can be skin tested and desensitized, or treated with trimethoprim-sulfamethoxazole (5 mg/kg of the trimethoprim component intravenously every 6 h). However, trimethoprim-sulfamethoxazole should be

avoided in the first trimester and in the last month of pregnancy due to the risk of kernicterus in the fetus. In this situation, vancomycin is the preferred option [19].

Pregnant women are usually not aware of the risk of listeriosis and they do not take precautions to prevent listeriosis during their pregnancy [18]. Thus, it is important that pregnant women are educated about the risk of listeriosis and the necessary precautions, including dietary guidelines on avoiding high-risk foods [20].

In conclusion, *L. monocytogenes* infection in pregnancy usually occurs during the third trimester and has been rarely observed during the first trimester. Moreover, *Listeria* infection during pregnancy rarely spares the fetus or the neonate. The reported case is thus unusual in occurring in the first trimester and resulting in the demise of only one of twin fetuses.

## Acknowledgment

The authors wish to acknowledge the Saudi Aramco Medical Services Organization (SAMSO) for providing facilities used in this work. Opinions expressed in this article are those of the authors and not necessarily of SAMSO.

## References

1. Lecuit M. Understanding how *Listeria monocytogenes* targets and crosses host barriers. *Clin Microbiol Infect.* 2005; 11:430-6.
2. Posfay-Barbe KM, Wald ER. Listeriosis. *Pediatr Rev.* 2004;25:151-9.
3. Pezeshkian R, Fernando N, Carne CA, Simanowitz MD. Listeriosis in mother and fetus during the first trimester of pregnancy. Case report. *Br J Obstet Gynaecol.* 1984;91:85-6.
4. Naruse K, Yamasaki M, Harada N, Sakamoto Y, Morikawa H. Maternal listeriosis in pregnancy associated with measles virus infection. *J Obstet Gynaecol Res.* 2004;30:117-9.
5. McLauchlin J. Listeriosis. *BMJ.* 1992;304:1583-4.
6. Gupta V, Gautam V, Mehta N, Kumari I, Joshi RM. Listeriosis in second trimester of pregnancy: case report from India. *Jpn J Infect Dis.* 2003;56:60-1.
7. Gray JW, Barrett JF, Pedler SJ, Lind T. Faecal carriage of *Listeria* during pregnancy. *Br J Obstet Gynaecol.* 1993;100: 873-4.
8. Mylonakis E, Paliou M, Hohmann EL, Calderwood SB, Wing EJ. Listeriosis during pregnancy: a case series and review of 222 cases. *Medicine (Baltimore).* 2002;81:260-9.
9. Braden CR. Listeriosis. *Pediatr Infect Dis J.* 2003;22: 745-6.

10. Mascola L, Ewert DP, Eller A. Listeriosis: a previously unreported medical complication in women with multiple gestations. *Am J Obstet Gynecol.* 1994;170(5 Pt 1):1328-32.
11. Rivera-Alsina ME, Saldana LR, Kohl S, Arias JW. *Listeria monocytogenes*. An important pathogen in premature labor and intrauterine fetal sepsis. *J Reprod Med.* 1983;28:212-4.
12. Huang YT, Chen SU, Wu MZ, Chen CY, Hsieh WS, Tsao BN, et al. Molecular evidence for vertical transmission of listeriosis, Taiwan. *J Med Microbiol.* 2006;55(Pt 11):1601-3.
13. Gellin BG, Broome CV. Listeriosis. *JAMA.* 1989;261:1313-20.
14. Lecuit M, Nelson DM, Smith SD, Khun H, Huerre M, Vacher-Lavenu MC, et al. Targeting and crossing of the human maternofetal barrier by *Listeria monocytogenes*: role of internalin interaction with trophoblast E-cadherin. *Proc Natl Acad Sci USA.* 2004;101:6152-7.
15. Goldenberg RL, Thompson C. The infectious origins of stillbirth. *Am J Obstet Gynecol.* 2003;189:861-73.
16. Aljicević M, Beslagić E, Zvizdić S, Hamzić S, Mahmutović S. *Listeria monocytogenes* as the possible cause of the spontaneous abortion in female of the fertile age. *Bosn J Basic Med Sci.* 2005;5:89-92.
17. Peleg D, Ferber A, Orvieto R, Bar-Hava I, Ben-Rafael Z. Single intrauterine fetal death (fetus papyraceus) due to uterine trauma in a twin pregnancy. *Eur J Obstet Gynecol Reprod Biol.* 1998;80:175-6.
18. Hof H. An update on the medical management of listeriosis. *Expert Opin Pharmacother.* 2004;5:1727-35.
19. Lorber B. *Listeria monocytogenes*. In: Mandell GL, Bennett JE, Dolin R, eds. *Mandell, Douglas, and Bennett's principles and practice of infectious diseases.* 6th ed. Philadelphia: Churchill Livingstone; 2005:2478.
20. Gillespie IA, McLauchlin J, Grant KA, Little CL, Mithani V, Penman C, et al. Changing pattern of human listeriosis, England and Wales, 2001-2004. *Emerg Infect Dis.* 2006;12:1361-6.