

In Brief

Listeriosis

Lara Jacobson, MD
Baltimore, Md

Author Disclosure

Drs Jacobson and Serwint have disclosed no financial relationships relevant to this In Brief. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

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Listeriosis is a rare but potentially serious food-borne infection caused by *Listeria monocytogenes*, a motile gram-positive bacillus. *Listeria* can be found throughout the environment in soil, vegetation, water supplies, and animals. The bacterium is particularly suited for food-borne disease because it can survive in acidic and salty conditions. Unlike most pathogens, *Listeria* can continue to multiply at low temperatures, allowing for growth even in properly refrigerated foods.

After ingestion, the bacillus enters the body through the gastrointestinal tract and disseminates hematogenously. In pregnant women, it can cross the placenta and infect the neonate. Macrophages and other cells endocytose the bacteria, which subsequently multiply and spread directly to other macrophages. The host immune system's response is T-cell-mediated. Symptoms manifest an average of 3 weeks after infection.

Pregnant women, neonates, the elderly, and immunocompromised individuals have the highest risk of invasive listeriosis because of relative T-cell deficiencies. Patients who have cancer or diabetes mellitus, have received organ transplants, are receiving long-term steroids, and have other immunosuppressive conditions are at increased risk of infection. Pregnant women are 20 times more likely than the average population to acquire the disease; patients infected with human immunodeficiency virus are 300 times more likely.

Most cases of listeriosis are sporadic, but outbreaks can occur. In the United States, approximately 2,500 cases and 500 deaths are reported each year. Serotypes 1/2a, 1/2b, and 4b most commonly cause disease. Although *Listeria* infection typically is invasive, several outbreaks have been marked by gastroenteritis alone. The overall incidence rate is likely to be underestimated because noninvasive infections may escape detection.

Most maternal infections occur during the third trimester of pregnancy, when T-cell immunity is most impaired. Infected women typically develop nonspecific flulike symptoms but may remain asymptomatic. The nonspecificity of the symptoms makes recognition of

maternal listeriosis difficult, leading to delays in the identification of infection in the neonate. Neonatal disease manifests either as early-onset or late-onset listeriosis.

Early-onset listeriosis is due to in utero transmission and frequently leads to prenatal death or preterm delivery. Neonatal sepsis usually develops 1 to 2 days after delivery. Severe disease can result in widespread granulomas, termed granulomatosis infantisepticum. Up to one third of affected neonates who have early-onset disease die despite adequate antimicrobial therapy.

Neonatal late-onset disease is associated with a better prognosis. This infection is more likely to present as meningitis, and infants up to 30 days of age are at the greatest risk. Mothers typically are asymptomatic. Transmission is believed to occur across the placenta, from exposure in the birth canal, or after delivery.

Sepsis and meningoencephalitis are the most common clinical manifestations of listeriosis outside of the neonatal age group. Invasive disease leads to death in up to 30% of patients, and up to 33% of those who survive meningoencephalitis suffer long-term neurologic sequelae. A subset of patients who have central nervous system involvement develops rhombencephalitis, characterized by brainstem involvement. Rarely, endocarditis, cutaneous involvement, or localized infection occurs.

Listeriosis is diagnosed by a positive culture from a normally sterile site. Intravenous ampicillin or amoxicillin is the mainstay of treatment, although high drug concentrations are required for bactericidal effects. Gentamicin works synergistically and should be

added to the treatment, except in pregnant women because of possible teratogenic effects. Almost no resistance has developed to this treatment. Infected neonates are treated with a minimum course of 14 days of ampicillin and gentamicin. Cephalosporins are not effective against *Listeria*. Ampicillin should be used empirically for infants younger than 1 month of age or in infants up to 3 months of age who show evidence of meningitis, severe illness, or pyelonephritis (to provide coverage for *Enterococcus*). Ampicillin also should be considered in older patients who have meningitis and underlying risk factors. Trimethoprim-sulfamethoxazole can be used to treat patients who are allergic to aminopenicillins, and prophylactic therapy for

Pneumocystis carinii pneumonia may prevent listeriosis in immunocompromised patients. Although exposure to *Listeria* cannot be avoided completely, proper food preparation and storage can decrease the risk. Pregnant women and immunocompromised patients should be advised to avoid unpasteurized soft cheeses, deli meats, hot dogs that are not heated adequately, refrigerated pates, and smoked seafood because they can harbor high levels of contamination.

Comment: Although the overall incidence of listeriosis has decreased by 40% in the United States over the past decade, some studies have suggested that the perinatal rates have remained static. Aggressive public health inter-

ventions, including control measures by the food industry, the United States Department of Health and Human Services, and the United States Department of Agriculture, have been instrumental in leading to the overall decrease. Identified cases need to be reported to the health department so that public health agencies can investigate outbreaks quickly, identify contaminated food, and remove it from public consumption. Although such public health measures remain essential, anticipatory guidance to pregnant women regarding appropriate food avoidance remains important to decrease perinatal rates.

Janet R. Serwint, MD
Consulting Editor

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