A Premature Girl with Pallor and Rash

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A 32-week girl was born by preterm delivery with birth weight of 1,600 g to a gravida 1 para 0 (G1P0) 26-year-old Hispanic mother. The mother’s past medical and gynecological history was unremarkable until 2 days before delivery, when she developed upper respiratory symptoms and received one dose of the second-generation cephalosporin.

The infant was born by cesarean section because of abnormal fetal tracing, with Apgar of 0, 2, and 6 at 1, 5, and 10 minutes. The baby was intubated at birth and was started on intravenous ampicillin (100 mg/kg/day); IV cefotaxime (100 mg/kg/day); and gentamicin (5 mg/kg/day).

On physical exam, the baby had severe clinical pallor and generalized erythematous rash with occasional papules and vesicles. Initial laboratory investigation showed severe neutropenia, and chest X-ray showed left pneumothorax, for which needle decompression was attempted. Initial arterial blood gas showed severe respiratory and metabolic acidosis and clinically had refractory hypotension. She was started on high-frequency ventilation and pressors support. Echocardiogram showed normal cardiac anatomy and no congenital heart anomalies.

Her condition continued to deteriorate despite aggressive fluid resuscitation, pressors support, and ventilation. At about 31 hours of life, the infant became bradycardic and was resuscitated, to which she responded briefly but became bradycardic again at 32 hours of life. Resuscitation was resumed, but she failed to respond. The infant was pronounced dead at 33 hours of life. Additional laboratory evaluation revealed the diagnosis.

An autopsy was performed, which showed bilateral pleural effusions, firm lungs, and autolysis of cerebral hemispheres with subarachnoid hemorrhage around brainstem and bilateral temporal lobes and large hematoma within lateral ventricles extending to the fourth ventricle. Microscopic examination of tissues revealed acute necrotizing granulomatous inflammation in lungs, severe punctate subcapsular necrosis in liver, and necrotizing cortical granulomata with cortical pseudofollicular change in adrenal glands. Placental microscopy was reported to show acute chorioamnionitis and acute funisitis.

For diagnosis, see page 297.

Editor’s note: Each month, this department features a discussion of an unusual diagnosis in genetics, radiology, or dermatology. A description and images are presented, followed by the diagnosis and an explanation of how the diagnosis was determined. As always, your comments are welcome via email at editor@pediatricsupersite.com.
DIAGNOSIS

Listeriosis

DISCUSSION

Blood culture and postmortem lung tissue culture were positive for *Listeria monocytogenes*. No maternal blood and vaginal culture were performed.

Listeriosis has been prevalent in the United States since 2000. Although the infection is relatively uncommon, listeriosis is a leading cause of death attributed to foodborne illness in the United States. Recent association of listeria infection with several large foodborne outbreaks suggest contaminated food may be the primary source of infection.

Between 1976 and 2009, at our hospital, we saw 13 neonates with early-onset listeriosis. The gap between the recent cases and last case was nearly 20 years.

An estimated 800 cases of listeriosis occur annually in the US. The incidence of listeriosis in the US has increased from 1991 to 2006. Factors contributing to this increase might include a true increase in disease transmission, greater use of diagnostic testing, or an increase in reporting.

The incidence of neonatal listeriosis is approximately 13 per 100,000 population. No difference in carriage rate between pregnant women and nonpregnant women have been found in fecal and vaginal specimens. Fecal carriage may lead to vaginal colonization and be responsible for development of late-onset infection in infants born of healthy mothers.

Maternal listeriosis can be transmitted to the fetus by an ascending or transplacental route. Early gestational listeriosis is associated with septic abortion. However, most cases of perinatal listeriosis are found after the fifth month of pregnancy with premature delivery of a septic or stillborn infant.

Maternal influenza-like illness with fever and chills, fatigue, and muscle pains often preceded delivery by 2 to 14 days. Premature labor in mothers with *Listeria* is common; length of gestation is less than 35 weeks in approximately 70% of patients. The mortality rate, including stillbirth and abortion, is 40% to 50%. Early treatment of *Listeria* sepsis in pregnancy can prevent infection or sequelae.

Neonatal infection is the most common clinical form of human listeriosis. Infection in the neonatal period is usually divided into two clinical groups, early-onset infection and late-onset infection. Early-onset infection is usually acquired in utero and manifests within 1 to 2 days of life. Most cases are clinically apparent at delivery with meconium staining, cyanosis, apnea respiratory distress, and pneumonia.

The most common form of late-onset infection is meningitis, which presents in 94% of late-onset cases. Other clinical forms are *Listeria*-induced sepsis without meningitis. *Listeria* is ranked second only to Group B *Streptococcus* as a cause of bacterial meningitis in neonates. The poorest prognosis is linked to early-onset type.

In newborns, based on animal studies, susceptibility to *Listeria* appears to be associated with delayed activation of macrophages, and impaired interaction of macrophages/T lymphocytes.

Cultivation of *Listeria* is the only reliable means of proving that the cause of an infection is caused by *Listeria*. Culture of venous blood, cervical material, urine, amniotic fluids, lochia, and meconium and tissue at biopsy or autopsy offer best chances for identifying *Listeria*. Feces are positive in 1% to 5% of healthy women. Culture of stool is not helpful because of multiple contaminations. Sheep blood agar and chocolate agar media is mainly used for isolation of *Listeria*. Although the serotyping of *Listeria* used as epidemiology markers, unfortunately, no serotyping was done in our present cases.

During outbreaks of listeriosis, pregnant women presenting with sepsis syndrome or flu-like illness should be empirically treated with ampicillin plus amnogycoside after appropriate cultures of blood, rectum, and vagina. Treatment should be continued for 14 days, but some studies have shown that duration of treatment should be continued for up to 3 weeks. If allergic to penicillin, erythromycin may be given. Cephalosporin antibiotics have no role in treatment because *Listeria* is uniformly resistant.

In this case, the mother had flu-like illness with fever and was treated with cephalexin. The infant did not get any protection with maternal treatment. The infant then contracted typical granulomatosus infantisepctica.
CONCLUSIONS

This case illustrates the outcome of a difficult choice made by physicians. Since the widespread use of ampicillin for prophylaxis of early-onset group B streptococcal neonatal infections, infections have decreased. Because of this, cephalosporins are now being prescribed to mothers with suspected perinatal infections.

Although cephalosporins are effective against group B streptococcal and many Escherichia coli infections, they are not effective against Listeria infections.

On further questioning, we found out that the mother was exposed to nonpasteurized cheese. The source of infection in the mother still remains unclear, but the source could be associated with food. Because of the severity of infection, all pregnant women should be advised to avoid prepared foods, such as lunch meat, deli foods, raw vegetables, and soft cheese.

REFERENCES