Hit or Miss? A Review of Early-Onset Sepsis in the Neonate

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KEYWORDS

• Early-onset sepsis • EOS • Neonatal sepsis • Group B streptococcus • GBS
• Neonatal infection

KEY POINTS

- Neonatal sepsis carries a high morbidity and mortality rate due to the neonate's immature immune response to pathogens.
- Early-onset sepsis occurs within the first week of life.
- Identification of at-risk infants is often overlooked because clinical presentation can be subtle and vague.
- Lack of universal implementation of screening protocols leads to inconsistencies in identification and treatment of at-risk neonates.
- The role of the bedside nurse is critical in the recognition and treatment of at-risk neonates and their families.

INTRODUCTION

Infections during the neonatal period have a high incidence of developing into sepsis, which carries a high morbidity and mortality rate for this vulnerable population.[1] A major concern for health care providers is the difficulty of early diagnosis of neonatal sepsis due to inconsistent use of nationally established guidelines. Impediments to accurate diagnosis, recommended treatments, nursing management, and recommendations for addressing this high-risk condition are discussed. The primary focus is addressing early-onset sepsis (EOS) as opposed to late-onset sepsis (LOS).

DEFINITION

Neonatal sepsis can be defined as a potentially life-threatening infection occurring within the first 28 days of life. Infections may be either bacterial or viral in nature.[1]

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Neonatal sepsis is separated into 2 categories: EOS and LOS. EOS occurs within the first week of life, most often within the first 3 days after birth.[2] LOS occurs after the first week of life, often from days 7 through 28 but can occur up to 90 days after birth.[1]

The primary route of transmission for EOS is vertical from the mother to the fetus during the intrapartum period, whereas LOS may be acquired through exposure to environmental contaminants from either the hospital or the community.[1] Infections in the neonate predispose the infant to sepsis development due to a weak immune system that is poorly responsive to bacteria.[3] Common infections leading to the development of sepsis include pneumonia, urosepsis, and meningitis. It is important for health care providers to suspect a diagnosis of sepsis in any neonate presenting with a fever. These infants should receive an immediate workup for sepsis and meningitis because of the rapid deterioration of the infant's physical condition.[3]

RISK FACTORS

Maternal diagnoses of intrapartum fever and chorioamnionitis are the most common factors used to identify EOS risk.[4] Chorioamnionitis is caused by vertical transmission of bacterial colonization of the uterus leading to inflammation of fetal membranes. Maternal fever and foul-smelling or cloudy amniotic fluid are the most prevalent symptoms of chorioamnionitis. The Centers for Disease Control and Prevention (CDC) guidelines allow maternal fever to be used as a surrogate for chorioamnionitis and recommend the use of neonatal antibiotics.[4] **Table 1** lists the most common risk factors requiring an EOS evaluation of the neonate.

The infant is protected within the sterile environment of the amniotic sac during pregnancy. However, pathogenic exposure from the birth canal and the environment may occur during labor and the delivery process. Neonatal immunity is received passively through transfer of maternal antibodies across the placenta, with most placental transfer occurring after 30 weeks gestation.[1] The primary form of passive immunity before birth is the transmission of immunoglobulin (Ig)G antibodies. These antibodies help protect the neonate from viruses and bacterial infections. Newborns lack IgA, IgE, and IgM antibodies because they do not readily cross the placenta. This leaves the neonate vulnerable to gram-negative organisms and certain viruses.[3] Active immunity is not developed at birth, leaving neonates susceptible to infection.

Premature infants, especially those less than 30 weeks gestation, are at higher risk of developing EOS than term infants owing to an immature immune system and lack of

Table 1
Risk factors necessitating early-onset sepsis evaluations in the neonate

Maternal Factors	Fetal Factors
Intrapartum maternal fever 38.0° – 38.2° C	Fetal tachycardia
Obstetric diagnosis of chorioamnionitis	Gestational age <37 wk
Prolonged ROM ≥24 h	Low birthweight infants
Premature rupture of membranes	Low Apgar score (<6 at 1 or 5 minutes)
GBS-positive or unknown status	Birth asphyxia
Inadequate GBS intrapartum antibiotic prophylaxis (IAP)	Meconium staining
IAP given <4 h before delivery	Congenital anomalies
No IAP given	
Poor prenatal care	

Abbreviation: ROM, rupture of membranes.
Data from Refs.[1,5,6]