

A 6-day-old infant is brought to the emergency department by his mother for lethargy and poor feeding. The mother's medical history is unremarkable. The pregnancy and delivery were uneventful, but she did not have adequate prenatal checkups and care.

Physical examination of the infant shows hypotonia, poor reflexes, and bulging fontanelles. Temperature is 39.4° C (103° F). Initial laboratory studies show a white blood cell count of 16,000/ $\mu$ L with 20% bands. What is the most likely cause of this infant's condition?

- ☐ A. Group B *Streptococcus*
- ☐ B. *Haemophilus influenzae*
- ☐ C. Herpes simplex virus
- ☐ D. *Listeria monocytogenes*
- ☐ E. *Neisseria meningitidis*
- ☐ F. *Toxoplasma gondii*



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- ☒ A. **Group B Streptococcus** [87%]
- ☐ B. *Haemophilus influenzae* [1%]
- ☐ C. Herpes simplex virus [1%]
- ☐ D. *Listeria monocytogenes* [6%]
- ☐ E. *Neisseria meningitidis* [2%]
- ☐ F. *Toxoplasma gondii* [2%]

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Explanation:

User Id: [REDACTED]

Causes of neonatal bacterial sepsis & associations	
Group B <i>Streptococcus</i> and <i>Escherichia coli</i>	Most common causes of early- & late-onset sepsis
<i>Staphylococcus aureus</i>	Associated with skin, bone, or joint infections
<i>Listeria monocytogenes</i>	Causes early-onset sepsis during outbreak of listeriosis
<i>Enterococcus</i>	Causes sepsis in preterm infants
Coagulase-negative staphylococcus	Affects infants with indwelling intravascular catheters
Other Gram-negative bacteria (eg, <i>Klebsiella</i> ,	Causes late-onset sepsis especially in infants in



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Other Gram-negative bacteria (eg, <i>Klebsiella</i> , <i>Enterobacter</i> , <i>Pseudomonas aeruginosa</i> )	Causes late-onset sepsis especially in infants in intensive care units

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This patient's presentation suggests neonatal sepsis, a systemic bacterial infection that occurs in infants <28 days old. Although Group B *Streptococcus* (GBS) sepsis rates have declined due to universal screening and use of intrapartum antibiotic prophylaxis, **GBS** and *Escherichia coli* continue to be the most frequent causes of both early-onset (age ≤3-7 days) and late-onset sepsis. Infection with these pathogens occurs during passage through the birth canal. Studies have shown that sepsis in most term infants is due to GBS, whereas preterm infants are infected with *E coli*.

Signs and symptoms of sepsis include poor oral intake, irritability, hyper/hypothermia, respiratory distress, vomiting, and jaundice. Patients with bacterial meningitis may also have hypotonia, full or bulging fontanelles, nuchal rigidity, and seizures. Evaluation of neonatal sepsis involves obtaining complete blood count and blood and cerebrospinal fluid cultures prior to administering systemic antibiotics (**ampicillin plus gentamicin**). Neutrophilia with a significant left shift (bands of >700/μL or a band to total neutrophil count ratio >0.16) usually indicates neonatal sepsis from bacterial infection.

(Choice B) Infants and children who are not immunized for *Haemophilus influenzae*



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**(Choice B)** Infants and children who are not immunized for *Haemophilus influenzae* type b (Hib vaccine) are at risk for meningitis (as well as pneumonia and epiglottitis) caused by the organism. However, *H. influenzae* is not a common cause of sepsis in newborns.

**(Choice C)** Neonates with herpes simplex virus (HSV) encephalitis usually present with seizures. The infection is acquired during delivery from the genital tract of the mother with HSV disease. This patient's mother has no history of HSV and is not a likely cause of this patient's symptoms.

**(Choice D)** *Listeria monocytogenes* is the third most common cause of neonatal meningitis and is transmitted from mother to newborn. Pregnant women with listeriosis have nonspecific flulike symptoms such as fever, body aches, and fatigue prior to delivery. This patient's delivery was uncomplicated, making *Listeria* unlikely to be the cause of his symptoms.

**(Choice E)** Meningococcal meningitis most commonly occurs in individuals age 3 years to adolescence. About 75% of patients present with a petechial rash that appears within 24 hours of the infection and is prominent on the axilla, wrists, flanks, and ankles.

**(Choice F)** This patient does not present with signs and symptoms of congenital toxoplasmosis, which include maculopapular rash, hepatosplenomegaly, microcephaly, chorioretinitis, hydrocephalus, and intracranial calcifications.

#### Educational objective:

Group B *Streptococcus* (GBS) and *Escherichia coli* are the most common causes of neonatal sepsis. Prevention of GBS infection includes maternal testing and treatment with intrapartum intravenous antibiotics (eg, penicillin).

#### References:

1. [Early onset neonatal group B streptococcal sepsis.](#)