

Bacterial Meningitis in Infants



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KEYWORDS

- Neonatal bacterial meningitis • Very low birth weight • Lumbar puncture
- Cerebrospinal fluid • Antibiotics • Vaccine

KEY POINTS

- Neonatal bacterial meningitis is uncommon but is associated with high mortality and morbidity.
- Group B *Streptococcus* (GBS) is the most common cause of neonatal meningitis.
- *Escherichia coli* has recently become the most common pathogen isolated from very low birth weight infants with meningitis.
- Infants with culture-proven meningitis can have negative blood cultures and normal cerebrospinal fluid parameters.
- All infants showing signs of infection and with suspected early-onset or late-onset sepsis should undergo a lumbar puncture.
- A GBS vaccine for the prevention of neonatal GBS disease including meningitis is currently under development.

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INTRODUCTION

Bacterial meningitis is a serious infection associated with high mortality and morbidity in the neonatal population. Prompt diagnosis and treatment are essential to achieving good outcomes in affected infants. Although overall incidence and mortality have declined over the last several decades, morbidity associated with neonatal meningitis remains virtually unchanged.^{1,2} Prevention strategies, adjunctive therapies, and improved diagnostic strategies have been the focus of recent research seeking to improve the outcomes.³

DESCRIPTION OF THE DISEASE

Meningitis is the acute inflammation of the meninges, subarachnoid space, and brain vasculature resulting from infection.⁴ Neonatal meningitis is categorized as early and late onset, which is defined by the presence of signs of infection and organism isolation from cerebrospinal fluid (CSF) cultures at less than or equal to 72 hours and greater than 72 hours of life, respectively.^{3,5–7}

EPIDEMIOLOGY

The incidence of neonatal meningitis varies by geographic location (Fig. 1).^{8–10} Compared with older age groups, the incidence of meningitis is highest during the neonatal period.^{9,16}

Developed Countries

The incidence of culture-proven neonatal meningitis is estimated at 0.3 per 1000 live births in developed countries.^{2,10,16} However, this number is likely an underestimation of the true incidence. For infants in the intensive care nursery who are evaluated for sepsis, 30% to 50% do not have a lumbar puncture (LP) performed.^{6,17} When an LP is performed, more than 75% of the time it occurs after the initiation of antibiotics, possibly biasing CSF culture results.^{6,17,18}

In developed countries, mortality from neonatal meningitis ranges from 10% to 15%.^{2,8} In a prospective study including 444 cases of confirmed meningitis from 2001 to 2007, mortality in premature infants compared with term infants was more

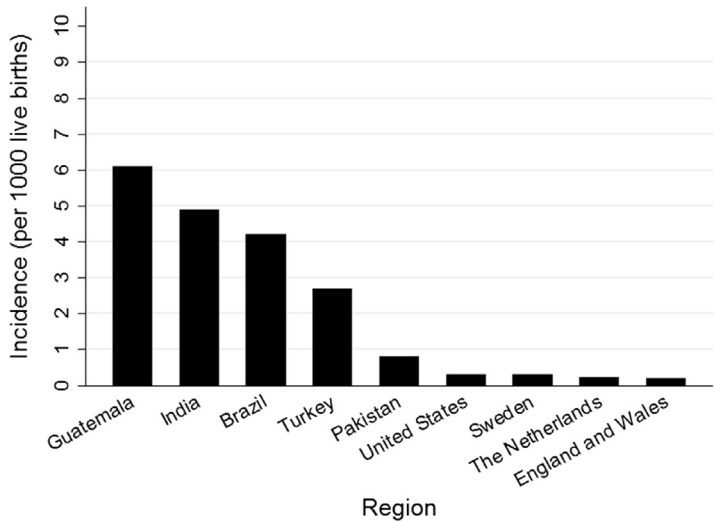


Fig. 1. Incidence of neonatal meningitis across the world. (Data from Refs.^{2,11–15})

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