



Haemophilus influenzae type B (HiB) Disease

Hib disease, primarily pneumonia and meningitis in young children, is a significant public health concern in many parts of the world where large-scale Hib immunization has not yet been implemented. The majority of Hib morbidity and mortality occurs in developing countries. The disease burden is the highest among those aged between 4 months and 18 months, but Hib disease is occasionally observed in infants aged <3 months and among those aged >5 years. In unvaccinated populations, Hib is the dominant cause of non-epidemic bacterial meningitis during the first year of life. Even with prompt and adequate antibiotic treatment, 3–20% of patients with Hib meningitis die. Where medical resources are limited, fatality rates for Hib meningitis may be much higher, and severe neurological sequelae are frequently observed in survivors (in up to 30–40%). Other important but less frequent manifestations of Hib infection include septicaemia, septic arthritis, osteomyelitis, pericarditis, cellulites and, particularly in industrialized countries, epiglottitis.

Causative organism

Hib disease is caused by a bacterium, *Haemophilus influenzae*. *H. influenzae* is a Gram-negative coccobacillus that affects only humans. There are six different types of these bacteria (a through f). Type b organisms account for 95% of all strains that cause invasive disease, and this is the type against which the Hib vaccine protects.

Mode of transmission

Spreads as droplet infection and discharges from nose and throat during the infectious period. The portal of entry is most commonly the nasopharynx.

Pathogenesis

H. influenzae type b, is a common commensal in the nasopharynx of children. In the pre-vaccination era, the majority of non-immune children were colonized by Hib in their nasopharynx at some time, occasionally for months, although the bacterial colonization rate varied considerably with age and socioeconomic factors. Nasopharyngeal colonization of this agent drops dramatically in populations where Hib immunization has achieved high coverage. Only a tiny fraction of those who harbour this organism on their respiratory mucosa will subsequently develop clinical disease.

Incubation period

The period between exposure to Hib and the beginning of symptoms is unknown, but is probably short (2-4 days).

Communicability: The contagious potential of invasive Hib disease is considered to be limited. However, in certain circumstances, particularly close contact with a case-patient (e.g., household, child care, or institutional setting) can lead to outbreaks or direct secondary transmission of the disease.

Clinical Features

Invasive disease caused by *H. influenzae* type b can affect many organ systems. The most common types of invasive disease are meningitis, epiglottitis, pneumonia, arthritis, and cellulitis. Hallmarks of Hib meningitis are fever, decreased mental status, and stiff neck. Hearing impairment or other neurologic sequelae occur in 15%–30% of the survivors. The case-fatality rate is 2%–5%, despite appropriate antimicrobial therapy. Epiglottitis may cause life-threatening airway obstruction. Septic arthritis (joint infection), cellulitis (usually involves face, head, or neck), and pneumonia (which can be mild focal or severe empyema) are common manifestations of invasive disease. Osteomyelitis and pericarditis are less common forms of invasive disease.

Laboratory Diagnosis

A Gram stain of an infected body fluid may demonstrate small gram-negative coccobacilli suggestive of invasive *Haemophilus* disease. CSF, blood, pleural fluid, joint fluid, and middle ear aspirates should be cultured on appropriate media. A positive culture for *H. influenzae* establishes the diagnosis.

Antigen detection may be used as an adjunct to culture, particularly in diagnosing *H. influenzae* infection in patients who have been partially treated with antimicrobial agents, in which case the organism may not be viable on culture. Two tests are available. Latex agglutination is a rapid, sensitive, and specific method to detect Hib capsular polysaccharide antigen in CSF, but a negative test does not exclude the diagnosis, and false-positive tests have been reported.

Treatment

Antimicrobial therapy with an effective third-generation cephalosporin (cefotaxime or ceftriaxone), or chloramphenicol in combination with ampicillin should be begun immediately.

Patients are no longer infectious 24-48 hours after receiving effective antimicrobial therapy.

Control and preventive measures

Haemophilus disease is potentially preventable by vaccination and chemoprophylaxis under specific circumstances. Close contacts of a person infected with Hib may require immediate preventative antibiotics depending on circumstances.

Vaccination

All infants should receive doses of Hib conjugate vaccine as part of their routine immunization (unless they have a medical reason not to). As Hib disease is rare in children older than five years of age. Hib vaccine is not routinely recommended for people aged five years or older.

Chemoprophylaxis

Rifampicin prophylaxis (20 mg/kg once daily for four days, maximum dose 600mg/day) was used in **close** contacts [including adults] of children with *Haemophilus influenzae* type b (HIB) disease.