

4.3 *Haemophilus influenzae*, serotype B, invasive disease

Etiology

Haemophilus influenzae (*H. influenzae*) disease is caused by the bacterium *Haemophilus influenzae*. There are six identifiable types of *Haemophilus influenzae* bacteria (a through f) and other non-identifiable types (called non-typeable). *Haemophilus influenzae* type b (Hib) is the most common type and is the only type that is vaccine preventable. All laboratory confirmed invasive *Haemophilus influenzae* disease cases are reportable. The case definition for invasive non-type B is found at the following link:

http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/09vol35/35s2/Haemo_non_b-eng.php

Case Definition

Confirmed Case

Clinical evidence of invasive disease² with laboratory confirmation of infection:

- isolation of *H. influenzae* (serotype b) from a normally sterile site **OR**
- isolation of *H. influenzae* (serotype b) from the epiglottis in a person with epiglottitis

Probable Case

Clinical evidence of invasive disease with laboratory evidence of infection:

- demonstration of *H. influenzae* type b antigen in cerebrospinal fluid **OR**
- demonstration of *H. influenzae* DNA in a normally sterile site **OR**
- buccal cellulitis or epiglottitis in a child < 5 years of age with no other causative organisms isolated **OR**
- demonstration of *H. influenzae* type b antigen in cerebrospinal fluid

Clinical Presentation

Haemophilus influenzae serotype b (Hib) can cause pneumonia, bacteraemia, meningitis, epiglottitis, septic arthritis, cellulitis, otitis media and purulent pericarditis. The onset of symptoms is usually sudden with development of symptoms associated with the disease presentation; for example, with Hib meningitis symptoms may include fever, vomiting, lethargy, headache and stiff neck.

² Clinical illness associated with invasive disease due to *H. influenzae* includes meningitis, bacteraemia, epiglottitis, pneumonia, pericarditis, septic arthritis and empyema.

Diagnosis

The diagnosis is made by the isolation of the *Haemophilus influenzae* organism from a normally sterile site. For confirmation on laboratory specimens go to the public health laboratory web site www.publichealthlab.ca or call 709-777-6583.

Epidemiology

Occurrence

Worldwide, Hib disease is estimated to cause three million cases of meningitis and severe pneumonia and approximately 386,000 deaths worldwide per year in children aged <5 years. In developed countries, the incidence of Hib disease has dramatically declined since the introduction of the Hib conjugate vaccine in 1988. In Canada the incidence rate has declined from 1.9 per 100,000 in 1989 to 0.2 per 100,000 in 2004. In Newfoundland Labrador, there have been four cases of Hib reported from 1998 to 2015. Invasive *Haemophilus influenzae* non-type B has also been identified in the elderly and is a notifiable disease.

Reservoir

Humans are the only known reservoir.

Transmission

The mode of transmission is person-to-person by inhalation of respiratory droplets or by direct contact with respiratory tract secretions.

Incubation Period

The incubation period is unknown but believed to be short, 2 – 4 days.

Communicability

It is communicable seven days prior to the onset of symptoms until the case has been on effective antibiotic therapy for 24 hours. If untreated Hib is communicable as long as organisms are present.

Control Measures

Management of Case

Investigations

- Verify the diagnosis and confirm the serotype with the laboratory
- Obtain a case history
- Estimate the period of communicability
- Review immunization status
- Identify contacts

Treatment

- Prompt treatment with an antibiotic is required

- Droplet precautions are recommended for hospitalized cases until the case has had 24 hours of effective antibiotic therapy
- Determine if the case needs chemoprophylaxis. It is not indicated in cases treated with cefotaxime or ceftriaxone as these drugs eradicate Hib from the nasopharynx.

Immunization

Complete the age appropriate vaccine schedule according to the Newfoundland and Labrador Immunization Manual available on the web site

http://www.health.gov.nl.ca/health/publichealth/cdc/S2_Routine_Imztn_Schedules_060116.pdf

Exclusion

Isolation of the case from household contacts may be of little benefit since the infection has usually spread by the time the first case is suspected.

Management of Contacts

Contact tracing needs to begin immediately after identification of a case. It is important to identify exposed, unimmunized or incompletely immunized children who are household, child care or nursery school contacts.

Definitions

Household Contact

- An individual residing with the case or has spent 4 or more hours per day with the case for at least 5 of the 7 days preceding the day of hospital admission of the case (not school contacts). This includes people who share sleeping arrangements, such as in a dormitory setting. It is assumed that when children have spent 4 or more hours together per day, they are likely to have napped and/or eaten together, which increases transmission risk.

Childcare contact

- A contact who has attended a childcare or nursery school center where an infected individual has been identified.

Immunoprophylaxis

Post-exposure is an ideal opportunity to review and update the immunization status of contacts. Post-exposure Hib immunization is not known to decrease the risk of transmission.

Chemoprophylaxis

The aim of chemoprophylaxis is to eliminate nasopharyngeal carriage of Hib bacteria and prevent transmission.

Chemoprophylaxis is recommended for all household contacts in the following circumstances:

- Household with at least one contact younger than four years of age who is unimmunized or incompletely immunized (as per Newfoundland and Labrador Immunization Manual)
- Households with a child younger than 12 months of age who has not completed the primary Hib series (3 dose primary series)
- Households with a contact who is an immunocompromised child, regardless of that child's Hib immunization status
- Childcare and preschool contacts when two or more cases of Hib invasive disease have occurred within 60 days and unimmunized or incompletely immunized children attend the childcare facility or preschool

Chemoprophylaxis is not required for:

- Contacts of invasive *Haemophilus influenzae* (not type b) cases
- Household contacts of invasive Hib infection when the contacts have completed the Hib vaccine series
- Occupants of households with no children younger than four years of age other than the index patient
- Childcare and preschool contacts of one index case
- Pregnant women

Product

- Rifampin eradicates Hib from the pharynx in approximately 95% of carriers and decreases the risk of secondary invasive illness in exposed household contacts.
 - Rifampin is given once per day for four days
 - Weight of child is required for dosage
 - MOH provides the prescription
 - Rifampin is available for contacts of Hib disease at no charge

Exclusion

Contacts do not need to be excluded from any routine activities.

Management of Outbreaks

An outbreak management team should be established to address infection prevention and control measures at the discretion of the MOH.

Education and Preventive Measures

- Careful observation of exposed, unimmunized or incompletely immunized children who are household, childcare or preschool contacts of patients with invasive Hib disease is essential. Exposed children who develop symptoms should receive immediate medical evaluation.
- The early prevention of Hib disease through immunization remains the first line of defense against the disease and its circulation.
- Provide information on the disease and symptoms
 - A fact sheet is available on website
<http://www.phac-aspc.gc.ca/im/vpd-mev/hib-eng.php> OR
[http://www.health.gov.nl.ca/health/publichealth/cdc/infectioncontrol/Haemophilus%20influenzae%20type%20b%20\(Hib\)%20May%202013.pdf](http://www.health.gov.nl.ca/health/publichealth/cdc/infectioncontrol/Haemophilus%20influenzae%20type%20b%20(Hib)%20May%202013.pdf)

Reporting Requirements and Procedures

- The laboratory (hospital or public health laboratories) report case/s to the attending physician, the Chief Medical Officer of Health and the Medical Officers of Health (MOH)
- MOH office will notify, as required, local physicians, nurse practitioners, environmental health officers, community health nurses, communicable disease control nurses (CDCNs) and Infection control practitioners (ICP), in the particular region as required for follow-up and case investigation
- The CDCN in collaboration with the ICP (if necessary) will collect case details
- The CDCN will enter the case details into the electronic reporting system and utilize the Canadian Network of Public Health Intelligence (CNPHI) tool for alerts and/or outbreak summaries

Provincial Disease Control

- Reports the aggregate case data to Public Health Agency of Canada
- Provides an analysis of the case/s with reports in the Quarterly Communicable Disease Report (CDR), also posted on the Public Health website
- Coordinates the response if an outbreak occurs across RHAs

References

American Academy of Pediatrics. *Haemophilus influenzae* Infections. IN: Pickering LK, Baker CJ, Kimberline DW, Long SS, eds. *Red Book: 2012 Report of the Committee on Infectious Diseases*. Elk Grove Village, IL: American Academy of Pediatrics; 2012: 345-352.

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