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Update on *Haemophilus influenzae* Type a Invasive Disease — Alaska, 2002–2013

Background

Haemophilus influenzae (Hi) is a gram-negative coccobacillus that can cause severe pneumonia and invasive infections, such as bacteremia, meningitis, epiglottitis, cellulitis, and infectious arthritis. There are six typeable Hi serotypes, designated a–f, which have distinctive capsular polysaccharides; unencapsulated Hi bacteria are designated as nontypeable. Transmission typically occurs through the respiratory droplet route; however, neonates can acquire infection through aspiration of amniotic fluid or through contact with genital tract secretions during birth. The incubation period of Hi disease is unknown.

Before introduction of Hi serotype b (Hib) vaccines, rates of invasive Hib disease in Alaska Native people were among the highest in the world. Following the introduction of the Hib conjugate vaccine in 1991, the incidence of Hib declined dramatically. However, since 2002, invasive Hi serotype a (Hia) disease has emerged in Alaska,[1] which can cause disease similar to Hib infections. There is no vaccine currently available for Hia or other non-b Hi infections.

Methods

The Arctic Investigations Program, Centers for Disease Control and Prevention (AIP-CDC), has conducted statewide laboratory-based surveillance for invasive Hi since 1980. Invasive Hi disease is reportable to the Alaska Section of Epidemiology (SOE), and collaborative data reporting occurs between SOE and AIP-CDC. The gold standard test for confirming a case of invasive Hi disease is isolation of Hi from a normally sterile site (e.g., blood, cerebrospinal fluid, pleural fluid, peritoneal fluid, or joint fluid); however, Hi cases can also be confirmed through polymerase-chain reaction analysis of a clinical specimen obtained from a normally sterile site in culture-negative patients with a clinically-compatible illness. Laboratories send Hi isolates to AIP-CDC for confirmation and serotyping. Demographic and illness-related data are collected for each identified case.

Results

The first invasive Hia case was identified in Alaska in 2002. During 2002–2013, 215 Hi cases were reported; of these, 104 had identifiable serotypes, 101 were nontypeable, and 10 did not have isolates available for typing. Of the 104 identifiable serotypes, the most frequently identified types were Hia (n=40, 39%), Hib (n=27, 26%), and Hif (n=27, 26%).

Of the 40 Hia cases identified, 31 (89%) were in Alaska Native persons, and 26 (65%) were in males. The median age of infected persons was 8 months (range: 3 months to 48 years), and 28 (70%) were in children aged <1 year. Thirty-two (80%) occurred in the Yukon-Kuskokwim Delta region (Figure). The most common clinical syndromes were meningitis (40%), pneumonia with bacteremia (26%), septic arthritis (17%), and cellulitis (9%). Thirty-four (85%) infected persons were hospitalized, and three (9%) died. Of the 25 isolates tested for antimicrobial susceptibility, all were susceptible to ampicillin, chloramphenicol, and ceftriaxone; 13 (52%) isolates showed either intermediate or full resistance to trimethoprim-sulfamethoxazole.

During 2002–2013, the incidence of invasive Hia infection was 20.7 per 100,000 persons for all Alaska children aged <1 year, 69.6 per 100,000 persons for all Alaska Native children aged <1 year, and 318.6 per 100,000 persons for Alaska Native children aged <1 year who were living in the Yukon-Kuskokwim Delta region.

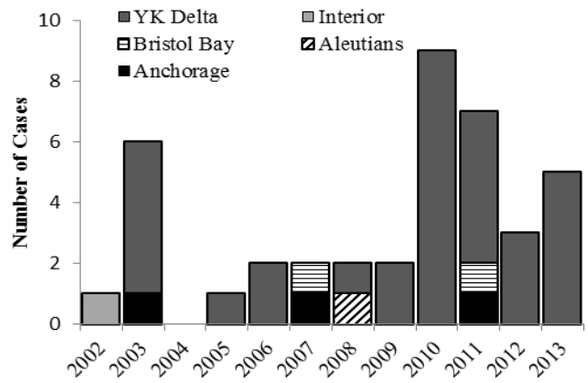
Discussion

Invasive Hia infection has become an important public health problem in Alaska, particularly among Alaska Native children. During 2002–2013, the incidence of Hia among children aged <1 year living in the Yukon-Kuskokwim Delta region (318.6 per 100,000) was 17% higher than the incidence of Hib among all Alaska children aged <1 year in 1990 (272.8 per 100,000), the year before the Hib vaccine was available in Alaska. Moreover, the Hia rates in Alaska are considerably higher than the U.S. estimated rate of 2.4/100,000 for all non-b Hi serotypes, as reported by CDC's Active Bacterial Core Surveillance program for 2011.[2] Even higher rates of invasive Hia disease have been reported among indigenous children living in northern Canada.[3,4]

We reviewed Hi isolate data (both from patients with invasive disease and from carriage studies) at AIP-CDC going back to 1983, and found no evidence of confirmed Hia isolates in Alaska before 2002; however, because Hi surveillance was historically focused on Hib, it is possible that sporadic Hia cases in Alaska were missed prior to 2002.[1]

The incidence of Hia in Alaska has increased considerably in recent years; this is concerning because of the clinical severity of disease caused by Hia and the lack of a vaccine. Epidemiologists from AIP-CDC and the Alaska Section of Epidemiology are working collaboratively with health care providers to better characterize the epidemiology, severity, and natural history of Hia disease, which could contribute towards the development of an Hia vaccine.

Figure. Geographic Distribution of Invasive Hia Cases in Alaska — 2002–2013



Recommendations

1. Report cases of invasive *H. influenzae* to the Alaska Section of Epidemiology at 907-269-8000 (or 800-478-0084 after hours). All *H. influenzae* isolates should be sent to AIP-CDC where serotyping is performed. Call 907-729-3400 for shipping details.
2. There is currently insufficient evidence to support the routine chemoprophylaxis of close contacts to Hia cases, since secondary cases are rarely identified.

References

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