

# *Hemophilus influenzae* serotype-*b* meningitis in an adult immunocompetent patient

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## ABSTRACT

We present a case of meningitis caused by *Hemophilus influenzae type-b* in an immunocompetent 41-year-old Saudi lady. The patient was successfully treated with Ceftriaxone for 10 days. A review of *Hemophilus influenzae* meningitis in adults and the impact of conjugated vaccine on the epidemiology of the disease are given.

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*Hemophilus influenzae type-b (Hib)* is the leading cause of invasive infections such as meningitis and septicemia in children younger than 5 years.<sup>1</sup> Conjugative vaccines have had a dramatic effect on the epidemiology of the disease in this age group.<sup>2-4</sup> *Hemophilus influenzae type-b* has been recognized as a pathogen in adults particularly those with underlying illnesses.<sup>5-7</sup> Other reports suggest that the increasing incidence in such adults may be due to failure of natural acquisition of immunity to *Hib* or waning immunity with aging.<sup>8</sup> In addition, non-typable strains of *Hemophilus influenzae (Hi)* have also been isolated from adults with underlying illnesses with infections such as meningitis, pneumonia and septicemia.<sup>6,7,9</sup> On the contrary, there is a report from Alaskan natives indicating a decrease of *Hib* infections among adults after introducing the *Hib* conjugate vaccine program.<sup>10</sup> We report a case of meningitis caused by *Hib* in an apparently immunocompetent adult.

**Case Report.** A 41-year-old Saudi female patient was admitted to a medical ward with a 3 day history of

fever, chills and rigors associated with headache and vomiting. A day after onset of fever, she complained of right flank pain. She denied any further symptoms suggestive of genitourinary disorder. She had no past history of note, except for nasal polypectomy 10 months earlier, which was followed by episodes of cerebrospinal fluid (CSF) leak. Physical examination revealed an ill-looking patient, pyrexial, (38.3°C), conscious and alert with no signs of meningeal irritation. Abdomen was tender at both flanks and right hypochondrium with no palpable masses or organomegaly. Initial investigations: white blood cell count of  $21.5 \times 10^9/L$  with 91% neutrophils, erythrocyte sedimentation rate 122 mm/hour; other parameters were within normal. A midstream urine microscopy revealed 25 white blood cells/mm<sup>3</sup> and 190 red blood cells/mm<sup>3</sup>. A working diagnosis of acute pyelonephritis was made. Other investigations to rule out perinephric or hepatic abscess were made. She was put on ampicillin and gentamicin. However the patient did not show clinical response and remained febrile 24 hours after starting antibiotics. Abdomen ultrasound was unremarkable. Gram stain of

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positive blood culture [BacT-Alert 3D, Organon Teknika, United States of America, (USA)] showed Gram-negative coccobacilli. At this stage of her condition, the infectious diseases team was consulted. The patient was seriously ill with high fever (39°C), stiff neck, positive Kernig's sign, mentally alert and had normal fundoscopy. Clinical diagnosis of acute pyogenic meningitis was made and antibiotics changed to intra-venous ceftriaxone 4g/day. An urgent brain computerized tomography scan was carried out which did not contraindicate lumbar puncture. It showed no evidence of CSF leak or other abnormalities. Subsequent CSF examination revealed a turbid CSF with white blood cells count of 1200/mm<sup>3</sup> with 75% polymorphs and 25% lymphocytes, red blood cells were 100/mm<sup>3</sup>, glucose=0.4 mmol/L (2.5-4 mmol/L) and protein=4.4 g/L (0.15-0.4 g/L). Gram stain showed gram negative coccobacilli. Latex agglutination of CSF was positive for *Hib* (Wellcogen Bacterial antigen Kit, Murex biotech Limited, United Kingdom). The isolate from blood culture was identified as -lactamase producing *Hib* susceptible to cefuroxime, ceftriaxone, cefotaxime, gentamicin, chloramphenicol, ciprofloxacin and imipenem. The CSF culture was however negative. Immunoglobulin study was normal. Other investigations were all normal. The patient improved within 48 hours of starting ceftriaxone. A repeat lumbar puncture before discharge revealed Xanthochromic but clear CSF. She was discharged after 10 days of antibiotic course. The patient was seen 6 weeks after discharge where she was normal with no sequel.

**Discussion.** Adult cases of *Hib* meningitis are infrequent and often follow remote head trauma; prior neurosurgery or upper respiratory tract infections.<sup>5,7,11</sup> In our patient the meningitis may be associated with the previous nasal polypectomy and CSF leak. This association has also previously been reported.<sup>5,7,12</sup> Most infectious agents were suspected to reach the central nervous system by hematogenous spread, or by retrograde propagation of infected thrombi, or occasionally through bone but not through olfactory nerve.<sup>13</sup> Clinical features of meningitis in adults are similar to those in children.<sup>5,7,11</sup> However in our case only fever and headache were initially present. The neck stiffness followed later. Some studies report neck stiffness in most cases while other studies do not.<sup>11,14</sup> Our patient was conscious and had no seizures. This in contrast to the findings of Sigurdardottir et al<sup>7</sup> in which 60% of their patients had alteration in consciousness and 11% had alteration in seizures.

In KSA, the incidence of *Hib* disease dramatically decreased after the implementation of routine infant vaccination with conjugated *Hib* vaccine.<sup>2,15</sup> This was documented in one study by increased serum antibody level in response to the vaccine.<sup>15</sup> In the USA, the impact of large scale vaccination of children made *Hib* meningitis a disease of adults rather than infants and

young children.<sup>16</sup> Non-type *b-Hi* pathogen may have increased due to less competition from *Hib* in colonizing the nasopharynx.<sup>3,8,10,17,18</sup> It is too early to evaluate the effect of *Hib* vaccine in the epidemiology of invasive diseases in the KSA. The vaccine use became mandatory only recently, although since its approval by the food and drug administration, it has been available in certain private children clinics throughout the KSA since 1990.

In conclusion, meningitis and other invasive diseases due to *Hi* can occur in adult patients particularly those with underlying diseases as well as those with competent immune system. A population based surveillance program is recommended to study diseases due to *Hib* (and other serotypes) among adults in the KSA.

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