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Although the report by Apisarnthanarak et al. [1] showed possible characteristic features, these findings were based on only 3 patients. There are other clinical and initial laboratory findings that have been reported regarding the characteristics of B. pseudomallei liver abscess [4]. In my local region, we always consider B. pseudomallei as a possible etiology in all cases of liver abscess, particularly in patients with diabetes (previously known or newly diagnosed) or any other underlying immunocompromising conditions, such as malignancies and post-chemotherapy. The standard antibiotic regimen for sepsis at my institution consists of amoxicillin and clavulanic acid (with or without metronidazole), which provides coverage for infections caused by both B. pseudomallei and Klebsiella species. Third-generation cephalosporin is added if there is a high suspicion for B. pseudomallei infection. The presence of a honeycomb appearance on a CT scan may be helpful, but the absence of such findings should not detract the possibility of B. pseudomallei infection. Whether this CT finding is characteristic for B. pseudomallei liver abscess needs further evaluation using a larger sample size.

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Parents of all participating children. Informed consent was obtained from the Turku University Hospital, and written, approved by the ethics committee of clinically indicated. The study protocol was Dickinson), were performed when clinically indicated. The study protocol was using specific probes [3]. Viral antigen detection in nasopharyngeal aspirates [4], as well as blood cultures for bacteria (Bactec Peds Plus/F or Bactec Plus/F; Becton-Dickinson), were performed when clinically indicated. The study protocol was approved by the ethics committee of Turku University Hospital, and written, informed consent was obtained from the parents of all participating children.

The study included 170 hospitalization episodes among 163 children. Nine cases of bacteremic pneumococcal infections were detected among these patients. The clinical characteristics are shown in table 1. Respiratory viruses were detected in 7 (78%) of the 9 children (3 enteroviruses, 2 rhinoviruses, and 2 RSV). Respiratory symptoms preceded the development of more severe illness with high fever, suggesting that viral infection paved the way for pneumococcal invasion.

Our findings lend support to the epidemiologic and laboratory studies that link invasive pneumococcal disease with respiratory virus infections, in most cases with influenza virus or RSV infection [1, 5–7]. In a report published 20 years ago [8], respiratory viruses were detected in 40% of children with bacterial meningitis using serological methods (31%) and virus isolation (15%). Respiratory viruses have not been previously studied in children with invasive bacterial infection using sensitive PCR methods. Our findings suggest that rhinovirus and enterovirus infections may be important predisposing factors for invasive pneumococcal infections in children. Rhinoviruses are the most frequent cause of respiratory infections among children and adults [4, 9]. Enteroviruses are closely related to rhinoviruses, and recent studies using RT-PCR suggest that their role in respiratory infections is much more significant than previously realized [10, 11]. The association between rhinoviruses and enteroviruses and pneumococcal infections is also supported by epidemiologic data. The biphasic pattern of pneumococcal disease in children, with peaks in the autumn and spring and a decrease in the midwinter [12, 13], is remarkably similar to the seasonal pattern of rhinovirus and enterovirus infections [14].

Studies using surveillance data do not reveal the full impact of rhinoviruses and enteroviruses on the development of invasive bacterial infections, because these viruses are rarely searched for in patients with common respiratory infections using efficient RT-PCR methods. Systematic studies of these associations are needed, because it is likely that several currently unknown interactions between viral, bacterial, and host factors play important role in the pathogenesis of infectious diseases.

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