A pediatric case of bacteremia and possible cholecystitis, due to Moraxella osloensis

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SHORT COMMUNICATION

A PEDIATRIC CASE OF BACTEREMIA AND POSSIBLE CHOLECYSTITIS, DUE TO MORAXELLA OSLOENSIS

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Running title: A pediatric case of M. osloensis bacteremia

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Abstract

We have experienced a pediatric case of bacteremia and possible cholecystitis due to Moraxella osloensis, treated successfully. We confirmed the diagnosis with the presence of high-titer antibody to the organism in the patient’s serum. And also 16S rRNA sequencing was performed for identification of the bacteria.
Case Report

*Moraxella osloensis* is an aerobic, oxidase-positive, Gram-negative coccobacillus, and has been isolated widely from environments, including hospital settings and also it is thought to be commensal of human upper respiratory tract (1). It is not known well as human pathogen unlike *M. catarrhalis*. We have experienced a pediatric case of bacteremia and possible cholecystitis due to *M. osloensis*.

The patient was 9 year-old boy, who had been hospitalized for long-term because of cerebral palsy due to severe birth asphyxia and hypoxic ischemic encephalopathy. He had had tracheostomy and been mechanically ventilated since his infancy. He had been dependent on parenteral nutrition via central venous catheter for years, having many catheter related blood stream infections. Eventually, enteral nutrition via nasogastric tube was re-established, therefore central line had been removed when he was 9 years and 5 months. When his condition was stable, he had been able to spend at home for several days to weeks between hospitalizations.

Past infectious disease history included multiple urinary tract infections, blood stream infections (due to *S.aureus*, Bacillus species, *C.parapsilosis*, etc.), and cholecystitis/cholangitis due to choledolithiasis.

One month after the removal of the central venous catheter, the patient had developed low grade fever, tachycardia with cool extremities (or, hypoperfusion). He was admitted to Nagano Children’s Hospital, and his urine and blood were sent for cultures, and intravenous cefmetazole was started initially, under the suspicion of urinary tract infection. Blood culture had yielded *Moraxella osloensis*. Urine culture yielded *Serratia marcescens*, but it was regarded as contamination. Culture of tracheal aspiration did not yield *Moraxella* species and *Serratia marcescens*. The antimicrobial susceptibility of *M.osloensis* to cefmetazole was excellent (susceptibilities to antimicrobial agents are shown in Table), therefore the antimicrobial had been continued for 10 days.

Laboratory data on admission were as follows: white blood cells 13860/µl, with 86% of neutrophils and 8% of lymphocytes, hemoglobin 15.0g/dl, platelets 17*10^4/mm, ALT 156IU/l, G-GTP 870IU/l, total bilirubin 3.4mg/dl, direct bilirubin 2.7mg/dl (serum levels of bilirubin and liver enzymes had significantly increased from previous values), blood glucose 101mg/dl, CRP 9.1mg/dl.

Abdominal ultrasonography revealed multiple choledolithiasis and wall thickening
of gall bladder, which were compatible of cholecystitis. Infection was treated successfully and the patient had recovered to the previous level of his physical status. We did not perform endoscopic retrograde cholangio-pancreatography (ERCP) or bile fluid culture, because the patient could not endure these invasive procedures.

One set of blood culture was obtained and at 48 h after collection, one aerobic blood culture bottle was positive using the BACTEC FX system (Nippon Beckton Dickinson, Tokyo, Japan), yielding a Gram-negative small rod on Gram stain. The Gram-negative organism was subcultured to blood agar, chocolate agar and Drigalski agar (all Nippon Beckton Dickinson, Tokyo, Japan), all results were positive for bacterial growth, and was identified as *Moraxella* species using ID test HN-20 (Nissui Pharmaceutical, Tokyo, Japan). The isolate was asaccharolytic, oxidase positive, catalase positive and indole negative. The bacterial growth on 0% NaCl nutrient broth was positive. To obtain a definitive identification of the organism, 16S rRNA gene sequencing was performed. The 16S rRNA gene fragments were amplified by standard methods. The coding 16S rRNA region of 1387 bp was directly sequenced as described elsewhere(2) using the DTCS Quick Smart Master Mix kit (Beckman Coulter, Brea, Calif.) and a model CEQ 2000XL DNA analysis system (Beckman Coulter).

Sequencing data were analysed by comparison of the consensus sequences with GenBank sequences using Ribosomal Database Project (RDP)-II data and the Basic Local Alignment Search Tool software (BLAST). The percentage similarities were 99.5% to *Enhydrobacter aerosaccus* type strain ATCC2709 (GenBank/EMBL/DDBJ accession no. AJ550856), but 100% to *M. osloensis* (GenBank/EMBL/DDBJ accession no. AB643591) including non-type strain analysis.

For corroboration of the diagnosis serologically, classical tube agglutination test was performed. Isolated bacterial lawn (the antigen) was suspended into physiological saline, and sterilized with 121°C for 15 minutes. Then the suspension was washed twice, and adjusted to 1.0 McFarland turbidity. The sera of patient and controls were inactivated with 56°C for 30minutes. The serum was diluted serially with physiological saline, prepared into the dilutions of 1:20,
Each 0.5mL of the bacterial suspension was added in 0.5mL of the diluted sera in the tubes, then the tubes were incubated in a 35°C water bath for 6 hours and at room temperature overnight. If agglutination was visible, the results were considered positive. The results were as follows: the titer of our patient was 1:1280, and that of controls (healthy adults) were 1:20, 1:40, 1:20.

There had been several reports about the invasive infections caused by *M. osloensis* in children, as well as in older patients with cancer. To the best of our knowledge, this is the fourth case report of pediatric bacteremia due to this organism(3,4,5).

*Moraxella osloensis* has been isolated widely from environments, including hospital settings and also it is thought to be inhabitant of the human upper respiratory tract (1). *M. osloensis* is rare causative agent for human infections, and most cases reported in immunocompromised patients, such as cancer patients receiving chemotherapy, post- organ transplantation patient (6,7). Serious infections caused by *M. osloensis* are bacteremia, central line associated blood stream infection, meningitis, osteomyelitis, and arthritis.

In pediatric population, there have been 10 case reports of infection attributed to *M. osloensis* (3,4,5,8,9,10,11,12,13). There is no report of *M. osloensis* cholangitis, to the best of our knowledge. This patient has had multiple gall stones for years and history of chronic cholecystitis, therefore the entry of bacteria into the blood stream was supposed to be intestinal tract via bile duct. This hypothesis would be supported by the fact that there was obvious deterioration of cholangitis during the episode and respiratory specimen of the patient did not yield *Moraxella osloensis*.

*M. osloensis* can cause serious infection such as bacteremia. Relatively rare pathogen can cause severe infection in handicapped patients, we should be conscious about these possibilities. And 16S rRNA sequencing analysis is highly useful for detection of bacterial pathogen, especially for uncommon organism.

Conflicts of Interest: None to declare.
REFERENCES


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堀内緒華、久保田紀子、日高恵以子
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