Infection Due to Moraxella osloensis: Case Report and Review of the Literature

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We describe the successful treatment of Moraxella osloensis bacteremia in a 2-year-old boy who presented with fever, petechial rash, and exacerbation of reactive airway disease. We also review the 12 cases previously reported in the literature.

Moraxella osloensis is an aerobic, gram-negative coccobacillus infrequently isolated from clinical specimens. Because of its rarity, the clinical significance and appropriate therapy for patients with infections due to M. osloensis are not well understood. We report a case of a child with M. osloensis bacteremia who presented with fever and petechiae and was successfully treated with iv cephalosporins. We also review the pertinent literature.

Case Report

A 2-year-old Cambodian boy with a history of reactive airway disease was admitted to the hospital with fever, cough, rhinorrhea, wheezing, and posttussive emesis. He had received treatment with albuterol and acetaminophen before presentation. His medical history was otherwise unremarkable. He was born in the United States, and his immunizations were up-to-date.

During physical examination, the child was fussy but alert. His temperature was 38.4°C, heart rate was 189, respiration rate was 35–40, blood pressure was 114/74 mm Hg, and oxygen saturation was 100% while he was breathing room air. Physical examination was notable for an erythematous and inflamed pharynx with tonsillar exudate and audible wheezing with evidence of moderate respiratory distress. The tympanic membranes were normal in appearance and mobility. Scattered petechiae were noted on the lower back, abdomen, groin, and left arm. Capillary refill was brisk. There was no lymphadenopathy. The remainder of the examination was unremarkable.

A chest radiograph revealed mild hyperinflation and atelectasis without infiltrates. Laboratory analyses revealed the following: WBC count, 15,700/mm³ (67% segmented neutrophils, 23% lymphocytes, 6% monocytes, 3% eosinophils, and 1% basophils); hemoglobin level, 12.4 g/dL; and platelet count, 363,000/mm³. The prothrombin and partial thromboplastin times were normal. Specimens of tonsillar exudate, urine, and blood were obtained for culture. Nasopharyngeal washings were sent for viral detection by immunofluorescence. No additional virological studies were performed.

The patient received albuterol, ipratropium bromide, prednisolone, and cefotaxime in the emergency department. Antigens of influenza A and B viruses; parainfluenza virus types 1, 2, and 3; adenovirus; and respiratory syncytial virus were not detected in nasopharyngeal washings by immunofluorescence. The throat culture was negative for group A ß-hemolytic streptococcus. The urine was sterile. The patient recovered uneventfully from his exacerbation of reactive airway disease. Defervescence occurred 8 h after admission, and he remained afebrile and clinically well appearing for the remainder of his hospital course. There was no progression of petechiae. Antimicrobial therapy was changed to iv cefuroxime when M. osloensis susceptible to penicillin, cephalosporins, aminoglycosides, and trimethoprim-sulfamethoxazole was isolated at 36 h from the initial blood culture. A repeated culture of blood obtained before administration of cefuroxime was sterile. The patient was discharged on hospital day 6 to complete a 10-day course of trimethoprim-sulfamethoxazole therapy.

Discussion

The genus Moraxella consists of aerobic, oxidase-positive, gram-negative coccobacilli. Bacteria of the species Moraxella catarrhalis are common inhabitants of the upper respiratory tract and have been implicated as etiologic agents of otitis media, sinusitis, and pneumonia [1]. The species M. osloensis was proposed in 1967 to distinguish a subset of organisms that had formerly been classified as Moraxella nonliquefaciens. The natural habitat of the species M. osloensis and the clinical significance of infections due to this organism are less well studied. The organism has been isolated from environmental sources in the hospital, including anesthetic agents [2] and sink traps [3], suggesting that it may be capable of spreading to patients from the inanimate environment. From 1953 through 1980 the Centers for Disease Control and Prevention (Atlanta, GA) received...
Six of the 12 patients with *M. osloensis* infections described in the literature, including 2 of the 4 with bacteremia whose cases are discussed above, had underlying conditions predisposing them to infection. These conditions included complement deficiency or a CSF shunt in patients with meningitis [12], decubitus ulcers in a paraplegic with subsequent osteomyelitis [13], and alcoholism in a patient with peritonitis and accompanying *Neisseria meningitidis* bacteremia [15]. In a recent review of pediatric cases of bacteremia due to *M. catarrhalis*, 9 patients (41%) had underlying predisposing conditions including prematurity, malignancy, or immune deficiency [19]; in contrast to the current review in which there were no fatalities directly attributable to *M. osloensis* bacteremia, 6 (27%) of 22 pediatric patients with *M. catarrhalis* bacteremia died.

The appropriate treatment of infections due to *M. osloensis* has not been studied. Most isolates reported in the literature have been susceptible to the penicillins, cephalosporins, and aminoglycosides. However, strains of *M. osloensis* resistant to penicillin (MIC, 6.25 μg/mL) have been isolated [7]. The prognosis for patients with *M. osloensis* infections is generally good. Although it appears that infections due to *M. osloensis* cause varying degrees of illness, to our knowledge, there have been no reported fatalities directly attributable to infection with this organism.

In summary, *M. osloensis* is a gram-negative coccobacillus with potential to cause serious systemic disease. Further studies are required to determine the epidemiology, risk factors, and appropriate treatment of infections due to *M. osloensis*.

### Table 1. Clinical manifestations of *Moraxella osloensis* infections.

<table>
<thead>
<tr>
<th>Ref</th>
<th>Age (y), sex</th>
<th>Underlying condition(s)</th>
<th>Clinical manifestation(s)</th>
<th>Specimen from which isolate was recovered</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>[7]</td>
<td>1.5, F</td>
<td>CSF shunt</td>
<td>Meningitis</td>
<td>CSF</td>
<td>Pen, Chl, SSZ, Meth</td>
</tr>
<tr>
<td>[8]</td>
<td>2, F</td>
<td>None</td>
<td>Arthritis, vaginitis</td>
<td>Synovial fluid, vaginal discharge</td>
<td>Pen</td>
</tr>
<tr>
<td>[9]</td>
<td>2.5, M</td>
<td>None</td>
<td>Bacteremia, impetigo, stomatitis</td>
<td>Blood, oral ulcers</td>
<td>Amp</td>
</tr>
<tr>
<td>[10]</td>
<td>4, F</td>
<td>None</td>
<td>Meningitis</td>
<td>CSF</td>
<td>Pen</td>
</tr>
<tr>
<td>[11]</td>
<td>4, M</td>
<td>None</td>
<td>Meningitis</td>
<td>CSF</td>
<td>Pen, Chl</td>
</tr>
<tr>
<td>[12]</td>
<td>15, M</td>
<td>Complement C8 deficiency</td>
<td>Meningitis</td>
<td>CSF</td>
<td>Pen</td>
</tr>
<tr>
<td>[13]</td>
<td>34, M</td>
<td>Paraplegia, decubitus ulcers</td>
<td>Osteomyelitis</td>
<td>Bone</td>
<td>Amp</td>
</tr>
<tr>
<td>[14]</td>
<td>36, F</td>
<td>None</td>
<td>Arthritis, bacteremia, urethritis</td>
<td>Blood</td>
<td>Pen</td>
</tr>
<tr>
<td>[16]</td>
<td>45, M</td>
<td>None</td>
<td>Arthritis</td>
<td>Synovial tissue</td>
<td>Cephalosporin (unspecified)</td>
</tr>
<tr>
<td>[17]</td>
<td>66, M</td>
<td>Porcine aortic valve</td>
<td>Endocarditis, renal failure</td>
<td>Blood</td>
<td>Pen, Oxa, Tm</td>
</tr>
<tr>
<td>[18]</td>
<td>71, F</td>
<td>Chronic parenteral nutrition, central venous catheter</td>
<td>Bacteremia</td>
<td>Blood</td>
<td>Gm</td>
</tr>
</tbody>
</table>

**NOTE.** Amp, ampicillin; Cfur, cefuroxime; Chl, chloramphenicol; Meth, methicillin; Oxa, oxacillin; Pen, penicillin; PR, present report; ref, reference; SSZ, sulfisoxazole; Tm, tobramycin; TMP-SMZ, trimethoprim-sulfamethoxazole.

199 isolates that were subsequently identified as *M. osloensis* [4]. The isolates included specimens of blood (44 [22%]), CSF (18 [9%]); ear, nose, and throat (18 [9%]); urine (17 [9%]); and genital secretions (16 [8%]).

*M. osloensis* has also been isolated from the nasopharynx of healthy adults [5] and, occasionally, from outpatients complaining of various ear, nose, and throat problems [6]. However, individual reports of infection due to *M. osloensis* are rare. Twelve documented cases of invasive *M. osloensis* infection have been reported in the literature (table 1) [7–18].

Infections caused by *M. osloensis* include endocarditis, meningitis, osteomyelitis, septic arthritis, vaginitis, and bacteremia. Isolated *M. osloensis* bacteremia is an uncommon clinical finding. Butzler et al. [9] described the only previously reported case of pediatric *M. osloensis* bacteremia in a child who also presented with stomatitis and impetigo with necrotic skin lesions. The 3 other cases of bacteremia reported in the literature occurred in adult patients. These cases included *M. osloensis* bacteremia in a patient who presented with cutaneous lesions and symptoms of arthritis and urethritis [14], endocarditis in a patient with a porcine aortic valve who subsequently died of complications related to aortic perforation [17], and central venous catheter infection in an elderly woman receiving chronic parenteral nutrition [18].

Our patient with *M. osloensis* bacteremia is different from previously described patients with *M. osloensis* bacteremia because he was a previously healthy child without an obvious focus of infection. He presented with wheezing, fever, pharyngitis, and a petechial rash, prompting admission to the hospital for treatment of his asthmatic exacerbation, as well as for suspected bacteremia. He rapidly recovered and had no sequence. Although a concurrent viral infection was not identified by testing, it is possible that this patient had an antecedent viral upper respiratory tract infection that caused some of his symptoms and predisposed him to become bacteremic.

### References

4. Graham DR, Band JD, Thornbirds C, Hollis DG, Weaver RE. Infections...


