Case Report

The first Canadian Case of *Moraxella Osloensis* Meningitis

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Abstract

Moraxella osloensis is a rare cause of bacterial meningitis. There have been eight total reported cases of *M. osloensis* meningitis to date. We describe a unique case of a 53-year-old male with a history of extensive sinusitis who presented twice with *M. osloensis* meningitis. The first presentation of meningitis was a fever, headache, and neck stiffness. Upon the second presentation five months later, he had a fever, headache, neck stiffness as well as an altered level of consciousness. He underwent several investigations, including blood work, lumbar puncture, and imaging both times; however, on the second presentation, he had a CT scan of his sinuses, where bony destruction of the cribriform plate, which provided sinus communication to the CSF, contributing to his second presentation of meningitis. This case highlights the consideration of *M. osloensis* as a causative agent of meningitis in immunocompetent patients in Canada.

Keywords: *Moraxella Osloensis*, bacterial meningitis

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Introduction

Moraxella Osloensis is a gram-negative coccobacillus and belongs to the Moraxella Genus that colonizes humans and animals (1). *M. osloensis* can be isolated from the natural flora of the human respiratory tract and infrequently causes infections in humans (2). Current literature has reported it as the causative agent in peritonitis (3), osteomyelitis (4), pneumonia (5), and infective endocarditis (6). It is rare for *M. oloensis* to cause bacterial meningitis. *Neisseria meningitidis*, *Streptococcus pneumoniae,* and *Listeria monocytogenes* are the most common causative pathogens.

Eight cases of *M. osloensis* meningitis have been reported in the United Kingdom, Korea, Belgium, Germany, and the Netherlands (6–9). Of these, only two patients were adults, and both were immunosuppressed. To our knowledge, there are no reported cases in Canada. Therefore, this is the first reported case of *M. osloensis* meningitis in Canada and its recurrence.

Case Presentation

A 53-year-old male, 1-month post-bilateral laparoscopic inguinal hernia repair, presented to the Emergency Department (ED) with high-grade fever and a three-week history of left lower quadrant pain. He presented to the ED five times following the onset of these symptoms over the course of a four-week period. He was initially evaluated by his general surgeon, who did not suspect his symptoms of fever were attributable to his surgery and felt his abdominal pain was in keeping with post-operative pain. No surgical intervention was warranted at this time. Given the severity of the abdominal pain, an abdominal CT was obtained and was deemed unremarkable. In a subsequent ED visit, he completed a one-week course of Clavulin, which provided no relief of his symptoms. Clavulin was chosen, given symptoms of fever and abdominal pain, for aerobic and anaerobic coverage of possible intra-abdominal infection. Given his clinical stability, oral antibiotics were chosen over IV antibiotics.

During his fifth ED presentation, he complained of new symptoms of headache, nausea and neck stiffness in addition to his persistent fever and abdominal pain. His past medical history was significant for chronic sinusitis and bilateral endoscopic sinus surgery, including maxillary antrostomy, ethmoidectomy and frontal sinusotomy. His physical examination was remarkable for tenderness over the left inguinal region upon light palpation and antalgic gait favoring the right side. His surgical incisions were healing well with no signs of infection. Neurological examination was grossly normal. Blood cultures from his ED visit five days prior were unremarkable. Further blood work and a lumbar puncture were completed, and results were as follows: White Blood Cells (WBC) count of 10.5 x 10^9 (3.5–10.5 × 10^9/L), C-Reactive Protein count of 11 mg/L (≤ 10 mg/L), and lactate level of 2.3 mmol/L (0.5–2.5 mmol/L). Cerebral Spinal Fluid (CSF) is clear and colorless with WBCs 3 × 10^6 (<4 x 10^6), RBCs 128 × 10^6 (<0), Protein 0.57 g/L (0.15–0.6 g/L) and glucose 5.3 mmol/L (2.77–4.44 mmol/L). CSF culture grew *M. osloensis* at 48 hours.

The patient was admitted to the hospital under internal medicine with the diagnosis of *M. osloensis* meningitis. He started on IV Vancomycin 1 gram twice daily and IV Meropenem 1 gram every 8 hours. The infectious disease service was consulted, and they stepped down his antibiotic coverage to IV Ceftriaxone 2 grams twice daily for two weeks. They also recommended blood work to investigate possible immunodeficiency and imaging to rule out destructive sinusitis as a possible source. Head CT imaging at this time was unremarkable.

He was observed as an inpatient for one week and completed his total course of antibiotic treatment in the outpatient setting. At the time of discharge, his headache and neck stiffness had resolved. The patient was scheduled to follow up with his family physician regarding the immunodeficiency work-up. Results were unremarkable, with total IgG being mildly low at 5.85 g/L.

Five months later, he presented to the hospital with a fever and acute neurological changes, including confusion and expressive aphasia. His lumbar puncture grew *M. osloensis*. He was re-treated with a 10-day course of IV Ceftriaxone. Within a few days of treatment, his neurological deficits resolved, and he returned to his baseline. Given the recurrence of this rare organism and the patient's history of chronic sinusitis, the leading hypothesis was that there was a sinus communication to his central nervous system, causing his recurrent meningitis. He underwent a CT scan of his sinuses, which demonstrated bony destruction of the cribriform plate. An urgent referral was made to ENT for surgical closure of the communication. Unfortunately, for the patient, the surgical closure of the communication was unsuccessful, with the patient at increased risk of recurrence of this meningitis.

Discussion

Although *M. osloensis* rarely causes infections in humans, it is essential to recognize it as an offending agent in severe infectious diseases, especially in immunocompetent individuals. It has been proven sensitive to penicillin G, cephalosporins, and aminoglycosides (8).

Moreover, there is only one other reported case of chronic sinusitis leading to *M. osloensis* sinusitis (7). In our case, an unremarkable CT head imaging was completed initially. CT imaging of the sinuses was not considered at this time as he remained asymptomatic post bilateral endoscopic sinus surgery. Only with the recurrence of his meningitis, CT imaging of his sinuses when evaluating sources for infection. Based on this incident, we recommend considering CT imaging of the sinuses for patients with a history of sinus infections. CT imaging of the sinuses provides a more accurate description of the sinuses as it involves very thin slices compared to CT head, which provides very thin slices of the brain, brain stem, and skull. Whereas CT head evaluates for brain swelling and inflammation, given his focal neurological concerns of confusion and partial amnesia.

To our knowledge, the long-term complications of *M. osloensis* meningitis have not been extensively studied. Therefore, further research is needed to evaluate the short and long-term complications of *M. osloensis* meningitis.

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Declarations

The patient gave consent for the case to be published before submission. No grants, equipment, or other support facilitated the conduct of this research.

Disclaimers

The views expressed in the submitted manuscript are my own and do not represent the institution's official position or funder.

References

1. Hays JP. The genus Moraxella. The Prokaryotes [Internet]. 2019;958–87.
2. Tan L, Grewal PS. Pathogenicity of Moraxella osloensis, a bacterium associated with the nematode Phasmarhabditis hermaphrodita, to the slug Deroceras reticulatum. Appl Environ Microbiol. 2001;67(11):5010–6.
3. Adapa S, Gumaste P, Konala VM, Agrawal N, Garcha AS, Dhingra H. Peritonitis due to Moraxella osloensis: an emerging pathogen. Case Rep Nephrol. 2018;2018:1–3.
4. Sugarman B, Clarridge J. Osteomyelitis caused by Moraxella osloensis. J Clin Microbiol. 1982;15(6):1148–9.
5. Richards HW, Lancioni C, Jones M. Moraxella osloensis bacteremia and pneumonia in a seventeen-year-old patient. Int J Clin Pediatr. 2022;11(2):56–9.
6. Gagnard J, Hidri N, Grillon A, Jesel L, Denes E. Moraxella osloensis, an emerging pathogen of endocarditis in immunocompromised patients? Swiss Med Wkly. 2015.
7. Fox-Lewis A, Coltart G, Rice S, Sen R, Gourtsoyannis Y, Hyare H, et al. Extensive subclinical sinusitis leading to Moraxella osloensis meningitis. IDCases. 2016;6:39–42.
8. Roh KH, Kim CK, Koh E, Kim MS, Yong D, Park SC, et al. Three cases of Moraxella osloensis meningitis: a difficult experience in species identification and determination of clinical significance. J Korean Med Sci. 2010;25(3):501–1.

9. Tabbuso T, Defourny L, Lali SE, Pasdermadjian S, Gilliaux O. Moraxella osloensis infection among adults and children: a pediatric case and literature review. Arch Pediatr [Internet]. 2021;28(4):348–51.

10. CT Head (Orbits, Sinuses, Facial Bones) | Jackson Hospital [Internet]. 2018.