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ANAESTHESIA
Case Report

A Case Report of an Elderly Patient with Respiratory Failure Caused by *Moraxella osloensis* Infection

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Abstract

Introduction: *Moraxella osloensis* is a bacterium that is part of the normal flora of the human respiratory tract and a rare causative organism of infections in humans. Most cases of *M. osloensis* have been reported in immune compromised adults with cancer and infants.

Case presentation: We report here a case of an elderly patient infected with *M. osloensis*. The patient is a 94 year old Vietnamese man who was receiving long-term enteral nutrition through a catheter while in his home and had a recent history of recurrent reactive upper airway disease. In 2014, he was admitted to hospital with fever, cough, irregular heavy breathing and severe bronchitis. His blood culture showed Gram-negative cocco-bacilli that were β-lactamase-positive, ampicillin resistant and cephalosporin's 2,3,4-sensitive. From this bacilli culture, *M. osloensis* was identified by 16S rRNA gene sequencing.

Conclusion: The patient was successfully treated with a one-week course combination of Vancomycin and Ciprofloxacin. The MIC-V a results 2 μ/ml established *M osloensis* sensitivity for both antibiotics. To our best knowledge this is the first report of *M. osloensis* identified in a patient with respiratory failure in Southeast Asia, including Vietnam.

Keywords: *Moraxella osloensis; Pathogen of respiratory failures; Long-term use of the catheter; Elderly patient; Vietnam*

Introduction

Moraxella osloensis is an aerobic, Gram-negative, non-lactose fermenting coccobacillus, a commensal found in environmental sources in hospitals and in normal human upper respiratory tract and sporadically on the skin and in urogenital tract [1,2]. *M. osloensis* is a rare causative agent of infections in humans with most cases reported in immune-compromised patients. Due to *M. osloensis* infrequency and phenotypic similarity with a number of other species even isolated from normal sterile condition, the clinical significance together with an appropriate therapeutic protocol may be a hard task to establish [3] whilst a few cases have been reported of *M. osloensis* as a causative agent in conditions such as ophthalmic infection, ostemyelitis, pyomyositis and meningytism heterogeneous group of patients [2,4-6].

Case Report

Here we report the case of the elderly Vietnamese patient who had respiratory failure caused by *M. osloensis* infection. Prior to his diagnosis and treatment for *M. osloensis*, the patient had been hospitalized three times during the last six months and diagnosed with severe bronchitis. During all three hospitalizations his physical examination and evaluation were similar; the patient had severe difficulty

in breathing with a heavy and constant cough, accompanied with dense yellowish sputum and frequent signs of dyspnea. Physical examination was notable for an erythematous and inflamed pharynx with tonsillar exudates and audible wheezing with evidence of moderate to high respiratory distress. The tympanic membranes were normal in appearance and mobility. Scattered petechiae were noted on the lower back with some hematoma on both left and right upper limbs. Capillary refill was brisk. There was no lymphadenopathy.

The first time the patient was hospitalized, on November 2013 at the local international hospital, the medical evaluation showed no signs of bacterial infection from neither pulmonary nor blood specimen; however biochemistry analysis showed elevated CRP with a level of 14.2 mg/l; creatinine was elevated 115 µmol/l; sodium and chloride were respectively low with 125 and 91 mmol/l; lymphopenia and thrombocytopenia were also present respectively: 1.26 10^3/mm^3 and 125 10^3/mm^3; chest radiography showed an accentuated pulmonary vascularity with no signs of pleural or evolutive parenchymal lesions; temperature was 37.4-38.5°C, heart rate was 115-138, respiration rate was 90, blood pressure was 140/90 mm Hg, and oxygen saturation was 95% while he was breathing room air. The patient received as main line of antibiotic treatment of Amoxicillin in combination with Clavulanic acid, Amlodipine, Salbutanol and Budesonide (aerosol) as adjuvant.

By the end of December 2013, the patient had to be readmitted at the same hospital due to the re-appearing of his clinical symptoms. Biochemistry analysis showed a high level of CRP at 183.3 mg/l; high level of creatinine 126 µmol/l; high level of blood urea 9.9 mmol/l; low level of sodium and chloride respectively 132 and 95 mmol/l; high level of WBC 10.5 10^3/mm^3; neutrophilia 12.92 10^3/mm^3; lymphopenia and thrombopenia were also present respectively 1.34 10^3/mm^3 and 152 10^3/mm^3. Chest CT scan showed a bilateral basal pneumonia without pleural effusion. Blood culture showed positive for *Pseudomonas aeruginosa* and *Streptococcus pneumoniae*. At the time of hospitalization the patient's temperature was 38.5°C, heart rate was 120-139, blood pressure was 150/90 mm Hg, and oxygen saturation was 95% while he was breathing room air. The patient was administered the main medication and treatment of Tazocine, Pyostacine, Ciprofloxacine and as adjuvant Ventolin and Pulmicort. The patient was discharged with a final statement of "Partial recovery" and no additional virological or bacteriological analysis was performed.

By the second week of March 2014, the patient had to be admitted in our facility due to a third relapse. This time his symptoms were moderately milder than at previous presentations, however, clinical manifestations were similar and were increasing. Symptoms at the time of the hospitalization indicated mild fever of 37.5°C, oxygen saturation 95%, steady coughing with accumulation of yellowish sputum, erythematous and inflamed pharynx with tonsillar exudates and audible wheezing with evidence of moderate respiratory distress and dyspnea. Due to the circumstances and to avoid any further complication, a decision was made to strictly monitor the patient for further analysis. Blood analysis and a bacterial culture were carried out at the time of his recovery. WBC parameters were within normal ranges with a mild neutrophilia 10.62 10^3/mm^3, RBC showed slightly abnormal levels of MCV and MCH respectively 98.0 fL and 32.3 pg, thrombocytopenia 127 K/µL and 0.08 PCT L, low Cholesterol 118 mg %, low HDL 31 mg %, hypocalcaemia 1.9 mmol/L, high level of NH_3 87.59 µmol/L, high level of CRP 38.7 mg/L.

Bacteria species were isolated from blood cultures using the blood culture bottle containing 50 ml of Brain Hearth Infusion (Difco, USA) with SPS (Sigma, USA) at the concentration of 0.35 mg/ml for anticoagulant. When the blood culture bottle was positive, the subcultures were plated on blood agar and chocolate agar and incubated aerobically at 35°C with 5% carbon dioxide. Blood culture showed Gram-negative coco-bacilli that were β-lactamase-positive, ampicillin resistant, and cephalosporins 2,3,4-sensitive. Furthermore, to obtain a definitive identification of the organism, 16S rRNA gene sequencing was carried out. The 16S rRNA gene was amplified using universal primers (MicroSeq™ 16S rDNA Bacterial Identification System, Applied Biosystems, USA). Sequence of amplicons (527 bp) obtained were determined using the ABI 3130XL automated DNA sequence (Applied Biosystems).

The sequencing analysis was performed by a Gen Bank BLAST search. The percentage of similarity to other sequences was determined and a top match of 100% to *M. osloensis* was obtained. The isolate exhibited susceptibility to Ceftriaxone, Meropenem, Azithromycin, Ciprofloxacin, Bactrim, Cholranphenicol and Vancomycin. However, as preventive measure, based either on Sanford Antimicrobial guideline [7] or Han *et al*. protocol procedure, it has been decided to use Vancomycin and Ciprofloxacin as first line antibiotic treatment,

1 g/500 ml (0.9 sodium chloride) was used for seven days, and adjuvant Ventolin, Mucitux and vitamin D_3. With this treatment, the patient successfully recovered and, in view of the fact that no evidence of relapse of infection was noted we decided that an additional course of antibiotic was not necessary.

Discussion

The genus-family *Moraxella* includes aerobic, oxidase-positive, Gram-negative cocco-bacilli. The most studied sub-group, *M. catarrhal* is that, frequently presents within the upper respiratory tract and is considered a main etiologic agent of a few common infectious manifestations such as pneumonia, sinusitis and otitis media [8]. Conversely, *M. osloensis* is a rare causative organism of infections in humans, with most cases reported in immune-compromised hosts, especially newborn, child, elderly and cancer patients [1-4]. There have been case reports of *M. osloensis* causing bacteremia, central venous catheter-related infection, solid organ transplantation, pneumonia, meningitis, endocarditis, osteomyelitis, sepsis and septic arthritis, pyomyositis, and endophthalmitis [1,3-5,9-12]. Of note, *M. osloensis* can be a causative pathogen of catheter-related infection among immune-compromised patients, especially in patients with underlying cancer [2,4,12]. Some other studies on *M. osloensis* confirmed that this pathogen had been isolated from heterogeneous sources in hospitals, including anesthetic agents, sanitary devices, sink trap and wastes, suggesting that it may be capable of spreading to patients from the inanimate environment and individual reports of infection due to *M. osloensis* are rare [10,11]. The most fluent isolate case is from blood samples, as in the current report. Eventually, it was possible to identify *M. osloensis* by 16S rRNA gene sequencing, which has been reported as a successful method for accurate identification [2-4,9,11,12]. This process improves clinical microbiological specification by allowing better identification of weakly described microorganisms such as *M. osloensis*. In the case presented here, the patient showed with unique clinical features such as long-term enteral feeding catheter, acute recurrent pulmonary infection and age. Regarding this issue, the Infectious Disease Society of America guideline recommends removal of the catheter in patients with catheter-related bloodstream infection caused by Gram-negative bacilli [13]. The largest part of recorded data has shown that *M. osloensis* is vulnerable to most common antibiotics such as penicillin, cephalosporin, and amino glycosides, although strains of *M. osloensis* resistant to penicillin have been isolated [10]. On the other hand, almost nothing has been reported on *M. osloensis* sensitivity to Vancomycin which is one of the most widely known antibiotics against serious gram-positive infections involving methicillin-resistant *S. aureus* (MRSA) in combination with Ciprofloxacin [14]. As suggested by other authors the choice of using Vancomycin and Ciprofloxacin might be strictly dictated by a case to case circumstances [2,9,13] and whether this choice represents a consequence of the *M. osloensis* bacteremia or its etiology still remain an open debate.

Conclusion

In conclusion, we report a case of an elderly patient with upper tract respiratory failure caused by *M. osloensis* successfully treated by antibiotic therapy. Our report indicates it is necessary to consider *M. osloensis* as an opportunistic pathogen as cause of respiratory failure of unknown origin, especially in elderly patients or severe immune-compromised patients who are receiving chemo-therapy or have long-term use of the catheter [12]. To complete, the successfully use of Vancomycin and Ciprofloxacin in the present case is probably due to the combination of two factors; first, the very low frequency of *M. osloensis* as pathogenic agent in humans, especially in South-East Asia and therefore its high grade of sensitivity to the antibiotic; second, the rapid therapeutic intervention to treat this specific case of recurrent pulmonary infection. Eventually, our initial hypothesis was assessed by the MIC-V an analysis that confirmed the sensitivity of *M. osloensis* to Vancomycin and Ciprofloxacin at a concentration ratio of 2 µ/ml. Nevertheless, we are well aware that there are not sufficient data to confirm whether this approach can be considered conclusive. Even if an appropriate treatment of infections caused by *M. osloensis* has not been finalized and, the prognosis for patients with *M. osloensis* infections is generally positive [10], in elderly and immune compromised patients *M. osloensis* can be life threatening. Hence, in this vigorous healthcare environment, the prevention, an effective first line treatment strategy and a quality of care should be considered as central perquisite in the elimination of healthcare-associated infections. Thus we strictly believe that in this particularly case the combination of Vancomycin and Ciprofloxacin together with a proper health care management of catheter devices was the right solution to achieve the remission from the infection. To the best

of our knowledge, this is the first case of a patient who had respiratory failure that was identified caused by *M. osloensis* in Southeast Asia, including Vietnam.

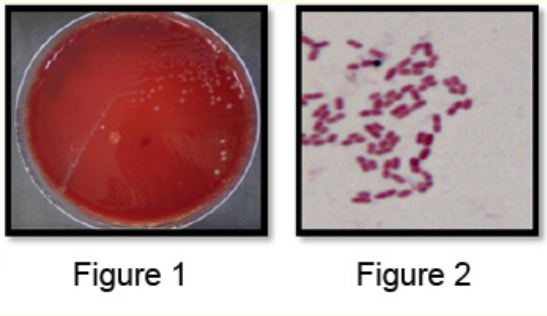

Figure 1-2: *Gram-staining of blood culture showing Gram-negative small coccobacilli.*

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Query  61   TTGCTAGAGAAGATTAGTGGCGGACGGGTGAGTAACATTTAGGAATCTGCCTAGTAGTGG  120
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Figure 3: *Gram-staining of blood culture showing Gram-negative small coccobacilli.*

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