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First Case of *Pasteurella multocida* Pneumonic Bacteremia in Korea

Jinho Jang, M.D.[1]*, Sang-Ha Kim, M.D.[2]*, Gilsung Yoo, M.D.[1], Gyu Yel Hwang, M.S.[1], Young Uh, M.D.[1], and Kap Jun Yoon, M.D.[1]
Departments of [1]Laboratory Medicine and [2]Internal Medicine, Yonsei University Wonju College of Medicine, Wonju, Korea

Dear Editor,

There are rising concerns related to the high incidence of zoonotic diseases in humans, caused by close encounters with pets and other wild or domestic animals [1]. *Pasteurella* species are one of the most prevalent commensal and opportunistic infection-causing pathogens found in domestic and wild animals worldwide, and are part of the normal flora of the oral, nasal, and respiratory cavities in many animals such as dogs and cats [2]. Although *Pasteurella* mostly causes local wound infections in humans following animal bites or scratches, cases of infections including those of the bloodstream or respiratory system have also been reported for this opportunistic pathogen [3, 4]. However, to our knowledge, there is no report of pneumonic bacteremia caused by *Pasteurella* in Korea. We describe a case of a systemic infection of *Pasteurella multocida* in the bloodstream and respiratory system of a Korean patient. This study was exempted from review by the Institutional Review Board for Human Research, Yonsei University, Wonju Severance Christian Hospital (2017-12-0145). Informed consent from the patient was not required for this report because de-identified patient data was used.

A 70-year-old man was admitted to Wonju Severance Christian Hospital because of abdominal pain and low blood pressure for one day. The patient also complained of coughing, a brownish blood-tinged sputum, rhinorrhea, heating sensation, chills, and chest discomfort. The patient had a medical history of hypertension, stable angina, pulmonary tuberculosis, chronic obstructive pulmonary disease, allergic rhinitis, and asthma. The patient does not breed any animals and did not report any contact with animals in the previous year. He was a chronic alcoholic with a more than 50-year history of heavy drinking, but had quit drinking one year prior to hospital admission and had no history of liver dysfunction. Physical examination revealed a low blood pressure of 76/52 mmHg and crackles on the right lower lung field. Laboratory findings showed an elevated white blood cell count of 21.3×10^9/L (94% segmented neutrophils) and serum C-reactive protein level (170.0 mg/L, reference: <3.0 mg/L). Chest computerized tomography showed consolidation in the right lower lobe. The patient was diagnosed as having community-acquired pneumonia and was empirically treated with cefoperazone-sulbatam and moxifloxacin.

A blood specimen was incubated using two aerobic and anaerobic culture sets in the BacT/Alert 3D system (bioMérieux, Durham, NC, USA). After a 14-hour incubation period, gram-negative coccobacilli grew in the aerobic bottle and were identified as *P. multocida* by VITEK 2 systems (bioMérieux) using the gram-negative identification card (Bionumber 0001410100040001, bioMérieux). A sputum specimen was also inoculated on 5%

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Corresponding author: Young Uh
https://orcid.org/0000-0002-2879-7870
Department of Laboratory Medicine, Yonsei University Wonju College of Medicine, 20 Ilsan-ro, Wonju 26426, Korea
Tel: +82-33-741-1592, Fax: +82-33-731-0506
E-mail: u931018@yonsei.ac.kr

*These authors contributed equally to this work.

sheep blood agar (KOMED Life Science Co., Seongnam, Korea) and MacConkey agar (produced in-house). *P. multocida* was isolated after five days of CO_2 incubation on sheep blood agar at 37℃. No growth was observed on MacConkey agar. Although the identification probability of *P. multocida* by VITEK 2 was 99%, 16S ribosomal RNA (rRNA) gene sequencing was carried out using the universal primers 27F (5′-AGAGTTTGATCATGGCTCAG-3′) and 801R (5′-GGCGTGGACTTCCAGGGTATCT-3′). The 16S rRNA sequences of the sputum and blood isolates showed 99% similarity with *P. multocida* strain CCUG 12400 (GenBank accession number AY362919). Antimicrobial susceptibility testing was performed by the broth microdilution method, following CLSI recommendations [5]. The isolate was susceptible to all tested antimicrobial agents with minimum inhibitory concentration values of 0.25 μg/mL ampicillin, 0.12 μg/mL penicillin, 0.5 g/mL amoxicillin-clavulanate, 0.5 μg/mL tetracycline, 1 μg/mL azithromycin, 1 μg/mL chloramphenicol, and 0.25 μg/mL trimethoprim-sulfamethoxazole. The patient showed a good response to the therapy and no complications, and was therefore discharged on the seventh day of empiric antibiotic therapy.

Pasteurella causes various systemic infections, especially in patients with comorbidities such as chronic obstructive pulmonary disease, although some cases without comorbidities have been reported [1, 6, 7]. *Pasteurella* can be transmitted to humans via direct contact with animals, although a history of animal exposure is not always evident. Indeed, the current patient had no recent animal contact except for a bite by a mouse one year prior to the onset of symptoms. Most of the reports of *Pasteurella* infections without direct animal contact involved patients living in rural environments or areas with a high likelihood of animal contact, as in the present case [8]. Given the simultaneous isolation of rare pathogens from the blood and sputum, the microorganism likely initially entered the respiratory tract of the patient, followed by dissemination into the circulation.

Although reports of human infections with *Pasteurella* are rare, the growing number of people raising pets might lead to an increase in opportunistic infections with such species. In addition, this case provides a warning for physicians that opportunistic infections should not be overlooked, particularly in more vulnerable patients.

Authors' Disclosure of Potential Conflict of Interest

There are no conflicts of interest to declare.

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