Pasteurella multocida and group G Streptococcus septicemia in a hereditary sensory and autonomic neuropathy type IV patient

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ABSTRACT

We report a case of a 16-year-old male with hereditary sensory and autonomic neuropathy type IV who presented with a one-day history of fever. He had been in close contact with a domestic cat. One hour before admission, he developed generalized tonic-clonic seizure and meningism. His hospital course was complicated by severe sepsis, meningitis, rhabdomyolysis and acute renal failure, which required intermittent hemodialysis. Blood cultures grew Pasteurella multocida and group G Streptococci. The patient significantly improved after a 10-day therapy with high dose ceftriaxone. This case illustrates the need for a high index of suspicion for P.multocida infection in the patient who owns a pet cat. (J Infect Dis Antimicrob Agents 2012;29:151-55.)

Note: This case had been presented and discussed in the Interhospital Case Conference on Infectious Diseases (ICCID), 17 May 2012, Bangkok, Thailand.

INTRODUCTION

Pasteurella multocida, a small, nonmotile, nonspore-forming, facultatively anaerobic gram-negative coccobacilli, has a high carriage rate in the oral and gastrointestinal tract of many animals. Carriage rate is highest amongst cats (70-90%) and dogs (20-55%).1,2 Human infections due to P. multocida are strongly associated with animal exposure and usually involve soft-tissue sites after animal bites or scratches.3,4 The most common consequence of P.multocida infection in humans is local cellulitis, although serious systemic diseases often occur (e.g.meningitis, empyema, pneumonia, peritonitis, osteoarticular infections, endocarditis, and septicemia).5-9 From our literature review, there is no case report of septicemia with P.multocida and group G Streptococci in a hereditary sensory and autonomic neuropathy type IV patient.

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Keywords: Pasteurella multocida, group G Streptococcus, septicemia
CASE REPORT

In December 2011, a 16-year-old Thai male was admitted to a tertiary care university hospital with one-day history of fever. One hour prior to admission, he developed generalized tonic clonic seizure. The patient was diagnosed with hereditary sensory and autonomic neuropathy type IV (HSAN type IV) or congenital insensitivity to pain with anhydrosis (CIPA) 7 years ago. He had haziness of corneas and premature loss of teeth and had self-mutilation of interphalangeal joints of the fingers and toes (Figure 1 and 2).

His neurological examination revealed appropriate response to thermal stimuli and no reaction to painful stimuli. His functional status was normal. He had raised a cat in his house for several years. He frequently held, hugged, and kissed the head of the cat and allowing the cat to lick his hands and feet.

At the emergency room, temperature was 38°C, heart rate was 120/min, blood pressure was 100/60 mmHg, respiratory rate was 20/min, and cutaneous oxygen saturation was 98%. Pulmonary auscultation and heart sounds were normal. He had no hepatosplenomegaly or lymphadenopathy. The neurological sign was unremarkable except stiffness of the neck. He had a linear ulcer with clear discharge at right big toe and a 2 cm round ulcer at right lateral malleolus (Figure 3 and 4).

Complete blood count revealed a hemoglobin level of 14.2 g/dL, hematocrit 44.1%, white blood cell count 56,120 cells/mm³ (neutrophil 71%, lymphocyte 13%, monocyte 1%, eosinophil 1%, basophil 1%, metamyelocyte 4%, and band form 9%), platelet count of 475,000/mm³. BUN 23.8 mg/dL; Cr 2.5 mg/dL; CPK 139,519 U/L. HIV serology was negative. CT brain without contrast showed right phtisis bulbi, posterior displacement of artificial len at left eye and no definite space occupying lesion in this study. The cerebrospinal fluid (CSF) showed turbid color; the cell count was 31,750 red blood cells and 89 white blood cells/mm³ (corrected white blood cells count 30 cells/mm³) with 97% neutrophil; the Gram stain of CSF revealed no organism; glucose was 70 mg/dL with a blood glucose of 173 mg/dL; and the protein concentration was 120 mg/dL.

The patient was empirically treated with intravenous ceftriaxone 2 grams every 12 hours to cover bacterial meningitis after taking two sets of aerobic blood culture. The patient was diagnosed sepsis, rhabdomyolysis, acute renal failure, and possible early bacterial meningitis. He was admitted to medical ward and intermittent hemodialysis was performed. P. multocida and group G Streptococci were isolated from blood (Bact/ALERT® Aerobic Blood Culture System) in the first bottle and the other one grew only P. multocida. Swab from right big toe ulcer also grew group G Streptococci. However, culture and molecular identification of bacterial DNA (16S ribosomal DNA) of CSF were negative. P. multocida isolate was susceptible to penicillin, ciprofloxacin, cefotaxime and tetracycline and group G Streptococci isolate was susceptible to penicillin, clindamycin, erythromycin and cefotaxime, according to Clinical and Laboratory Standards Institute (CLSI) 2011. Ceftriaxone treatment was continued for 10 days. On the 10th day, he developed hospital acquired pneumonia. Consequently, antibiotic was changed to high-dose meropenem (6 g/day). The patient was treated for a total of 10 days with ceftriaxone and for 14 days with meropenem. His condition improved, without neurological sequelae.

DISCUSSION

Although P. multocida infection in humans is rare, these are frequently serious diseases such as septicemia, endocarditis and meningitis. Therefore, P.
multocida infection is considered an important zoonosis. P. multocida is part of the normal flora in the nasopharynx of various animals and can be a pathogen for humans. Eighty-three percent of P. multocida septicemic patients had a history of animal exposure, and 53% had direct close contact. The clinical diseases of patients with P. multocida septicemia were common in skin and soft tissue infection followed by arthritis, meningitis, peritonitis and pneumonia respectively and about 40% of the patients had no localized site of infection. Despite the patient reported that his cat had licked his feet including uncovered ulcers, there was no sign of inflammation of the skin or ulcers on examination. These observations implied that P. multocida in cat oral cavities might enter the body directly from the cutaneous ulcer or via the upper respiratory tract.

Approximately half of the P. multocida septicemic patients had no underlying disease. In one case series from Greece, the most common underlying diseases were elderly, diabetes, malignancies, rheumatoid arthritis, liver dysfunction, chronic pulmonary diseases and systemic lupus erythematosus. In this case, he was diagnosed HSAN type IV, a rare autosomal recessive neuropathy. Clinical disorder is characterized by...
insensitivity to pain with intact tactile perception, self-mutilation, recurrent unexplained fever, anhydrosis, mental retardation and autonomic nervous system abnormality since infancy. Patients with HSAN type IV often experience trauma, bony fractures, and osteomyelitis because of insensitivity to pain. There was no report of abnormal phagocytosis in this patient with HSAN type IV. Therefore, *P. multocida* infection might not be directly related to his underlying disease.

Group G *Streptococcal* bacteremia is relatively uncommon, constituting about 0.3% to 0.4% of bacteremia. Group G *Streptococci* are generally regarded as a normal flora of the human skin, pharynx and intestine. Group G *Streptococci* can also be isolated in approximately 30% of domestic cats. Most of the group G *Streptococci* isolated from cats have physiological and biochemical properties similar to those of group G *Streptococci* from humans. Group G *Streptococci* found in many cats could be potentially pathogenic for humans. We did not perform throat swab culture from the patient’s cat. For this reason, we cannot demonstrate that *P. multocida* and Group G *Streptococci* had been simultaneously spread from the cat.

Most *P. multocida* isolates are susceptible to penicillin, ampicillin, fluoroquinolones, second and third-generation cephalosporins. However, there were a few reports of β-lactamase-producing *P. multocida* strains in humans. First-generation cephalosporins, erythromycin, antistaphylococcal penicillins, aminoglycosides, vancomycin and clindamycin are not effective against the organism. Group G *Streptococci* are susceptible to nearly all β-lactam antibiotics. Due to possible diagnosis of meningitis, we considered high dose intravenous ceftriaxone to be an efficient and easily administered antibiotic regimen.

**Conclusion**

*P. multocida* infection requires a high degree of suspicion, and should be considered in the differential diagnosis of skin and soft tissue infection or septicemia, in patients with a history of domestic pet exposure. Thorough animal contact history and careful clinical examination will lead to the institution of appropriate antibiotic therapy.

**Acknowledgement**

We would like to express our sincere thanks to microbiologist, Assoc. Prof. Dr. Amornrut Leelaporn, B.Sc. (Pharm), M.Sc. (Microbiol), Ph.D. (Microbiol).

**References**


