

รายงานผู้ป่วย: การติดเชื้อ *Pasteurella multocida* ที่ไม่สัมพันธ์กับสัตว์ทำให้เกิดการติดเชื้อ ในกระแสเลือดในผู้ป่วยโรคตับแข็ง

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บทคัดย่อ

แบคทีเรียชนิดแกรมลบ *Pasteurella multocida* มีรูปร่างลักษณะจัดอยู่ในกลุ่ม coccobacillus เป็นแบคทีเรียที่ทำให้เกิดการติดเชื้อในคนเกือบทั้งหมดจากการโดนสัตว์เลี้ยงกัดหรือข่วน อย่างไรก็ตามมีรายงานว่ายังสามารถทำให้เกิดการติดเชื้อได้แม้ไม่มีประวัติดังกล่าวแม้มีจำนวนที่น้อยมากก็ตาม ซึ่งมักจะพบการติดเชื้อในคนที่มีภูมิคุ้มกันต่ำ ในรายงานวิชาการพบว่าการติดเชื้อนี้ในผู้ป่วยโรคตับแข็งสามารถทำให้เกิดระบบไหลเวียนเลือดล้มเหลวจากภาวะติดเชื้อในกระแสเลือดได้ รายงานผู้ป่วยคนนี้เป็นผู้ชาย อายุ 48 ปี มีโรคประจำตัวเป็นโรคตับแข็ง ไม่มีประวัติการสัมผัสการติดเชื้อจากสัตว์เลี้ยง มีอาการไข้ ปวดท้อง และสับสน ได้รับการวินิจฉัยว่ามีภาวะระบบไหลเวียนเลือดล้มเหลวจากภาวะติดเชื้อในกระแสเลือดจากแบคทีเรียชนิดนี้ หลังได้รับการรักษาด้วยเครื่องช่วยหายใจ และยาปฏิชีวนะเป็นเวลา 14 วัน ผู้ป่วยมีอาการดีขึ้นจนออกจากโรงพยาบาลได้

คำสำคัญ: เชื้อพาสเทลลล่า มัลโตไซด์; ตับแข็ง; ภาวะช็อก

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Pasteurella multocida infection unrelated to animal bites as a cause of septic shock in a liver cirrhosis patient: A case report

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Abstract

A gram-negative bacteria known as *Pasteurella multocida* is morphologically classified as a coccobacillus. It is among the most prevalent organisms that infect pet bites. However, even without animal bites or scratches, serious illnesses can still develop. Humans are susceptible to *Pasteurella multocida*, particularly those with weakened immune systems. Few cases in the literature, particularly in cirrhotic patients, point to *Pasteurella multocida* as the primary cause of septic shock. This study consisted of a 48-year-old male patient, who had no prior history of animal exposure, presented with fever, abdominal pain and an altered mental status, then developed septic shock due to *Pasteurella multocida* bacteremia. After treatments of ventilation and antibiotics, the patient recovered and was discharged from the hospital.

Keywords: *Pasteurella multocida*; liver cirrhosis; septic shock

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Introductions

Important pathogens in both animals and humans include *Pasteurella* species, which are native organisms found in the oral and gastrointestinal flora of many wild and domestic animals. Most often, *Pasteurella multocida* infections in humans are linked to infected wounds from animal bites. But even when there are no bites or scratches from animals, serious *Pasteurella multocida* infections can still develop. Pet animals' frequent licking of healthy or damaged skin was the most common way for the pathogen to enter those cases. There have also been reports of infections linked to inhaled microbes or infections with an unknown source of acquisition.^{1,2}

We describe a patient who, presumably as a result of an intra-abdominal infection, experienced septic shock due to *Pasteurella multocida* bacteremia. The objective of this case report is aimed to alert physicians to the severity of Pasteurellosis and this unusual illness.

Case Report

A 48-year-old Thai man who had been experiencing nonspecific abdominal pain, altered mental status, dyspnea, fevers, and chills for one day was taken to the emergency room. His prior medical history was notable for alcohol addiction and liver cirrhosis brought on by alcohol. Vital signs were as follows in the emergency room 39.6 degrees Celsius temperature, heart rate of 110 beats per minute, respiratory rate of 24 breaths per

minute and blood pressure of 80/50 mmHg. Jaundice, abdominal distention and modest widespread tenderness to palpation were notable physical examination findings. No rash or ulcers were present. Upon notification from his wife, he hadn't recently traveled or been among sick folks. She denied keeping pets at home or having any interactions with the patient. He was admitted to the medical intensive care unit and put on mechanical ventilation. Systemic inflammatory response syndrome with septic shock and multi-organ dysfunction syndrome was the diagnosis at the time of admission, and it was assumed to be attributable to spontaneous bacterial peritonitis (SBP) and alcoholic cirrhosis. Vasopressors and aggressive intravenous fluid resuscitation using crystalloids were started. We collected blood, urine, sputum cultures and a titer for melioidosis. To acquire ascitic fluid for cytology and cultures, a paracentesis and abdominal CT scan were performed. Azithromycin (500 mg per oral every 24 hours) and ceftazidime (2 g intravenous every 8 hours) were administered as part of an empiric antibiotic treatment regimen.

Complete blood cell count was 10,340/mm³ (69% neutrophils), platelet count was 33,000/mm³, sodium level was 136 mEq/L, potassium level was 3.8 mEq/L, bicarbonate level was 23 mEq/L and creatinine level was 0.86 mg/dL at the time of admission. There were 317 and 35 IU/L of aspartate aminotransferase and alanine aminotransferase, respectively. Albumin 1.8 g/dL, gamma-glutamyl transpeptidase level was 280 U/L,

alkaline phosphatase level was 103 IU/L and lactate dehydrogenase level was 93 U/L. Direct bilirubin was 5.3 mg/dl, while total bilirubin was 8.8 mg/dl. 95 mg/dl of lactic acid was present. It took 22.4 seconds for the prothrombin time and 2.35 of INR. The serum alcohol concentration was within the normal range. While undergoing mechanical ventilation with FIO₂ of 60%, the patient's arterial blood gases displayed pH of 7.25, pCO₂ of 28 and pO₂ of 92. No discernible infiltration was visible on a chest X-ray. Ascitic fluid cell count of 128 cells/uL, white blood cells 123 cells/uL (46% neutrophils, 54% lymphocytes and monocytes) and serum-ascites albumin gradient (SAAG) of 1.6 g/dL. Despite what appeared to be the proper empiric antibiotic therapy after the patient had been admitted for 24 hours, the patient was still in critical condition and

needed the highest doses of vasopressors. *Pasteurella multocida* was grown in blood cultures from admission samples for two samples. There was no analysis using the polymerase chain reaction. Ampicillin, Amoxil/Clavulanate, Piperacillin/Tazobactam, Ceftazidime and Erythromycin were found to be effective treatments for the isolated *Pasteurella multocida*. For these antimicrobials, there are no known minimal inhibitory concentrations.

When the patient's overall health had improved after 72 hours of admission, the endotracheal tube and mechanical ventilation were turned off. After completing the full 14 days of intravenous antibiotics, he was moved to the common ward and eventually released from the hospital.

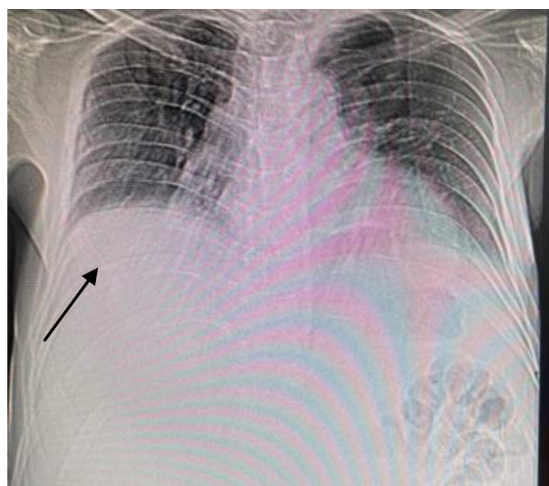


Figure 1 Chest and abdominal radiography reveals elevated right diaphragm (arrow) and many ascites (arrow)

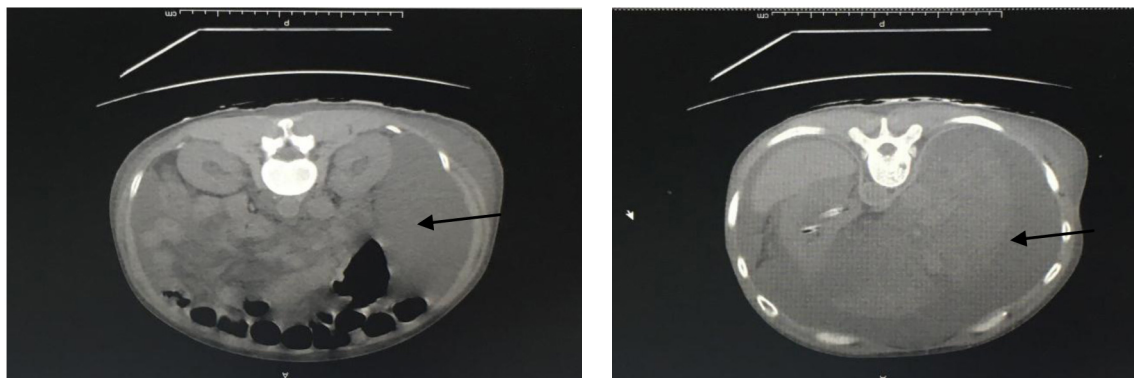


Figure 2 Abdominal CT scan reveals many ascites (arrow)

Discussion

Small Gram-negative facultative anaerobe *Pasteurella multocida* lives naturally in the upper respiratory tract and normal gut flora of wild and domestic animals, particularly cats and dogs. Due to its resemblance to *Haemophilus influenzae*, *Francisella tularensis*, and *Yersinia pestis*, it is frequently overlooked and is readily overgrown by other organisms in the sputum. The majority of pasteurellosis cases are caused by the following five species: *multocida*, *septica*, *canis*, *stomatis*, and *dagmatis*. There have been reports of human *Pasteurella multocida* infections both with and without animal exposure, with the former being primarily linked to domestic cat and dog bites or scratches.^{3,4}

Most infections affect the skin and soft tissues and they can become worsened by osteomyelitis and septic arthritis. The other clinical manifestations of *Pasteurella multocida* include respiratory tract infections, pneumonia, intra-abdominal pelvic infections, spontaneous bacterial peritonitis, tubo-ovarian abscess,

endometriosis, pyogenic arthritis, endocarditis, osteomyelitis, genitourinary tract infections, pyelonephritis and cystitis.^{5,6,7,8} Rare manifestations include uvulitis and pharyngitis. *Pasteurella multocida* has a polysaccharide capsule and a lipo-polysaccharide surface molecule that allow it to resist phagocytosis by host cells and complement-mediated lysis. Immunocompromised humans are particularly susceptible to developing an infection from *Pasteurella multocida*. These include individuals with cirrhosis, diabetes, malignancies, chronic obstructive pulmonary disease and kidney failure requiring dialysis,⁹ who are more likely to develop invasive forms of *Pasteurella multocida* infection. The development of bacteremia appears to be significantly influenced by the reticuloendothelial system's impaired function and the presence of portosystemic shunts in individuals with liver disease.¹⁰

The fact that no direct interaction with a domestic animal could be proven makes this case look unusual. This patient's history of alcohol-induced liver cirrhosis made

bacteremia more likely to occur. However, it is challenging to identify the primary source of infection in retrospect. Pleural effusion and no infiltration were the findings of the chest radiography. The results of the abdominal exam may imply that the intra-abdominal cavity was the major cause. It was looked into the abdominal CT scan. When ascites fluid is discovered, paracentesis to extract ascites fluid for cytology and cultures may indicate that the intra-abdominal cavity is the main site of infection. We thought the intra-abdominal cavity was the patient's most likely primary site of infection given the patient's history of symptoms upon admission and the existence of underlying liver disease. Inhaling the organism has been linked to illnesses of the respiratory system and the abdomen. In immunosuppressed cat owners, nasopharyngeal colonization of *Pasteurella multocida* with transitory bacteremia and seeding of the peritoneal cavity may be significant contributors to the development of SBP. It is uncommon for *Pasteurella multocida* to produce SBP. Thirteen patients with *Pasteurella multocida* SBP were reported by Tamaskar et al.¹¹ Nine of these patients' blood cultures were positive, four patients died and ten of these patients had animal exposure.

Penicillin is the drug of choice for treating *Pasteurella multocida* infections. Penicillin-resistant strains have been reported, nevertheless.¹² Macrolides, fluoroquinolones, tetracyclines, second and third-generation cephalosporins and trimethoprim/sulfamethoxazole are suggested as alternatives

in certain situations. Among patients who are bacteremic, the mortality rate ranges from 15% to 34%.^{13,14} The depth of the underlying condition, the severity of the infection, and the prompt start of the right medication all affect the outcome.^{15,16}

Conclusion

Despite the rarity of cases of *Pasteurella multocida* infections being documented in the literature, clinicians should take this virus seriously because it can cause serious infections that can be fatal in humans. In patients with underlying chronic liver disorders who arrive with a suspected intra-abdominal infection, *Pasteurella multocida* should be included in the microbiologic differential diagnosis, even in the absence of a history of contact with domestic animals.

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