

Septic arthritis and subsequent fatal septic shock caused by *Pasteurella multocida* in Vietnam

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Abstract

Pasteurella multocida is a facultative anaerobic and gram-negative bacteria. It lives in the upper airway of animals, especially dogs and cats. *P. multocida* infection commonly results in regional cellulitis, although septic shock complication is uncommon. Here, we report on a fatal case of septic shock developing from a natural knee joint infection.

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Keywords: Cirrhosis, *Pasteurella multocida*, Septic arthritis, Septic shock, Vietnam

Original Submission: 22 September 2022; **Revised Submission:** 22 December 2022; **Accepted:** 30 December 2022

Article published online: XXX

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Abbreviations

CRP	C-reactive protein
AST	Aspartate aminotransferase
ALT	Alanine transaminase
PT	Prothrombin
INR	International Normalized Ratio

I. Case report

A 49-year-old male with a history of cirrhosis was admitted due to 5 days of worsening painfully swollen right knee and high fever. His exposure history with animals was unclear. On admission, the temperature was 36.6°C, pulse 140 bpm, blood pressure 116/60 mmHg, SpO₂ 100% with oxygen supply via

mask of 15 liter/minute. On examination, he was lethargic. Crackles were noticed on lung fields. Abdominal examination revealed collateral circulation and hepatosplenomegaly. The right knee and surrounding areas were puffed out, and redness with some broken blisters. The remaining examination was unremarkable.

Laboratory results showed leukocyte count of $6.07 \times 10^9/L$ with 85.7% neutrophil, platelet count of $26 \times 10^9/L$, CRP 77 mg/L, procalcitonin 10 ng/ml, AST 137 U/L, ALT 25 U/L, total bilirubin 109 µmol/L, direct bilirubin 59 µmol/L, PT 22%, INR 3.46, urea 7.41 mmol/L, creatinine 191 µmol/L, arterial blood gas disclosed pH of 7.15, pCO₂ of 36 mmHg, lactate of 15 mmol/L, HCO₃⁻ 12.5 mmol/L. Ultrasound showed a 10mm depth of fluid in the right knee and inflammatory signs in surrounding tissues. The blood and right knee synovial fluid cultures were carried out.

Fluid resuscitation and empirical antibiotic were given, including meropenem and vancomycin.

On day 3, he rapidly developed septic shock combined multi-organ failure. His blood pressure was 105/80 mmHg under a dose of noradrenalin 1.5 µg/kg/minute. Both peripheral blood samples and right knee synovial culture were positive for *Pasteurella multocida*. Species identification was performed by Vitek MS (bioMérieux, France). Antibiotic susceptibility of *Pasteurella multocida* was presented in Table I. He eventually passed away despite our efforts at resuscitation.

TABLE 1. Antibiotic susceptibility of *Pasteurella multocida*

Antibiotics	Results
Amoxicillin/Clavulanic acid	Intermittent
Ampicillin	Intermittent
Azithromycin	Intermittent
Ceftriaxone	Sensitive
Chloramphenicol	Sensitive
Doxycycline	Sensitive
Erythromycin	Resistance
Levofloxacin	Sensitive
Penicillin G	Resistance
Tetracycline	Sensitive

2. Discussion

Pasteurella multocida is a facultatively anaerobic, gram-negative microorganism which Louis Pasteur isolated in the 1880s [1]. *Pasteurella* species are the resident population in the oral mucosa, nasopharynx, and large airway of animals, predominantly dogs and cats [2]. *Pasteurella* infections are almost the consequence of a bite or scratch from a domestic animal resulting in skin and soft tissue infections [2]. It also can cause bacteremia, meningitis, brain abscess, pneumonia, endocarditis, and urinary tract infection [3].

Among Pasteurellosis cases relevant to animal bite wounds, the mortality rate was 25-30% [2]. In immunodeficient individuals, *Pasteurellosis* cases do not develop from bite wounds commonly resulting from the contact between animal secretion and damaged skin or oral or upper respiratory mucosa [2].

Regarding treatment, cephalosporins, fluoroquinolones, and tetracyclines are recommended for antimicrobial therapy in the context of suspected penicillin-resistant *P. multocida* [4]. Some Pasteurellosis cases related to leg cellulitis and shoulder arthritis were reported [5,6]. Bacteremia secondary to *P. multocida* is uncommon, especially in patients without any

prosthetic appliance. To our knowledge, this is the first *Pasteurella multocida* case recognized in Vietnam and the first case that developed septic shock secondary to natural knee joint infection globally.

3. Conclusion

Pasteurella multocida infection obviously can result in septic shock and mortality in compromised individuals. If the patient has an exposure history to animals, it must be on the differential diagnosis list and given an appropriate early regimen.

Conflict of interest

None.

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