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Pasteurella canis sepsis with fatal outcome in the frail older: a case report

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Abstract

Pasteurella canis typically causes wound infections following dog bites, while invasive infections are uncommon. Within invasive infections, bacteremia (the presence of bacteria in the bloodstream) must be differentiated from sepsis (the organ dysfunction caused by a dysregulated immunological response to infection).

Sepsis and heart failure interact in a continuum where sepsis-induced cardiomyopathy is triggered by acute systemic inflammation, whereas preexisting heart failure increases susceptibility to sepsis and mortality.

We present the case of an 87-year-old frail woman admitted with heart failure. Blood cultures taken after a febrile episode resulted positive for *P. canis*. Response to piperacillin/tazobactam was satisfactory, although the patient died from heart failure. She did not report a history of a dog bite; therefore, we speculated that *P. canis* spread through respiratory secretions of a dog known to the patient, causing pneumonia (documented at a computed tomography scan) followed by sepsis.

Key words: *Pasteurella canis*, sepsis, immunocompromised, frail.

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Introduction

Sepsis in elderly patients bears substantial mortality and significant healthcare costs. Many predisposing elements such as coexistent medical conditions, functional status, frailty, and malnutrition contribute to the higher predisposition to sepsis in this group of patients.[1] Moreover, biological mechanisms linked to immunosenescence (the age-related functional impairment affecting both innate and adaptive immunity) cause an increased risk to develop sepsis with a potential for a more severe presentation and outcome.[2]

Clinical manifestations of sepsis are often atypical in older adults. Classic symptoms like fever or localized pain are often missing, while delirium/abnormal mental status, falls, hyporexia, malaise, may be present. Therefore, early, low-threshold suspicion is key, especially in frail patients.[3]

Pasteurella species are small, non-motile, gram-negative coccobacilli belonging to the Pasteurellaceae family and are part of the normal oral and upper respiratory tract flora of many domestic animals, particularly dogs and cats. Human infections are classically associated with animal bites or scratches, although transmission may also follow licking of broken skin or, less frequently, without an identifiable animal-related injury.[4-6] Among the genus *Pasteurella*, *Pasteurella multocida* is by far the most frequently isolated species in human disease, accounting for the majority of reported skin, soft tissue and respiratory infections, and invasive infections such as bacteremia and meningitis. Other species, including *Pasteurella canis*, *Pasteurella dagmatis*, and *Pasteurella stomatis*, are far less commonly implicated and are typically associated with specific animal exposures, particularly dog bites.[5]

P. canis is predominantly isolated from the oral cavity of dogs and is most often associated with localized wound infections following dog bites. In contrast to *P. multocida*, invasive human infections caused by *P. canis* have historically been considered exceedingly rare, with early microbiological series reporting its near-exclusive association with superficial infections and an apparent lack of systemic involvement.[5] Over the past two decades, however, sporadic cases of invasive *P. canis* infections have been described, including bacteremia, pneumonia, septic arthritis, osteomyelitis, and, more recently, severe sepsis and septic shock.[6-8] Antibiotic options for *P. canis* infections include penicillins (ampicillin, amoxicillin-clavulanate, piperacillin/tazobactam) second and third-generation cephalosporins, doxycycline, and fluoroquinolones.[9]

Although *Pasteurella* invasive infections are uncommon, they carry a high short-term mortality, exceeding 30% in large series,[4] with chronic liver disease, diabetes mellitus, chronic lung disease, malignancy, and immunosuppressive therapies being associated with worse prognosis.

Despite these emerging reports, current evidence remains limited and the epidemiology and clinical spectrum of invasive *P. canis* infection are poorly defined. Here, we report a case of *P. canis* sepsis, emphasizing that *P. canis*, although uncommon, can cause life-threatening systemic infection and that careful exposure history and prompt microbiological identification are essential to guide early targeted therapy.

Case Report

An 87-year-old woman was admitted to the Emergency Department of Ospedale Bassini (Cinisello Balsamo, Milano, Italy) with a 1-month history of fatigue, dyspnea and lower limb edema. Her past medical history was notable for rheumatoid arthritis with inconsistent follow-up, a right-sided pleural effusion known for at least 1 year but never investigated, and a relapsing vascular ulcer of the left lower limb. She was receiving chronic low-dose methotrexate and prednisone, although adherence to therapy prior to admission was likely poor. She was a mildly-frail woman who used to live alone, reported to be independent in activities of daily living (ADLs) and partially dependent in instrumental ADLs, in which she was helped by her nephew and her neighbors.

During the stay in the Emergency Department, she was diagnosed with acute heart failure in the context of a recent silent myocardial infarction. A first episode of atrial fibrillation was also noted, but anticoagulant therapy could not be initiated due to spontaneous elongation of prothrombin time (PT), the presence of a possible septal pseudoaneurysm and mild thrombocytopenia. The patient was initially admitted to the Intensive Coronary Care Unit of our Hospital and started on intravenous loop diuretics. Given the presence of anemia (hemoglobin 95 g/L) and thrombocytopenia (65*10^9/L) of unknown origin, on day two she was transferred to the Geriatric Unit for a comprehensive clinical assessment.

The following day the patient developed fever; blood and urine cultures were obtained, and ceftriaxone was initiated empirically. On physical examination no clear source of infection was identified. The known lower limb vascular ulcer, which had undergone dressings at home, appeared clean and close to complete healing. At this point the patient showed leukocytosis (17650*10^9/L) and raised CRP (41.6 mg/L), stable hemoglobin (89 g/L) and platelets (85*10^9/L); direct bilirubin was elevated (1.47 mg/dL), and PT remained prolonged (INR 2.17), findings attributed to congestive hepatopathy secondary to heart failure. Computed tomography (CT) of the chest and abdomen confirmed a massive right pleural effusion; in the remaining aerated lung, focal pneumonia could not be excluded; ground-glass opacities of possible infectious origin were noted in the left lung; ascites was noted at abdominal level. A transthoracic echocardiography showed no evidence of infective endocarditis.

Due to persistently raised inflammation markers after 3 days of ceftriaxone and preliminary blood culture results showing gram-negative rods, antibiotic therapy was escalated to piperacillin/tazobactam. Final culture results revealed multidrug-susceptible *Escherichia coli* in the urine and *P. canis* in the blood, susceptible to amoxicillin-clavulanate, ampicillin, ceftriaxone, and ciprofloxacin. Given the favorable clinical and biochemical response, piperacillin/tazobactam was continued. A decision was made not to de-escalate the antibiotic therapy as poor in-vivo response to cephalosporins (despite *in vitro* sensitivity) had already emerged.

Surveillance blood cultures obtained after 3 days of therapy showed no growth. Even if a significant pleural effusion was present, it was decided not to carry out a thoracentesis due to the persistent spontaneous PT elongation despite phytomenadione being administered and anticoagulants being withheld.

Upon further questioning, the patient reported regular contact with her nephew's dog, which visited her approximately every 2 weeks, but denied being bitten. This was her only known animal exposure.

Nevertheless, despite the good response to antibiotic therapy, the patient's heart failure worsened and ultimately became refractory to high-dose continuous infusion diuretics and optimization of medical treatment. End-of-life care was started, and the patient eventually died after 17 days of hospitalization.

Discussion

To our knowledge, this is one of the very few reported cases of *P. canis* invasive infection in adults. Following a literature review, we found only six previously published cases.[6-11] *P. Canis* rarely causes human infection; when it does, transmission usually occurs *via* animal bites or saliva, with soft tissue, joints and bone being the most common site of infection.[12-14] Nonetheless, alternative mechanisms of transmission have been reported: according to Bhat *et al.*,[10] *P. canis* can be transmitted by inhaled animal secretions leading to chronic bronchitis exacerbation. Moreover, according to Kaushal and Belachew,[15] *P. Canis* caused urinary tract infection without overt history of animal exposure.

In our case, the clinical presentation of sepsis was atypical as an isolated fever spike was documented alongside increased inflammation markers, although the patient did not show any relatable signs or symptoms. Two possible routes of infection were hence considered. One is that *P. canis* spread *via* inhaled dog secretions causing pneumonia followed by sepsis, supported by CT findings suggestive of pulmonary infection. Alternatively, a contact between the dog's saliva and the lower limb ulcer might have led to wound infection and sepsis – the chest infection therefore being caused by another agent. Given that the ulcer was nearly healed and showed no sign of local infection on admission, we believe respiratory transmission is most likely. Unfortunately, thoracentesis could not be carried out for safety reasons, precluding microbiological analysis of pleural fluid.

Notably, the patient lived alone and showed signs of initial cognitive impairment during hospitalization. As a result, a detailed medication history could not be reliably obtained; however, chronic immunosuppressive therapy was documented. This aligns with literature, as most reported adult cases of *P. canis* infection, whether or not invasive, occurred in immunocompromised individuals.[6,7,9,10,15] However, beyond medication-related immunosuppression *per se*, the altered functionality of the immune system linked to immunosenescence might have played a crucial role in making our patient more susceptible to sepsis, and other factors such as the patient's multimorbidity and frailty may have had an impact on the prognosis: multimorbidity and its interplay with the acute organ dysfunction that characterizes sepsis contributes to worse outcomes,[1] whereas frailty is generally linked to increased mortality and poor home discharge rates.[3]

Conclusions

This report presents an immunocompromised patient with *P. canis* sepsis of likely pulmonary origin, in which a respiratory transmission *via* dog secretions is speculated. The increasing prevalence of household pets in modern societies may contribute to a rising incidence of zoonotic infections. To date, this is one of the few reports of *P. Canis* invasive infection worldwide and, to our knowledge, the first described in Italy.

References

1. Ibarz M, Haas LEM, Ceccato A, et al. The critically ill older patient with sepsis: a narrative review. Ann Intensive Care 2024;14:6.
2. Martín S, Pérez A, Aldecoa C. Sepsis and immunosenescence in the elderly patient: a review. Front Med 2017;4:20.
3. Vitali A, Dini S, Cozza M, et al. Sepsis and septic shock in geriatrics. Geriatric Care 2024;10:11709.
4. Chatelier E, Mahieu R, Hamel JF, et al. Pasteurella bacteraemia: Impact of comorbidities on outcome, based on a case series and literature review. Int J Infect Dis 2020;92:89-96.
5. Holst E, Rollof J, Larsson L, et al. Characterization of Pasteurella species recovered from infected humans. J Clin Microbiol 1992;30:2984-7.
6. Davis BL, Rasnake M. Pasteurella canis/oralis: a tale of the immunocompromised. Cureus 2024;16:e64227.
7. Albert TJ, Stevens DL. The first case of Pasteurella canis bacteremia: a cirrhotic patient with an open leg wound. Infection 2010;38:483-5.
8. Faceira A, Póvoa S, Souteiro P, et al. Human infection by Pasteurella canis - a case report. Porto Biomed J 2017;2:63-5.
9. Nascimento B, Gomes AG, Coelho CN, et al. Septic arthritis and bacteremia due to infection by Pasteurella canis. Cureus 2021;13:e19478.
10. Bhat S, Acharya PR, Biranthabail D, et al. A case of lower respiratory tract infection with canine-associated Pasteurella canis in a patient with chronic obstructive pulmonary disease. J ClinDiag Res 2015;9:DD03-4.
11. Casallas-Rivera M, Faccini-Martínez A, Perdomo-Beltrán N, et al. Septicemia hemorrágica y empiema pleural por Pasteurella canis. Rev Chil Infectol 2016;33:85-8. [Article in Spanish].
12. Kaftandzieva A, Peneva M, Petrovska B, et al. Pasteurella canis as a cause of soft-tissue infection after dog bite: a case report. Maced J Med Sci 2013;6:74-8.
13. Kim B, Pai H, Lee KH, et al. Identification of Pasteurella canis in a soft tissue infection caused by a dog bite: the first report in Korea. Ann Lab Med 2016;36:617-9.
14. Ramiro GV, Gregorio AA, Luis GVJ, et al. Pasteurella canis as a cause of septic arthritis and soft tissue infection after sheep bite: a case report. Global J Med Clin Case Report 2016;3:012-4.
15. Kaushal K, Belachew W. "Whodunit": urinary tract infection by Pasteurella canis. Proceedings of UCLA Health, 2021;25(1).

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