



Case report

Disseminated *Pasteurella multocida* infection: Cellulitis, osteomyelitis, and myositis

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A B S T R A C T

A 67-year-old man with poorly controlled type II diabetes mellitus was evaluated for right lower extremity erythema and swelling and left-sided lower back pain. He was found to have *Pasteurella multocida* bacteremia; magnetic resonance imaging showed osteomyelitis of the lumbar spine with myositis in the adjacent left paraspinal muscles. He was initially treated with intravenous antibiotics and was later transitioned to oral amoxicillin. He recovered completely with six weeks of antimicrobial therapy.

Introduction

Pasteurella multocida should be considered as a possible cause of skin and soft tissue infection in patients with animal exposure, particularly to cats and dogs. These infections most commonly occur after bites or scratches, although they can also result from licks when the skin is not intact [1]. Symptoms often develop within 24–48 hours of the initial exposure [1]. Complications such as soft tissue abscesses, osteomyelitis, septic arthritis, and necrotizing fasciitis can occur [1], and are thought to arise predominantly from local extension of the infection [1–4]. This report describes a case of invasive disease due to *P. multocida* characterized by cellulitis complicated by vertebral osteomyelitis and paraspinal myositis at a distant anatomical site; these complications are thought to have occurred as a result of hematogenous spread of the infection. This constellation of clinical findings has not previously been described in the English-language literature.

Case presentation

A 67-year-old man with uncontrolled type II diabetes mellitus (hemoglobin A1c of 13.9 11 months prior to presentation), diabetic peripheral neuropathy, chronic foot wounds, and prior left below-the-knee and right fifth-digit ray amputations was evaluated for three days of right lower extremity erythema, pain, and swelling. The patient also described new, severe pain in the left lumbar paraspinal muscles during this time period. On the day prior to presentation, he developed subjective fever and chills. He reported exposure to a pet cat at home but

denied any known scratches or bites. At presentation, the patient was afebrile with a blood pressure of 85/55 mmHg, heart rate of 120 beats per minute, and oxygen saturation of 97% while breathing ambient air. The right lower extremity was warm to touch with erythema and pitting edema extending from the ankle to the knee; there was full range of motion in the ankle and knee joints. A blackened callus was present at the right fifth-digit ray amputation site, where the wound had previously been left to heal via secondary intention under a wound vacuum; it was without drainage or purulence at the time of presentation. His left-sided amputation stump appeared clean without erythema or swelling. The patient also had pain to palpation of the left paraspinal muscles in the L1–L5 region; there were no overlying skin changes in this area. Laboratory findings were notable for a white-blood-cell count of 5200 cells/microliter with 96% neutrophils and a lactic acid of 3.7 mmol/L (normal range: 0.5–2.2 mmol/L). The patient's hypotension and tachycardia improved with intravenous fluid resuscitation. He was given empiric vancomycin and ceftriaxone and admitted to the hospital. Admission blood cultures grew pan-sensitive *P. multocida* in two aerobic bottles and two anaerobic bottles. Contrast-enhanced magnetic resonance imaging of the lumbar spine showed osteomyelitis of the L4–L5 pedicles (Fig. 1) with associated myositis of the L1–L5 paraspinal musculature (Fig. 2). The patient improved with three days of ceftriaxone. He was then transitioned to oral amoxicillin, of which he completed a six-week course. All symptoms had resolved at the end of antimicrobial therapy.

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Fig. 1. Osteomyelitis of the L4–L5 pedicles due to disseminated *P. multocida* infection. Contrast-enhanced magnetic resonance imaging of the lumbar spine shows enhancement of the L4–L5 pedicles (see arrow).



Fig. 2. L1–L5 Left paraspinal myositis due to disseminated *P. multocida* infection. Contrast-enhanced magnetic resonance imaging of the lumbar spine shows enhancement of the left paraspinal muscles extending from L1–L5 (see arrow).

Discussion

We report a case of an older man with invasive *P. multocida* infection manifesting as cellulitis and bacteremia complicated by vertebral osteomyelitis and paraspinal myositis at a distant anatomical site. Although the patient denied any bites from his cat, he was suspected to have acquired the infection from his chronic wounds coming into contact with the cat's saliva. Osteomyelitis and myositis were thought to have occurred due to hematogenous spread of the infection from the right lower extremity.

Bone and joint involvement in *P. multocida* infection has most commonly been described following either direct inoculation of the periosteum at the time of a bite or from extension of skin and soft tissue infection [1]. Rarely, infection can spread to bone contiguously from the oropharynx, sinuses, or respiratory tract in colonized individuals [5,6]. Bacteremia with *P. multocida* usually accompanies a localized infection, and more commonly occurs in patients with an underlying predisposing condition, such as immunodeficiency, diabetes, chronic renal or liver disease, or at extremes of age, such as in neonates or the elderly [1,7,8]. This case is noteworthy in that hematogenous spread of *P. multocida* leading to osteomyelitis at a distant anatomical site is relatively uncommon [1,3]. Fifty-four cases of osteomyelitis at any site due to *P. multocida* have previously been reported in the English-language literature [1–19]. Forty-four of these cases were attributed to

direct inoculation of the periosteum or extension of cellulitis [1,8–19]; the remainder resulted from hematogenous dissemination or contiguous spread from the oral cavity, sinuses, or respiratory tract [1–7]. Only six cases of *P. multocida* vertebral osteomyelitis specifically have been reported [1–5]; five of these six cases were attributed to hematogenous spread [1–4] and one to contiguous spread from the oropharynx of a neonate [5]. There have been no reported cases of *P. multocida* myositis arising via hematogenous spread.

Our case is also unique in that, at the time of initial presentation, the patient had already developed complications of bacteremia. Osteomyelitis more commonly presents weeks to months after signs and symptoms of the initial infection [1].

Regarding treatment, oral amoxicillin is thought to be effective against *P. multocida* if the isolate does not produce beta-lactamase and appropriate drug levels can be attained in the target tissues [18]. In this case, the patient's isolate was sensitive to amoxicillin, which was dosed at 500 mg every eight hours to achieve sufficient blood levels. In addition, oral antibiotic therapy can be used to treat vertebral osteomyelitis in the appropriate clinical situation [19]. The chosen regimen treated the patient effectively.

Our patient's risk factors for *P. multocida* cellulitis and bacteremia were exposure to a cat, poorly controlled diabetes, and chronic wounds. In the presence of bacteremia, the patient's musculoskeletal complaints were highly concerning for a focus of metastatic infection. Practitioners should consider *P. multocida* infection in the appropriate clinical context, and should maintain a high index of suspicion for invasive disease.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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