



Case report

Pasteurella multocida prosthetic joint infectionMartin Runnstrom^{a,*}, Ryan Hyde^a, Kairav Shah^b^a University of Florida, Department of Medicine, 1600 Southwest Archer Road, Gainesville, 32610 FL, United States^b University of Florida, Department of Medicine, Division of Infectious Diseases and Global Medicine, 1600 Southwest Archer Road, Gainesville, 32610 FL, United States

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Introduction

Pasteurella multocida (*P. multocida*) is a Gram-negative coccobacillus that commonly causes cellulitis after a bite, scratch or lick from a cat or dog [1]. Rarely, it may cause invasive disease, which is more common in immunocompromised patients [2]. This may include osteomyelitis, sepsis, meningitis, peritonitis, endocarditis and septic arthritis. Septic arthritis is usually caused by direct injury to the same joint, or distal to the joint. We present a case of *P. multocida* causing septic joint in a prosthetic knee following hematogenous spread.

Case report

A 74-year-old male with morbid obesity, obstructive sleep apnea, gout, non-ischemic cardiomyopathy with an implantable cardioverter-defibrillator (ICD) for primary prevention, atrial fibrillation, osteoarthritis and a left total knee arthroplasty (TKA) presented to the emergency department for fever and leg swelling. He was a previous smoker with a 70-pack-year smoking history and he did not drink alcohol or take illicit drugs.

In the emergency department, his blood pressure was 97/65 mmHg, heart rate 105 beats/minute and respiratory rate was 30 breaths/minute. He had chronic bilateral lower extremity edema with evidence of chronic venous stasis with erythema that was worse on the right leg. Posterior to the right medial malleolus, he had what appeared to be a small chronic venous stasis ulcer surrounded by erythema, where the patient reported his dog (a Jack Russell terrier) had accidentally scratched him a few days prior. He denied exposure to any cats or birds or other animals. Laboratory investigations revealed leukocytosis at 13,800 cells/

mm³ (normal range 4000–10,000 cells/mm³) with 91.7% neutrophils (normal range 40–80%). Blood cultures were obtained and intravenous vancomycin 15 mg/kg every 12 h and intravenous cefepime 2 g every 8 h were initiated.

Blood cultures grew *P. multocida* in four out of four bottles, so antimicrobials were switched to intravenous ampicillin/sulbactam 3 g every 6 h. Two days into the admission, he developed worsening left knee pain, swelling and inability to bear weight on his left leg. X-ray of the left knee showed evidence of a new effusion (Fig. 1). Arthrocentesis revealed a cloudy appearing synovial fluid with 122,000 white blood cells/mm³ with 95% neutrophils. No crystals were seen. Cultures from the synovial fluid grew *P. multocida*. The following day the patient underwent left knee irrigation, debridement and left TKA revision. Bacterial cultures of the synovial fluid again grew *P. multocida*. Transesophageal echocardiography was performed and was negative for any valvular or ICD lead vegetations.

Hospital course was complicated by severe *Clostridium difficile* colitis requiring treatment with oral vancomycin 250 mg every 6 h. The *P. multocida* isolate was then tested for beta-lactamase production and was negative. Penicillin minimal inhibitory concentration was determined to be 0.19 µg/mL using an Epsilon-test strip and ampicillin/sulbactam was switched to a continuous intravenous infusion of penicillin G 24 million units per 24 h to help minimize the impact on the gut microbiome. The patient improved and was eventually discharged to complete a total of 6 weeks of intravenous penicillin G. Because the patient had retained hardware he was continued on oral suppressive therapy with penicillin V 500 mg every 8 h after he finished the intravenous antibacterials, with the plan to continue that therapy for 12 months.

Discussion

P. multocida is commonly part of the normal oral flora of cats and dogs and infection is usually caused by bites, scratches or licks

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Fig. 1. X-ray of the left knee showing left knee arthroplasty with interval increase in joint fluid suggesting a new effusion.

from these animals [2]. Reported cases of septic arthritis caused by *P. multocida* are rare and more commonly associated with damaged joints from long standing arthritis, in patients with prosthetic joints or in patients that are immunosuppressed from corticosteroid use or alcoholism [2,3]. Most commonly, the infected joint is ipsilateral to the initial site of injury suggesting direct inoculation into the joint as the cause or local spread, potentially through lymphatics [3,4].

Treatment of choice includes beta-lactam/beta-lactamase inhibitors such as ampicillin/sulbactam, alternatives include fluoroquinolones and doxycycline [2]. Occasional strains produce beta-lactamases making them resistant to penicillin and ampicillin [5,6].

Mortality associated with *P. multocida* septic arthritis is unknown. Bacteremia from the same organism carries a mortality rate of approximately 30% and prompt treatment with intravenous empiric antimicrobials is recommended if infection is suspected [7]. Patients with severe liver disease and patients undergoing chemotherapy for hematologic malignancy seem to be at higher risk for disseminated disease [7]. If septic arthritis is suspected synovial fluid aspiration and analysis should be performed and if confirmed, consideration of irrigation and debridement should be made.

Our patient had evidence of chronic venous insufficiency in his lower extremities and had a small scratch on his right leg caused by his dog a few days prior to the onset of the cellulitis. The cellulitis then likely resulted in bacteremic seeding of his left knee causing septic arthritis. This is a rare case of septic arthritis in an immunocompetent patient caused by *P. multocida* cellulitis that affected the patient's contralateral leg through hematogenous spread.

Declarations of interest

None.

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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.

Author's contribution

Martin Runnstrom, Ryan Hyde and Kairav Shah: each person contributed to taking care of the patient during the hospitalization, data review, literature review, writing and editing the paper including revision. Each author has read and agreed to the journal policies. Each author agrees to the final publication of this paper.

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