



Case report

Campylobacter jejuni prosthetic joint infection in an ulcerative colitis patient in the absence of gastrointestinal symptoms



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ABSTRACT

73-year-old man with ulcerative colitis was diagnosed with *Campylobacter jejuni* prosthetic knee infection. No preceding gastrointestinal illness was reported. Joint aspirate and operative cultures were negative; however, blood cultures were positive for *Campylobacter jejuni*. The role of ulcerative colitis in inducing bacteremia and subsequent prosthetic joint infection is discussed.

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Introduction

Campylobacter jejuni is most commonly known as a foodborne pathogen that causes about 1.5 million illnesses each year in the United States [1]. Gastroenteritis generally occurs following the consumption of contaminated undercooked meat, particularly poultry [1]. This illness is self-limited and does not usually require antibacterial treatment. While gastroenteritis is a common manifestation of *Campylobacter* species infection, subsequent bacteremia and joint space infections are uncommon. Here we describe a case of *Campylobacter jejuni* prosthetic joint infection following bacteremia in a patient with ulcerative colitis that presented without any associated intestinal symptoms.

Case report

A 73-year-old man with a prosthetic right knee joint presented to the emergency room with sudden onset of right knee pain, redness, and swelling. He reported a history of atrial fibrillation, ulcerative colitis, prostate cancer, and hypertension. His medications included apixaban, mesalamine, 6-mercaptopurine, leuprolide, lisinopril, metoprolol, and rosuvastatin. He also had extensive history of right knee surgery including a right total knee arthroplasty in 2007, a lysis of adhesions in 2012, and two manipulations under anesthesia, one of which was complicated by wound dehiscence. At that time, he underwent irrigation and debridement and was started on five weeks of antibacterial

therapy, though cultures were negative. Since then, the patient reported that he has had mild knee stiffness.

However, on the morning of admission, the patient described difficulty with range of motion of the right knee and an inability to ambulate. He denied trauma or inciting event, stating that he was able to ambulate well the previous day. He denied a history of gout, subjective fever, chills, cough, nausea, vomiting, or diarrhea. The patient was retired and lived at home with his wife. He denied contact with animals and reported no recent travel. He reported eats cooked meat at home and at restaurants regularly, although he did not feel he had eaten anything out of the ordinary.

On physical examination, the patient was febrile with a temperature of 39.2 °C, with heart rate of 81 bpm and blood pressure of 136/78 mmHg. There was swelling of the right lower extremity from the ankle to the mid-thigh. His right knee was markedly warmer than his left and was tender to palpation with a limited range of motion. There was no rash, erythema, or obvious signs of trauma noted. Knee radiographs were taken and showed osteolysis surrounding both the femoral and tibial implants as well as a moderate joint effusion. An arthrocentesis of the right knee yielded 30 mL of bloody purulent fluid that was sent for analysis and culture. Preliminary studies of joint aspirate showed 212,000 red blood cells/ μ L, 35,100 white blood cells/mm³ with 97 % segmented neutrophils, with the absence of crystals. Initial laboratory assessment demonstrated a complete blood count and comprehensive metabolic panel that were at baseline. However, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were elevated at 61 mm/hr and 1.741 mg/dL, respectively. Gram stain of the joint aspirate was negative with moderate neutrophils. Bacterial cultures of aspirate yielded no organisms. Although this synovial fluid analysis may have

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represented an inflammatory arthritis, the history of prosthetic right knee joint with multiple surgeries made the diagnosis most consistent with septic arthritis until proven otherwise. Therefore, the patient was started on empiric intravenous (IV) vancomycin dosed to trough of 15–20 µg/mL and cefepime 2 g IV every 8 h.

On hospital day five, 1 of the 4 admission blood cultures were positive for *Campylobacter jejuni*. With this result, vancomycin and cefepime were discontinued and the patient was started on ertapenem 1 g IV every 24 h. He then underwent explantation of the right total knee arthroplasty with placement of a vancomycin and tobramycin saturated spacer. During the procedure, cloudy sanguineous material was noted along with loose hardware. Two periprosthetic tissue samples were sent for aerobic, anaerobic, and fungal cultures as well as gram stain. However, these samples returned with negative results. Repeat blood cultures after five days of treatment with vancomycin/cefepime and two days of ertapenem also returned with negative results. Transthoracic echocardiogram (TTE) and transesophageal echocardiogram (TEE) were scheduled to rule out endocarditis in the setting of bacteremia, however the patient was unable to tolerate the TEE after the TTE was unremarkable for endocarditis. The blood culture report was finalized without antibacterial susceptibility data and patient was discharged with instructions to continue ertapenem 1 g IV for a duration of 6 weeks. This allowed for broad coverage of most organisms other than methicillin-resistant *Staphylococcus aureus* (MRSA) or *Pseudomonas*, as recurrent prosthetic joint infections are commonly polymicrobial [2].

After completing six weeks of IV ertapenem, the patient had decreased swelling of his knee. However, he continued to complain of persistent limitation with range of motion. Full extension of his right knee was limited by 10 degrees and flexion was less than 45 degrees. His ESR and CRP had declined to 27 mm/hr and 1.444 mg/dL, respectively. Due to the persistence of his symptoms after treatment with IV ertapenem, the patient was placed on oral moxifloxacin 400 mg daily and amoxicillin-clavulanate 875 mg twice daily for 8 weeks. At the end of this course, he had improvement of his knee flexion to 70–80 degrees with minimal swelling. His ESR and CRP had decreased to 12 mm/hr and 0.388 mg/dL, respectively. To ensure his infection was cleared, the patient agreed with orthopedic surgery to keep the spacer, an all-poly tibial and femoral implant, while he considered his options for total knee arthroplasty.

Discussion

Campylobacter bacteremia associated with prosthetic joint infection (PJI) as seen in our patient are very rare extraintestinal manifestations of infection [3]. To our knowledge, less than twenty-five cases of *Campylobacter* PJI have been reported worldwide [4–8]. Of these cases, most have been associated with *Campylobacter fetus*, while only three have been associated with *Campylobacter jejuni* [4–7]. Initial infection with *Campylobacter* species commonly presents as acute gastroenteritis [1]. However, some studies have found that a sizable portion (up to 45.5 %) of patients with *Campylobacter* bacteremia did not present with intestinal symptoms such as watery diarrhea and abdominal pain [3]. Additionally, five cases of *Campylobacter* PJI have been reported with no preceding diarrheal illness like in our patient [5]. *Campylobacter* bacteremia is more frequently seen in immunocompromised patients with the most common source of blood stream infection being intrabdominal [3,4]. Transient bacteremia as a result of gastrointestinal translocation is a well understood phenomenon, even in healthy individuals. However, in

immunosuppressed patients and those with compromise of the intestinal barrier, sepsis is more likely to ensue [9]. Furthermore, once bacteria enter the bloodstream, they are more likely to infect sites of prosthesis due to biofilm formation [10]. Therefore, we reason that the *Campylobacter jejuni* easily translocated this already immunosuppressed patient's impaired gut mucosa due to his ulcerative colitis and seeded his prosthetic knee joint, resulting in PJI [11].

As *Campylobacter* species are slow growing fastidious organisms, isolation from our patient's joint fluid and periprosthetic tissue samples proved to be difficult. *Campylobacter* species require 72–96 hours of incubation to be isolated from stool samples and can take even longer from blood samples [12]. As *Campylobacter jejuni* is a thermophilic organism, it grows best at 42 °C [12]. Growth of *Campylobacter jejuni* also improves under micro-aerophilic conditions and with the use of Mueller Hinton broth and agar [8,13]. Another method of isolating *Campylobacter* species includes the usage of real-time PCR assay on sonicated fluid [12]. In our patient's case, notification of the microbiology laboratory to use targeted culture media and incubation conditions may have yielded a positive joint fluid or periprosthetic tissue sample, given the high clinical suspicion of *Campylobacter* PJI. However, even with strategies to optimize yield, sensitivity of culturing this organism remains to be 39–70 % [14]. Furthermore, 7–50 % of PJI cases have yielded negative culture results [14].

This case illustrates a unique association between immunosuppression and chronic intestinal inflammation with *Campylobacter* bacteremia leading to PJI. With this case, we also demonstrate that *Campylobacter jejuni* sepsis may not present as it does classically with gastrointestinal symptoms. Finally, this case further underscores the criticality of communication between the clinician and microbiologist in identifying an uncommon pathogen.

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