

# Capnocytophaga canimorsus Periprosthetic Joint Infection in an Immunocompetent Patient: A Case Report

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Blane C. Kelly, MD<sup>1</sup>, David S. Constantinescu, BS<sup>1</sup>,  
and William Foster, MD<sup>1</sup>

## Abstract

**Introduction:** A periprosthetic joint infection (PJI) is a potentially devastating complication following an arthroplasty procedure. There are many organisms that commonly cause this complication; in this case report, we will discuss a PJI caused by an unusual bacteria found in the mouths of domestic pets. **Objective:** To present a case report of a patient with a periprosthetic hip infection from *Capnocytophaga canimorsus* and review the literature. **Methods:** We present a case of *C canimorsus* PJI in an immunocompetent woman who had undergone a total hip arthroplasty. The patient was doing well postoperatively for many years until she was bitten on the foot by a domestic canine. Patient diagnosed using Musculoskeletal Infection Society criteria, then treated with explant of the hip prosthesis, irrigation and debridement, placement of an antibiotic cement spacer, and a 6-week course of intravenous antibiotics. **Results:** Unfortunately, while awaiting replant, this patient had a massive myocardial infarction and died. **Discussion:** Current literature suggests treating canine bites with amoxicillin as well as a discussion with patients pre-/postoperatively from a lower extremity arthroplasty specialist. **Conclusion:** *Capnocytophaga canimorsus* is a rare cause of infection, even more unusual in an immunocompetent patient. This study highlights the importance of considering *C canimorsus* as a cause of PJI, regardless of the immunologic status of the patient.

## Keywords

periprosthetic joint infection

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## Introduction

A periprosthetic joint infection (PJI) is a potentially devastating complication following an arthroplasty procedure.<sup>1</sup> Diagnosis of a PJI relies on inflammatory markers, diagnostic imaging, and synovial fluid aspiration and culture.<sup>2</sup> *Capnocytophaga canimorsus* is a commensal bacterium species found in the saliva of both canine and feline species.<sup>3-5</sup> Clinically significant infections in humans most often occur in the immunocompromised, in the setting of asplenia, cirrhosis, or alcohol abuse.<sup>6</sup> Early recognition and appropriate treatment is crucial for patient survival and avoidance of PJI. These immune compromised patients are more susceptible to serious life-threatening long-term sequel and have a worse prognosis with *C canimorsus* infections.

*Capnocytophaga canimorsus* is a very rare cause of PJI, particularly in the immunocompetent.<sup>7,8</sup> We present a case of infection in an immunocompetent patient to further illustrate the importance of considering *Capnocytophaga*, regardless of immunologic status, particularly when a history of animal bite is present.

## Case History

A 58-year-old female with a history of a left total hip arthroplasty (THA) performed 3 years prior presented with increasing left hip pain 2 to 3 weeks after being bitten by her dog. She denied systemic symptoms of illness but rather experienced an insidious onset of left hip pain in the preceding weeks. Patient presented with a mildly elevated white blood cell count of 11 700, a C-reactive protein (CRP) of 15.5, and erythrocyte sedimentation rate (ESR) of 89. Her plain film showed a well-fixed implant with overall satisfactory alignment and no evidence of loosening (Figure 1).

<sup>1</sup> Virginia Commonwealth University Health System, Richmond, VA, USA

## Corresponding Author:

Blane C. Kelly, Virginia Commonwealth University Health System, 4214 Round Hill Dr, Richmond, VA 23298, USA.

Email: blane.kelly@vcuhealth.org





**Figure 1.** Initial presentation 2 weeks after canine bite to the ipsilateral lower extremity, demonstrating well-fixed implants within acceptable parameters regarding position.

Ultrasound-guided aspiration of the left hip was performed and the fluid was sent for microbial examination and culture. A Gram stain was reported to be negative; however, the culture speciation at 24 hours was consistent with *C canimorsus*. Within 3 days of presentation, the patient developed a draining sinus tract at area remote to the aspiration.

This patient met Musculoskeletal Infection Society major criteria for PJI with the draining sinus tract as well as additional minor criteria of elevated inflammatory markers and 1 positive culture. After explant with irrigation and debridement, a prefabricated articulating gentamicin-loaded cement spacer was implanted. Three intraoperative cultures were collected. One of these grew *C canimorsus*. A multidisciplinary approach to patient treatment was utilized with the infectious disease team who recommended a treatment of ceftriaxone for 6 weeks. Ceftriaxone was recommended rather than amoxicillin because the patient had a previous anaphylactic reaction to amoxicillin. Postoperatively, patient had inflammatory markers that were downtrending with CRP of 3.5 mg/dL at 4 weeks and 1.5 mg/dL at 6 weeks. While awaiting replant, the patient experienced a myocardial infarction and died.

## Discussion

The most common organisms responsible for PJI are *Staphylococcus aureus* and *Staphylococcus epidermidis*.<sup>9</sup> Involvement of atypical bacteria such as *C canimorsus* is unique within the literature. Given that this patient had been doing well for years before experiencing pain, erythema, and a draining sinus tract 2 weeks after a dog bite on the foot with an ipsilateral THA, the simplest explanation is that the dog bite was the inciting event for this devastating PJI.

Current literature suggests treating canine bites with amoxicillin as well as a discussion with patients pre-/postoperatively from a lower extremity arthroplasty specialist.<sup>6</sup>

## Summary

*Capnocytophaga canimorsus* is a rare cause of infection, even more unusual in an immunocompetent patient. It was likely caused by a dog bite, the resulting PJI was treated with an antibiotic spacer and ceftriaxone. Cultures, laboratory markers, and clinical examination would be in favor of this patient clearing the infection. Unfortunately, this patient had a myocardial infarction 4 months after her antibiotic treatment and died. Our study highlights the importance of considering *C canimorsus* as a cause of PJI, regardless of the immunologic status of the patient. Early detection and treatment is crucial in the prognosis of the patient.

## Declaration of Conflicting Interests

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