



Case report

Double valve infective endocarditis due to *Capnocytophaga canimorsus*Amye Harrigan^a, Kyle Murnaghan^{b,*}, Mark Robbins^c^a Division of Hematology, Dalhousie University, Nova Scotia Health Authority, Canada^b Division of Cardiology, Dalhousie University, Nova Scotia Health Authority, Canada^c Division of Infectious Diseases, Dalhousie University, Nova Scotia Health Authority, Canada

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ABSTRACT

Infective endocarditis caused by *Capnocytophaga canimorsus*, a commensal organism commonly found in dog saliva, is uncommon. We describe a case of a 76-year-old male with native aortic and mitral valve endocarditis with ventricular-atrial fistulization due to *Capnocytophaga canimorsus*. He was successfully treated with intravenous antimicrobials and surgery. *Capnocytophaga canimorsus* should be considered as a cause of infective endocarditis in patients with negative blood cultures, in asplenic patients, and in those with appropriate exposures.

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Introduction

Infective endocarditis is a life-threatening infection most commonly caused by gram-positive organisms. Zoonotic organisms are an uncommon cause [1]. *Capnocytophaga canimorsus* is a gram-negative bacterium that is found as a part of the normal oral flora of dogs. It is known to cause a variety of infections in humans including septicemia, meningitis, and, rarely, infective endocarditis [2]. We report a case of *C. canimorsus* infective endocarditis of both the aortic and mitral valves complicated by ventricular-atrial fistulization.

Case report

A 76-year-old male presented to a community emergency department with a month of fatigue, anorexia, and dyspnea. His medical history was notable for hypertension, type two diabetes, smoking, and alcoholism. There his temperature was 37.8 degrees Celsius, heart rate was 56 beats per minute, blood pressure 132/53 mmHg, respiratory rate 40 per minute and oxygen saturation was 94% on room air. His initial exam was notable for bilateral pulmonary crackles. Investigations revealed a white blood cell count of 35,000/ μ L, creatinine of 1.38 mg/dL, and a troponin-I of 0.128 ug/L. Chest x-

ray showed pulmonary edema. Electrocardiogram showed first degree AV block with left bundle branch block. He had no previous for comparison. Two sets of blood cultures were drawn, and he was treated with ceftriaxone, furosemide, and supplemental oxygen. He subsequently developed worsening dyspnea and was found to have developed third degree heart block, requiring transvenous pacing. Echocardiography demonstrated aortic valve endocarditis. He was then transferred to the coronary care unit at a tertiary care center for ongoing care.

On arrival to the Cardiac Intensive Care Unit, transesophageal echocardiography confirmed native aortic valve endocarditis with vegetation and abscess involving the non-coronary sinus and lateral aspect of the annulus with fistula into left ventricular outflow tract and small shunt into the right atrium. There was also additional involvement of the mitral-aortic continuity with large vegetation noted to be extending into the left atrium. On admission-day five gram negative rods were identified in his blood cultures. On admission day six, MALDI-TOF mass spectrometry identified this organism to be *Capnocytophaga canimorsus*. This was found to be sensitive to ceftriaxone, ampicillin, and ciprofloxacin. After *C. canimorsus* was identified, the patient was asked about dog exposure. He reported repeat severe dog bites occurring over the past three months.

Given the extensive valvular involvement, the patient underwent cardiac surgery on post-admission day 10. He had aortic valve replacement, mitral valve repair, and closure of a Sinus of Valsalva aneurysm. Pathology of the aortic valve demonstrated two aortic

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valve cusps, with two tan-brown confluent vegetations (2.3 cm) on one, associated with cusp perforation (0.8 cm) and cusp aneurysm (0.9 ×0.9 ×0.8 cm). Gram-stain and bacterial culture of the aortic valve were negative. Post-operative blood cultures were negative. His post-operative course was uncomplicated and he was discharged on post-admission day twenty. The planned duration of antimicrobial treatment is six weeks.

Discussion

Capnocytophaga canimorsus is a gram-negative rod first isolated in 1976 from a patient with septicemia following a dog bite [3]. This bacterium is a commensal organism that is part of the normal oral flora of dogs. The most frequent reported mode of transmission of this organism to humans is through bites. Although healthy individuals can become infected with *C. canimorsus*, individuals who are asplenic or abuse alcohol have been found to be at greatest risk [4]. *Capnocytophaga canimorsus* can be challenging to isolate and identify in the microbiology lab. Blood cultures require longer periods of incubation before becoming positive [5]. In cases where there is a clinical suspicion of *C. canimorsus* infection but the sterile clinical materials sent for traditional microbiologic work up are negative or the isolated organism is reported as “gram negative rods” that cannot be further identified, polymerase-chain-reaction sequencing of sterile clinical materials can be used for identification [6].

Infective endocarditis caused by *C. canimorsus* is a rare entity with 20 reported cases. Our patient, a 76-year-old male, is the oldest reported individual with *C. canimorsus* endocarditis. His biological sex, history of alcohol misuse and history of recent dog bite are all factors that have been identified as increasing the risk for *C. canimorsus* endocarditis. Our case is the fourth reported case of double native valve endocarditis and the second of *C. canimorsus* native valve endocarditis affecting the aortic and mitral valve [7].

This case highlights *C. canimorsus* as a rare cause of infective endocarditis. Suspicion for *C. canimorsus* infective endocarditis should be raised in patients who have had recent contact with dogs and whose medical history includes alcoholism and asplenia. In patients with blood culture negative endocarditis, it is reasonable to add *C. canimorsus* as a possible etiology. If there is suspicion of *C.*

canimorsus endocarditis, it is important for physicians to contact the microbiology laboratory to discuss how best maximize the possibility of isolating and identifying the organism. A multidisciplinary team including cardiology, infectious disease and cardiovascular surgery should be involved in the care of these patients.

Ethical approval

Approved case report.

Consent

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

Author contribution

Amye Harrigan: Primary author. Wrote first drafts, completed literature review. Kyle Murnaghan: Editor, corresponding author. Mark Robbins: Academic supervisor, editor.

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