



## Case report

# Mycotic aortic aneurysm due to *Capnocytophaga* species infection treated non-surgically



Kristen Westenfield<sup>a,\*</sup>, Matthew Glogozza<sup>a</sup>, David Tierney<sup>a</sup>, Jason Sanchez<sup>b</sup>

<sup>a</sup>Abbott Northwestern Hospital - Department of Graduate Medical Education, Minneapolis, MN, USA

<sup>b</sup>Infectious Disease Consultants PA, Minneapolis, MN, USA

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## ABSTRACT

*Capnocytophaga canimorsus*, a commensal organism in canine flora, is most frequently transmitted to humans via animal bite. Infection can lead to multiorgan failure, disseminated intravascular coagulation, and uncommonly mycotic aneurysm. We present a case of a 65-year-old male who presented to the emergency department with right lower quadrant abdominal pain, nausea with vomiting, and diarrhea that began the evening prior to presentation. A computed tomography (CT) scan of the abdomen and pelvis with contrast demonstrated a 4.3 cm fusiform infrarenal aortic aneurysm concerning for a mycotic aneurysm. Vascular surgery felt there was a low likelihood of rupture and empiric antimicrobials were started. Eventually blood cultures grew a *Capnocytophaga* species and antimicrobials were then narrowed to imipenem. No surgical intervention was performed. Serial imaging showed stability of aneurysm with improvement and later complete resolution of inflammatory changes one month after onset of symptoms. This is the first reported case of *Capnocytophaga* mycotic aneurysm that was treated with antimicrobials alone and no surgical intervention.

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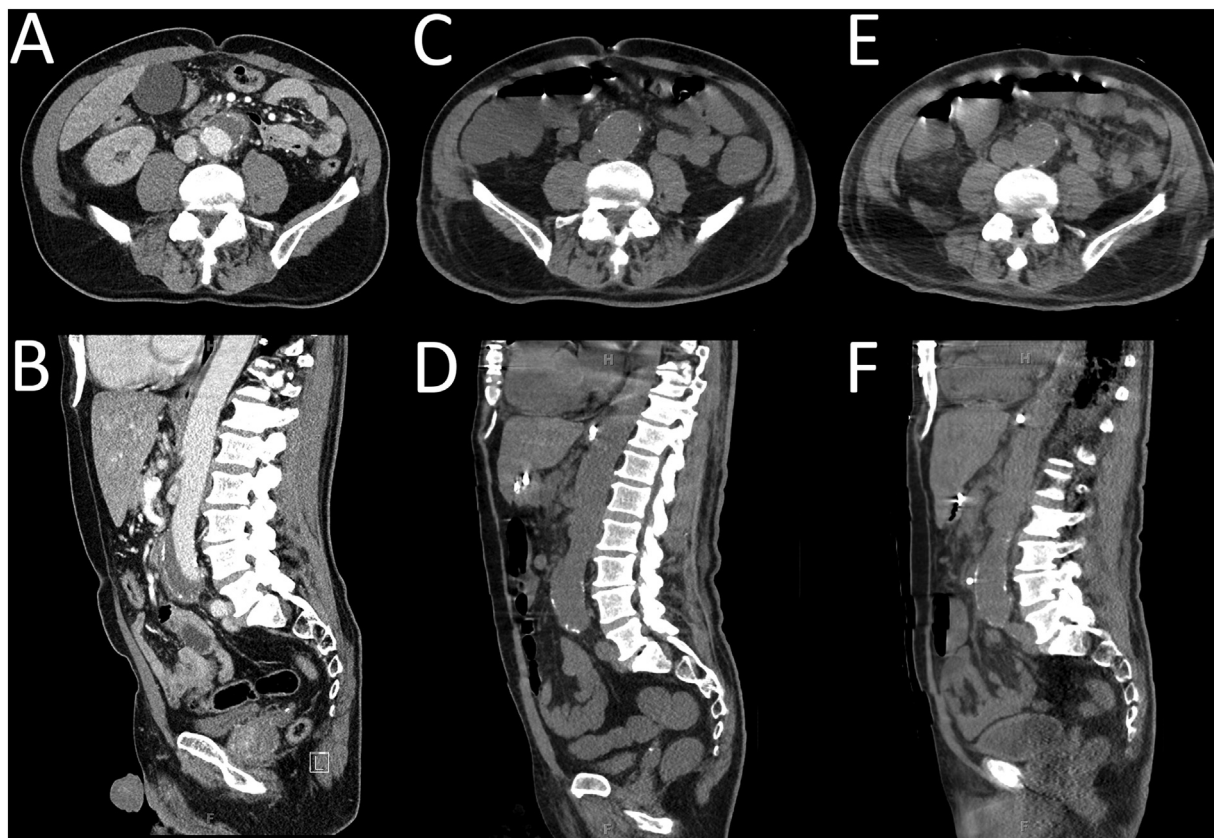
## Case report

A 69-year-old male presented to his local emergency department with right lower abdominal pain, nausea with vomiting, and diarrhea that began the evening prior to presentation. His medical history included coronary artery disease with a prior coronary artery bypass grafting, hyperlipidemia, and current smoker. At the outside emergency department, he was febrile (40.2C) and tachycardic. Physical examination was notable for tachypnea and a diffusely tender abdomen. Laboratory evaluation revealed leukopenia, thrombocytopenia, creatinine 1.76 (0.72–1.25 mg/dL), lactate 7.4 (0.5–2.0 mmol/L), and procalcitonin 90.94 (<0.50 ng/mL). A computed tomography (CT) scan of the abdomen and pelvis with contrast demonstrated a 4.3 cm fusiform infrarenal aortic aneurysm with mild wall thickening and a diffuse distribution of stranding concerning for a mycotic aneurysm (Fig. 1A–B). Vascular surgery felt there was a low likelihood of rupture based on the uniform appearance of inflammatory changes. The patient was started on empiric cefepime, vancomycin, and metronidazole.

Within hours of presentation, the patient developed purpura fulminans with labs concerning for disseminated intravascular coagulation and multiorgan failure. He was transferred to our tertiary hospital for consideration of extracorporeal membrane oxygenation given possible need for surgical intervention and coagulopathy. The patient later reported that three days prior to presentation he suffered a dog bite to his right hand. Due to continued decompensation and dog bite exposure his antimicrobials were switched to imipenem, clindamycin, ciprofloxacin, and vancomycin for coverage of *Capnocytophaga*, *Streptococcus* and *Staphylococcus* species, and anaerobes. On hospital day seven, one of four blood culture bottles grew gram-negative bacteria. Repeat noncontrast CT of the abdomen on hospital day seven showed stabilization of the aneurysm with resolution of inflammatory changes around the anterior wall of the aorta (Fig. 1C–D). On hospital day ten, the initial set of blood cultures returned positive for *Capnocytophaga* species, beta-lactamase negative. Other serial blood cultures from time of admission and hospital day two were without any growth. Antimicrobials were then narrowed to imipenem for coverage of *Capnocytophaga* and ongoing coverage of other bacterial species that are more commonly found to cause mycotic aneurysms. He completed a four-week course of intravenous antimicrobials. The patient's hospital course was complicated by hemodialysis-dependent renal failure, ventilator dependent respiratory failure, stress cardiomyopathy, *Candida albicans*

\* Corresponding author at: Abbott Northwestern Hospital, 800 E. 28th Street, Minneapolis, MN, USA.

E-mail address: [kristen.westenfield@allina.com](mailto:kristen.westenfield@allina.com) (K. Westenfield).



**Fig. 1.** Serial transverse and sagittal computed tomography (CT) images. Images A and B were obtained on hospital day one, demonstrating a 4.3 cm fusiform infrarenal abdominal aortic aneurysm with mild wall thickening and hazy attenuation consistent with a mycotic aneurysm. Images C and D were obtained on hospital day eight, showing resolution of inflammatory changes. Images E and F were obtained on hospital day thirteen, again with resolution of inflammatory changes.

fungemia with suspected central line associated bloodstream infection, and severe purpura fulminans covering 27 % of his total body surface area which resulted in significant necrosis of bilateral lower extremities, left index finger, penis, and nose. He eventually required surgical debridement and skin grafts of those wounds as well as a right below-the-knee amputation. Prior to transferring to a long-term care hospital a final noncontrast CT of the abdomen showed continued stability of aneurysm with complete resolution of inflammatory stranding encompassing the aorta (Fig. 1E–F). Since, he had three follow up abdominal CT scans at one month, seven months and one year following initial imaging, all of which showed stability of the 4.0 cm abdominal aneurysm.

## Discussion

*Capnocytophaga canimorsus* is a fusiform gram-negative rod and facultative anaerobe. The organism is commensal in canine and feline oral flora. It is usually transmitted to humans via dog or cat bite, but can also be transmitted by scratch, lick, or close contact. The median onset of symptoms is three days following the bite [1]. It is estimated that *C. canimorsus* is present in the oral cavity of up to 74 % of dogs [2]. Patients who are asplenic, immunocompromised, or have a history of alcohol abuse are suspected to have increased susceptibility of infection, however some data suggests at least 50 % of cases occur in immunocompetent individuals [3].

Patients with *C. canimorsus* can present with septic shock, disseminated intravascular coagulation, multiorgan failure, meningitis, acute respiratory distress syndrome and uncommonly with a mycotic aneurysm [1,3,4]. Severe *Capnocytophaga* infections are often treated with a beta-lactam/beta-lactamase or a carbapenem.

There have been some studies to suggest increasing reports of betalactamase producing strains as well as fluoroquinolone resistance. If resistance to cephalosporins, penicillins, or carbapenems is present, treating with clindamycin is an alternative choice [5,6]. The few reported cases of aortic mycotic aneurysm caused by *C. canimorsus*, were repaired with open surgical reconstruction due to ulcerations and hemorrhage [2,3,7]. Our case is the first to report a patient treated with conservative medical management with stabilization of aneurysm size and resolution of inflammatory changes seen on serial CT scans.

Mycotic aneurysms are a rare and life-threatening condition, constituting only 0.6 % of aneurysms. Infections can result from direct inoculation, hematogenous spread, contiguous infection, such as osteomyelitis or pancreatic pseudocyst, or lastly septic emboli [8]. The most common causative agents include *Staphylococcus* species, *Streptococcus pneumoniae*, *Enterococcus*, and *Salmonella* species. Notably gram-negative organisms tend to cause more virulent infections with increased risk of rupture and mortality compared with gram-positive counterparts [8]. Currently, the standard of care of mycotic aneurysm includes early diagnosis, antimicrobial therapy, and surgical intervention. Open or endovascular repair is important for identification of the microbe, containment of the infection, and management of potential ischemia. As previously stated, the three case reports caused by *C. canimorsus* were repaired surgically [2,3,7]. There is far less data regarding treatment of mycotic aneurysm caused by any organism with antimicrobial therapy alone as seen in our patient. One retrospective study of 22 patients treated with antimicrobials alone due to significant comorbidities, old age, or patient preference demonstrated a 50 % in-hospital mortality rate.

The most common cause of death was aneurysmal rupture [9]. Additionally, there have not been any prospective studies regarding duration of antimicrobial therapy, however, general guidelines suggest at least a six-week course of antimicrobials studies have normalized. Lifelong antimicrobial therapy remains controversial [8].

In conclusion, we have reported the first case of a *Capnocytophaga* aortic mycotic aneurysm successfully treated with antimicrobial directed therapy alone. Given the rarity of this diagnosis and clinical findings, this case highlights the importance of sharing experiences through publications such as case reports, case series, and letters to the editor. It highlights the value of sharing unique clinical cases or findings to promote research and advancement in clinical practice.

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### Ethical approval

This manuscript was created in accordance with the ethical standards of the institutional research committee.

### 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 contribution

Kristen Westenfield, MD - writing of manuscript.  
Matthew Glogoza, MD - writing of manuscript.  
David Tierney, MD - writing of manuscript.  
Jason Sanchez, MD - writing of manuscript.

### Author statement

The authors of this manuscript have made adjustments based on recommendations of reviewers. We do not have any rebuttals to the suggestions made by the reviewer.

### Declaration of Competing Interest

None of the authors involved in the creation of this manuscript have any conflicts of interest to report.

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