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CASE REPORT

# Successful treatment of mitral valve endocarditis in a dog associated with ‘*Actinomyces canis*-like’ infection



N. Balakrishnan, M.S., PhD<sup>a</sup>, K. Alexander, DVM<sup>a</sup>, B. Keene, DVM<sup>a</sup>, S. Kolluru, B.S.<sup>a</sup>, M.L. Fauls, B.S.<sup>b</sup>, I. Rawdon, DVM<sup>a</sup>, E.B. Breitschwerdt, DVM<sup>a,\*</sup>

<sup>a</sup> Department of Clinical Sciences and the Intracellular Pathogens Research Laboratory, Center for Comparative Medicine and Translational Research, North Carolina State University, 1060 William Moore Dr., Raleigh, NC 27607, USA

<sup>b</sup> Clinical Microbiology Laboratory, College of Veterinary Medicine, North Carolina State University, 1060 William Moore Dr., Raleigh, NC 27607, USA

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## KEYWORDS

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**Abstract** Infective endocarditis, an inflammation of the endocardial surface due to invasion by an infectious agent, is more common in middle sized to large breed dogs. We herein report a case of mitral valve endocarditis in a 9-year-old male-castrated Weimaraner caused by an *Actinomyces canis*-like bacterium, not previously reported in association with infection in dogs.

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## Case description

On February 2015, a 9-year-old male-castrated Weimaraner (33.5 kg), was referred to the North Carolina State University, College of Veterinary Medicine, Veterinary Hospital (NCSU-CVM-VH) for

evaluation of lethargy and hyporexia of 5 days duration. Two other household dogs remained healthy. Historically, the dog had access to a wooded area with tall grass that had resulted in tick attachments. Vaccination status was current and the dog received heartworm and flea and tick preventive products.

When initially examined by the referring veterinarian two days before NCSU-CVM-VH admission,

\* Corresponding author.

E-mail address: [ed\\_breitschwerdt@ncsu.edu](mailto:ed_breitschwerdt@ncsu.edu) (E.B. Breitschwerdt).

Abbreviation	
ALP	alkaline phosphatase
BAPGM	<i>Bartonella</i> alpha Proteobacteria growth medium
CBC	complete blood count
HCT	hematocrit
IE	infective endocarditis
ITS	intergenic transcribed spacer
LRS	Lactated Ringers solution
NCSU-CVM-VH	North Carolina State University, College of Veterinary Medicine, Veterinary Hospital
P.O.	Per os
PCR	polymerase chain reaction
RR	reference range
SQ	subcutaneous

the dog was febrile (104.5 °F) and had hemoatochezia. Laboratory abnormalities included anemia (hematocrit [HCT] 36.5%, reference range [RR] 37.3–61.7), neutrophilia (11.9 K/ $\mu$ L, RR: 2.95–11.64), lymphopenia (0.85 K/ $\mu$ L, RR: 1.05–5.10), thrombocytopenia (92 K/ $\mu$ L, RR: 148–484), and increased serum alkaline phosphatase (ALP) [449 U/L, RR: 23–212] and lipase (1,842 U/L, RR: 200–1800) activities. Ultrasound did not identify intra-abdominal fluid. The dog was treated symptomatically for potential dietary indiscretion with maropitant (1 mg/kg SQ), famotidine (1 mg/kg SQ) and 1 L of Lactated Ringers solution (LRS) subcutaneously. When reexamined the next day, the dog was restless and had become progressively more hyporexic. Laboratory abnormalities included anemia (HCT 31.3%, RR: 37.3–61.7), neutrophilia (15.33 K/ $\mu$ L, RR: 2.95–11.64) with band neutrophils (0.02 K/ $\mu$ L), and thrombocytopenia (82 K/ $\mu$ L, RR: 148–484). A 400 mL bolus of Lactated Ringer's solution was administered intravenously, followed by 100 mL/h until the dog was discharged that evening with instructions to receive metronidazole (500 mg P.O. every 12 h), sucralfate (1 g slurry every 8 h), famotidine (20 mg P.O. every 12 h), and tramadol (100 mg every 8–12 h). Despite this therapy, the dog continued to be hyporexic, febrile overnight (104.5 °F at 12 AM and 103.5 °F at 7 AM) and was referred for further diagnostic evaluation.

When admitted to NCSU-CVM-VH that morning, the dog was normothermic (101.0 °F), tachycardic (heart rate 150 beats/min), and a newly discovered grade II/VI left apical systolic heart murmur was heard, which may have been related to

pre-existing mitral valve disease and intravenous fluid administration before referral. Following hospitalization and while awaiting diagnostic test results, intravenous fluids (0.45% NaCl at 70 mL/h and LRS at 70 mL/h) were administered to maintain hydration. Laboratory abnormalities included anemia (HCT 36.6%, RR: 37–55), leukocytosis (21.7 K/ $\mu$ L, RR: 6.00–17.00), neutrophilia (19.747 K/ $\mu$ L, RR: 2.841–9.112) with no bands or neutrophil toxicity, lymphopenia (0.434 K/ $\mu$ L, RR: 0.594–3.305), monocytosis (1.736 K/ $\mu$ L, RR: 0.075–0.85), thrombocytopenia (160 K/ $\mu$ L, RR: 200–500), and increased serum ALP (412 IU/L, RR: 20–150). Thoracic radiographs were unremarkable. Abdominal ultrasonographic abnormalities included a single hypoechoic hepatic nodule, multifocal intrahepatic branching mineralization, cholecystic debris, a splenic nodule (aspiration cytology-lymphoid hyperplasia), and mild left adrenomegaly. Because of the fever, thrombocytopenia, and a history of tick infestations, the dog was treated presumptively for rickettsioses with doxycycline (5 mg/kg P.O. every 12 h), while awaiting results of a vector borne disease serology and a polymerase chain reaction (PCR) panel.

Overnight, the dog remained hyporexic, appeared nauseated, with rectal temperatures fluctuating between 101.5 °F and 102.7 °F. Beginning on hospitalization Day 2, gastrointestinal supportive medications sucralfate (1 g every 8 h) and maropitant (1 mg/kg orally every 24 h) were added to the treatment regimen. An echocardiogram confirmed a large vegetative, irregular, ovoid mass, measuring approximately 1.5  $\times$  1 cm and attached to the distal half of the anterior mitral leaflet, apparently involving the atrial side of the leaflet, with mild mitral valve regurgitation (Fig. 1). Doxycycline therapy was discontinued and amikacin (20 mg/kg IV every 24 h), enrofloxacin (10 mg/kg IV every 12 h), and ampicillin-sulbactam (22 mg/kg IV every 8 h) was instituted for treatment of bacterial vegetative valvular endocarditis. Packed cell volume, total plasma protein and blood glucose (for detection of sepsis-induced hypoglycemia) were monitored every six hours. Normoglycemia was documented throughout hospitalization. After initiation of the combination antibiotic therapy, the dog remained afebrile for the remainder of the hospitalization period.

Because of the fever and new onset of heart murmur, blood and urine specimens, obtained shortly following admission, were cultured using the BACTEC 9050 automated blood culture system (Becton, Dickinson and Company, Sparks, MD). Two of three blood culture broths grew bacteria, which were successfully subcultured onto Trypticase soy

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