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Prosthetic Valve Endocarditis Caused by *Pasteurella dagmatis*, Germany

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An 81-year-old male patient in Germany had prosthetic valve endocarditis caused by *Pasteurella dagmatis* after a domestic cat bite. We surgically treated a paravalvular abscess and administered definitive antibiotic therapy consisting of penicillin G and levofloxacin. The patient was discharged from the intensive care unit in good condition 21 days after the surgery.

Pasteurella spp. are gram-negative, facultative anaerobic bacteria. They are part of the oral flora of domestic animals, including cats and dogs. In cases of animal bites, *Pasteurella* spp. bacteria can be detected culturally in 50%–75% of cases (1). Infections are typically caused by *Pasteurella multocida*, whereas *P. dagmatis* are rarely isolated from wounds, and severe

P. dagmatis infections are exceedingly uncommon or unreported. Few cases of infective endocarditis (IE) attributable to *P. dagmatis* bacteria have been reported in the English-language literature (2–5). We report an additional case in a man in Germany. Given the rarity of gram-negative non-HACEK endocarditis (i.e., caused by species other than *Haemophilus* species, *Actinobacillus actinomycetemcomitans*, *Cardiobacterium hominis*, *Eikenella corrodens*, or *Kingella*) and the unfavorable prognosis associated with it, the contribution of case reports is essential to improve the management of affected patients (6).

An 81-year-old male patient was admitted to the hospital with a fever of up to 39.3°C. He reported weight loss of 10 kg during the preceding month. Vital signs and physical examination revealed no relevant pathologies. A domestic cat bite on the foot 2 months before admission was the only potential source of infection, but the wound had already healed weeks before. Underlying medical conditions included a mechanical aortic valve implanted 20 years previously because of a combined vitium.

After obtaining a set of blood cultures, we administered empiric antibiotic therapy with piperacillin/tazobactam. Results of chest radiograph, urine dipstick, and venous blood gas analyses were unremarkable. Results of point-of-care respiratory PCR testing for influenza and SARS-CoV-2 were negative. Blood testing showed mild anemia (hemoglobin 10.2 g/dL [reference range 11.6–15.5 g/dL]) but unremarkable leukocyte and platelet levels. C-reactive protein was moderately elevated at 47 mg/L (reference range <5 mg/L). Creatinine, urea, and liver function test results were unremarkable except for an international normalized ratio of 2.3 as a result of phenprocoumon therapy.

A set of blood cultures showed bacterial growth after 5 hours (anaerobic) and 10 hours (aerobic). We identified *P. dagmatis* bacteria by using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI Biotyper Sirius System; Bruker, <https://www.bruker.com>). The antibiogram demonstrated susceptibility to penicillin G, doxycycline, cotrimoxazole, and levofloxacin. Transthoracic echocardiography revealed a paravalvular abscess. We diagnosed prosthetic valve IE on the basis of modified Duke criteria (1 major clinical criterion, imaging; 3 minor clinical criteria, predisposition, fever, and microbiologic evidence falling short of a major criterion) (7).

The abscess measured at 24 × 14 × 31 mm on the subsequent computed tomography scan (Figure) and was communicating with the left ventricular outflow tract. The cardiac surgery department recommended

abscess removal and surgical replacement of the mechanical valve and ascending aorta. The patient underwent paravalvular abscess resection and replacement of the prosthetic valve and ascending aorta with a 25-mm biological valve (Carpentier-Perimount Magna Ease; Edwards Lifesciences, <https://www.edwards.com>) and bovine pericardial patch plasty. Intraoperative molecular diagnostic tests (16S rRNA PCR) were positive for *P. dagmatis* bacteria.

After surgery, the patient cardiogenic shock developed, requiring extracorporeal life support (ECLS). Because of bleeding attributable to ECLS, open chest management was necessary for 3 days. Acute kidney failure with anuria and hypervolemia (KDIGO acute kidney injury stage 3 [<https://kdigo.org/guidelines/acute-kidney-injury>]) resulted in dialysis for 5 days. ECLS could be explanted after 6 days. We treated sinus node dysfunction with a cardiac resynchronization therapy (pacemaker) device (Enitra 8 HF-T QP; Biotronik, <https://www.biotronik.com>) before intensive care unit discharge.

We continued to administer antiobio-gram-appropriate penicillin G therapy for a total of 6 weeks after the initial negative blood culture results. We administered levofloxacin, which we selected over an aminoglycoside antibiotic because of its superior abscess penetration, for the first 20 days as a combined therapy. The patient was discharged from the intensive care unit on the 21st day after surgery, exhibiting full consciousness and only mild focal neurologic deficits (dysphagia). He was discharged from the hospital shortly afterward and began rehabilitation treatment.

The choice of treatment in this case was complicated by the paucity of evidence regarding IE caused by *P. dagmatis* (2–5,8). Gump and Holden (5) reported IE caused by a new species of *Pasteurella* bacteria in 1972. In 1994, Sorbello et al. (2) reported another case, complicated by vertebral osteomyelitis. In 2001, Rosenbach et al. (4) reported prosthetic valve IE caused by *P. dagmatis*. A more recent case was reported in 2012 by Strahm et al. (3) (Appendix Table, <https://wwwnc.cdc.gov/EID/article/30/10/24-0727-App1.pdf>). Four of the 5 reported cases (including the case we describe) resulted from domestic cat bites, and all definitive therapies included either penicillin G or ceftriaxone. All patients survived infection. Antimicrobial therapy for *P. multocida* infection is similar to the course we describe, and penicillin has been recommended in all specimens that tested susceptible to it (9).

Empiric antibiotic therapy for animal wounds varies by severity (ranging from amoxicillin/clavulanate to piperacillin/tazobactam) and also needs to target other potential pathogens. Cat bites can be easily underestimated and justify careful therapy and



Figure. Preoperative contrast-enhanced computed tomography (sagittal) of an 81-year-old male patient in Germany who had *Pasteurella dagmatis* infection after a domestic cat bite, indicating a paravalvular abscess of 24 × 14 × 31 mm. The large abscess near his mechanical valve, combined with *P. dagmatis* bacteria in blood cultures, confirmed a diagnosis of infective endocarditis based on Duke criteria (7).

follow-up. Animal contact could have been missed in this case because the wound had healed fully before the first symptoms of IE. Obtaining the patient's history greatly helped in the diagnosis.

About the Author

Dr. Rottmann studied medicine at the University of Freiburg in Germany. He is currently in training at the Department of Medicine IV, Nephrology and Primary Care, at the University of Freiburg Medical Center. His primary research interests include kidney function in critical care medicine, including care for patients on extracorporeal membrane oxygenation therapy.

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etymologia

Pasteurellaceae [pas''-tər-ə-lā'-sē-ī]

Clyde Partin

A novel member of the family Pasteurellaceae, *Emayella augustorita*, was introduced in the August 2024 issue of *Emerging Infectious Diseases*, by Meyer and colleagues of Limoges, France. Isolated from a patient in France, the bacterium is a new member of the family Pasteurellaceae, named in honor of Louis Pasteur. Pasteur was deemed by medical historian Robert P. Gaynes to be the “most notable nonphysician in the history of medicine.” His name is most recognized for the eponymous pasteurization process, but he is also lauded in Linnaean taxonomy with the family name Pasteurellaceae, formally accepted in 1981. The designation was conceived to accommodate a collection of gram-negative organisms currently representing 34 genera and 105 species, described as “specialized commensals, primarily and potential pathogens of vertebrates—mainly mammals and birds.”



Figure. This 1885 painting by Albert Edelfelt (1854–1905), currently in the collection of the Musée d'Orsay (Paris, France), shows Louis Pasteur in his laboratory. Pasteur was an accomplished artist, and examples of his artwork, done as early as age 15, are on display at the Pasteur Institute in Paris. Before pursuing his scientific career, Pasteur aspired to become

an art teacher. Image source: Wikimedia Commons.

The constituent bacteria of this family have a propensity to inhabit the mucosal membrane of the mouth, respiratory, and genital tracts. The species *Haemophilus influenzae* and *Aggregatibacter actinomycetemcomitans* are well-known Pasteurellaceae that contribute to human illness. Of note, the *Pasteurellaceae* family is polyphyletic, and the taxonomy of some of the species is in need of further study.

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