**Pasteurella Endocarditis in a Patient with Rheumatic Mitral Valve Disease**

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**Patient:** Female, 76-year-old  
**Final Diagnosis:** Mitral valve vegetation with *Pasteurella multocida*  
**Symptoms:** Generalized malaise  
**Medication:** —  
**Clinical Procedure:** —  
**Specialty:** Cardiology • Geriatrics

**Objective:** Unusual clinical course  
**Background:** As a common member of the oral bacterial flora of cats and dogs, *Pasteurella multocida* can cause skin and soft tissue infection in humans after bites, licks, or scratches from animals. Uncommonly, infection due to *Pasteurella* can cause sepsis in humans. Even more rare is the development of infectious endocarditis from a *Pasteurella* infection.

**Case Report:** A 76-year-old woman presented with malaise and symptoms of fluid overload. Blood cultures were positive for *Pasteurella multocida*, and an echocardiogram was significant for mitral valve vegetation and severe biventricular enlargement. A diagnosis of *Pasteurella* endocarditis was made. Surgical intervention was recommended, but owing to the risk involved, the patient elected for conservative management involving long-term treatment with intravenous antibiotics.

**Conclusions:** While exceedingly rare, *Pasteurella multocida* can cause infectious endocarditis in patients with predisposing factors. This patient had a known history of rheumatic heart disease, which is believed to have caused the significant findings on imaging. To the best of our knowledge, our case is the only one to depict *Pasteurella* endocarditis in a patient with rheumatic heart disease and severe biventricular enlargement. It is the authors’ belief that the rheumatic heart disease and remodeling of the heart increased her susceptibility to severe infection from *Pasteurella*. The purpose of this case is to describe the pathogenicity of an otherwise low-attack bacterial infection in an elderly patient with underlying structural acquired heart damage.

**Keywords:** Endocarditis, Bacterial • Heart Failure • *Pasteurella multocida*

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Background

Infective endocarditis is a life-threatening disease that results from infection of the endocardial surface of the heart. Diagnosis of infective endocarditis can be difficult and requires the combination of clinical, microbiological, and echocardiography results [1]. The most common pathogens causing infectious endocarditis with positive blood cultures are staphylococci, streptococci, and enterococci [2]. While Pasteurella multocida typically causes skin and soft tissue infections, few cases have reported infectious endocarditis from Pasteurella infection. Patients who develop more serious infections, such as endocarditis, from Pasteurella tend to have predisposing factors, including chronic obstructive lung disease, chronic liver disease, immunosuppression, or diabetes [2]. While a previous echocardiogram was not available for this patient, her known history of rheumatic heart disease is believed to have predisposed her to this serious infection.

Case Report

A 76-year-old woman with a past medical history of atrial fibrillation on coumadin, rheumatic heart disease (RHD), and congestive heart failure, with preserved ejection fraction treated with digoxin, presented to the Emergency Department with generalized malaise for 1 week. The patient endorsed shortness of breath, lower extremity swelling, and subjective fever but denied chest pain, orthopnea, and paroxysmal nocturnal dyspnea. Her vital signs were significant for a blood pressure of 79/54 mmHg, oral temperature of 38.3°C, and heart rate of 55 beats/min. The physical examination was significant for crackles up to the mid-lung fields bilaterally, an irregularly irregular heart rhythm, and 2+ pitting edema up to the knees.

A chest X-ray showed congestion in the bilateral lower lung fields and cardiomegaly. A complete metabolic panel was significant for a sodium level of 126 (range, 136-145 mmol/L), potassium of 5.2 (range, 3.5-5.1 mmol/L), blood urea nitrogen of 33 (range, 7-25 mg/dL), and creatinine of 2.77 (range, 0.60-1.20 mg/dL). The white blood count was 4.9 (4.1-10.4 µL). The INR was therapeutic at 2.8. An electrocardiogram (Figure 1A) showed signs of digoxin toxicity. The peak troponin level was 0.20 ng/mL (range, 0.00-0.05 ng/mL), and the digoxin level was notably elevated at 3.6 ng/mL (range, 0.5-2.0 ng/mL).

The patient was admitted to the Cardiac Intensive Care Unit. Cardiology was consulted and the patient was given digoxin immune fab (Digibind) for digoxin toxicity (Figure 1B). An echocardiogram (Figure 2A-2C) displayed an ejection fraction of 45% to 49%, a possible vegetation on the mitral valve, and severe eccentric mitral and tricuspid regurgitation. A transesophageal echocardiogram (Figure 3) was significant for a mitral valve vegetation measuring 1.2×0.7 cm. Additionally, severe biatrial enlargement was noted; the left atrium had a volume of 101.40 mL/m², and the right atrium was 233.80 mL/m² (normal: 16-34 mL/m²). Unfortunately, a previous echocardiogram was unobtainable.

Blood cultures were positive for Pasteurella multocida. Ceftriaxone was started for Pasteurella septicemia. Head computed tomography revealed numerous chronic infarctions, likely from septic emboli. When the patient was screened for risk factors for Pasteurella exposure, she said she owned 4 cats. The cardiothoracic surgery team evaluated the patient for multi-valve replacement surgery and biopsy of the vegetation. The patient was classified as being at high risk for such an operation, which led her to choose conservative treatment. The patient’s condition stabilized, and she was discharged to a skilled nursing facility with a 6-week course of ceftriaxone. The patient was readmitted for congestive heart failure exacerbation 1 month after discharge, and the family elected for hospice care.

Figure 1. (A) The patient’s electrocardiogram (EKG) showing junctional rhythm with ventricular bigeminy, both commonly seen findings in digoxin toxicity. (B) EKG 1 h after administration of digoxin immune fab: EKG exhibits atrial fibrillation with multiple premature ventricular contractions, the most noted EKG finding in digoxin toxicity.
Discussion

A common member of the oral bacterial flora of cats and dogs, Pasteurella multocida is a gram-negative, facultative anaerobic coccobacillus [3]. Typically, 30% to 40% of wounds from cat bites become infected and are usually limited to the skin or soft tissue [2].

Rarely, Pasteurella multocida can be the cause of sepsis and bacteremia [2,4], and while extremely rare, it can also be the cause of infectious endocarditis [5].

Pasteurella infection typically presents with a subtle onset, low-grade fever, and prolonged course [3]. In patients who develop more serious infections, such as endocarditis from Pasteurella, they typically have predisposing factors, such as chronic obstructive lung disease, chronic liver disease, immunosuppression, or diabetes [2]. Fatalities due to Pasteurella are exceedingly rare in patients without predisposing conditions [3]. Our patient had a known history of RHD, which likely caused the remodeling of the atria and the severe biatrial enlargement seen on imaging. Dilation of cardiac atria is usually confined to 1 chamber and can rarely involve both atria. When both atria are involved, it is usually associated with RHD [6]. Restrictive cardiomyopathy, isolated mitral insufficiency, and constrictive pericarditis can also cause bi-atrial enlargement referenced [7]. Due to the decreased prevalence of RHD in modern medicine, significant biatrial enlargement is uncommonly seen, furthering the significance of this case [6].
The patient depicted in this case developed Pasteurella endocarditis affecting the mitral valve. To the best of our knowledge, only 36 cases of endocarditis due to Pasteurella have been reported [5]. Of the 36 cases, only 10 depicted the mitral valve being affected, as in the patient depicted in the present case [5]. Also, to the best of our knowledge, our case is the only one to depict Pasteurella endocarditis in a patient with severe biatrial enlargement due to RHD. It is the authors’ belief that the remodeling of the heart due to RHD increased her susceptibility to severe infection from Pasteurella.

Treatment for Pasteurella endocarditis involves intravenous antibiotic therapy, and surgical intervention should be seriously considered to minimize damage to valves and reduce complications [3,8]. As Pasteurella endocarditis is typically characterized by large vegetations, antibiotic penetration can be hindered and contribute to failed therapy with antibiotics only [5]. Most cases require surgical removal of the affected valve for complete recovery [4,5].

References:

1. Holland TL, Baddour LM, Bayer AS, et al. Infective endocarditis. Nat Rev Dis Primers. 2016;2:16059
2. Ahlsson A, Friberg Ö, Källman J. An angry cat causing Pasteurella multocida endocarditis and aortic valve replacement – a case report. Int J Surg Case Rep. 2016;24:91-93
3. Fukumoto Y, Moriyama Y, Iguro Y, et al. Pasteurella multocida endocarditis: Report of a case. Surg Today. 2002;32(6):513-15
4. Yuji D, Tanaka M, Katayama I, Noguchi K. Pasteurella multocida infective endocarditis. J Heart Valve Dis. 2015;24(6):768-69
5. Porter RS, Hay CM. Pasteurella endocarditis: A case report and statistical analysis of the literature. Case Rep Infect Dis. 2020;2020:8890211
6. Lorusso R, Morone M, Farina D, Gelsomino S. Pseudo-dextrocardia: An unusual case of giant biatrial enlargement. J Thorac Cardiovasc Surg. 2013;146(6):e59-61
7. Sethi T, Singh AP, Singla V, Singh Y. Biatrial enlargement: An unusual cause of massive cardiomegaly. BMJ Case Rep. 2013;2013:bcr2012008320
8. Habib G, Hoen B, Tornos P, et al. Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009): The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and the International Society of Chemotherapy (ISC) for Infection and Cancer. Eur Heart J. 2009;30(19):2369-413

Conclusions

While exceedingly rare, Pasteurella multocida has been reported to cause infectious endocarditis in patients with predisposing factors [2]. The patient presented in this case had a history of RHD, which was believed to have caused the significant findings on echocardiogram. The patient’s history of RHD and heart remodeling is presumed to be the predisposing condition that led to her being more susceptible to Pasteurella endocarditis. Only 10 cases of Pasteurella infective carditis involving the mitral valve have been reported [5]. To the best of our knowledge, our case is the first to depict Pasteurella endocarditis in a patient with RHD and severe biatrial enlargement. Treatment involves intravenous antibiotic therapy, and surgical intervention should be seriously considered to minimize damage to valves and reduce complications, as antibiotics alone are rarely curative [3].

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