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## CLINICAL VIGNETTE

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# Anemia and Worsening Renal Failure in an Immunocompromised Patient with Mechanical Valves

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A 67-year-old male with rheumatic heart disease with mechanical aortic and mitral valve replacements and HLA-B27 negative inflammatory arthritis, was referred to the emergency department for worsening anemia and kidney function. The patient was asymptomatic and denied any active bleeding, new rashes, nausea, vomiting, abdominal pain, lightheadedness, chest pain, shortness of breath, or back pain. He was also free of fevers, chills, recent illness, any sick contacts or recent travel.

His inflammatory arthritis was well controlled on etanercept, without recent flares. He recently was evaluated for chronic anemia and was diagnosed with IgG lambda monoclonal gammopathy and iron deficiency, and was taking oral iron. He had prior positive FIT tests, most recently seven months prior to admission, but had no prior colonoscopy.

On arrival to the emergency department, the patient was afebrile, blood pressure 168/73, heart rate 85, respiratory rate 19, pulse oximetry 100% on room air. Labs were notable for a BUN of 27 and Creatinine of 2.73. Hgb of 7.0 and MCV of 93.0. Platelets, white blood cell count, and differential were unremarkable. ESR and CRP were elevated at 85 and 5.07. Calcium was within normal limits. Urinalysis was positive for protein of 30 and microscopic hematuria (134 RBCs).

Initial exam was noteworthy for a III/VI systolic murmur heard best at the left sternal border, without no other significant findings.

The patient was admitted for further evaluation. Throughout the hospitalization, he had no active bleeding, but his hemoglobin continued to downtrend, requiring transfusion of five units of packed red blood cells over his month-long stay. Colonoscopy and esophagogastroduodenoscopy were negative for sources of acute gastrointestinal bleeding. Abdomen/Pelvis CT showed no significant abdominal or peripheral intraabdominal bleeding. Bone marrow biopsy was not consistent with multiple myeloma, blood smear showed no schistocytes. LDH was only minimally elevated, and haptoglobin was undetectable. Trans-thoracic echocardiogram was inconclusive. Subsequent trans-esophageal echo (TEE) did not identify vegetations or valvular abnormalities, though the aortic valve was difficult to visualize due to shadowing from the mechanical mitral valve. Creatinine improved minimally with fluids and blood transfusions, suggesting an intrinsic cause to his kidney injury. Renal ultrasound

was negative for obstruction. Antinuclear antibody and chromatin antibody were positive, but anti-histone, ANCA, and MPO antibodies were negative.

Though the patient remained afebrile and asymptomatic throughout the hospitalization, endocarditis was suspected given this patient's mitral and aortic valve replacements with unexplained anemia and acute kidney injury. Blood cultures were collected and were positive for *Enterococcus faecalis* in 2/2 bottles. Repeat cultures after 24 hours were positive in 4/4 bottles, confirming *Enterococcus* bacteremia. Kidney biopsy showed necrotic crescents consistent with glomerulonephritis. Given negative ANCA antibodies, the biopsy findings were most likely secondary to the underlying endocarditis-associated process. Though no imaging confirmed vegetations on the mechanical valves, the aortic valves were poorly visualized, and the anemia and undetectable haptoglobin were likely secondary to intravascular hemolysis caused by shearing from infected mechanical valves. Rheumatoid factor (RF) was also positive, further supporting the diagnosis of infective endocarditis. According to the modified Duke criteria, this patient had one major criteria (*Enterococcus bacteremia*) and two minor criteria (history of mechanical valves and immunologic phenomena in the form of glomerulonephritis and positive RF factor), which was consistent with probable endocarditis. Given his risk factors, he was treated for presumed prosthetic valve endocarditis with a six-week course of intravenous antibiotics ceftriaxone and ampicillin. His hemoglobin eventually stabilized and his creatinine improved following treatment.

### Discussion

This case highlights an atypical presentation of probable prosthetic valve endocarditis (PVE). The vast majority of patients with infective endocarditis present with fever (90%), however atypical presentations are common in elderly or immunocompromised patients. Fever is less common in these patients than in younger patients.<sup>1</sup> Therefore, the presence of risk factors for endocarditis, should prompt further evaluation to prevent delay of diagnosis and treatment.

Blood cultures and echocardiograms are the major criteria in the modified Duke criteria and are essential in the evaluation of suspected prosthetic valve endocarditis. Blood cultures should be appropriately drawn in patients suspected of having endocar-

ditis. If antibiotics have not been administered, blood cultures will be positive in 90% or more of patients with prosthetic valve endocarditis. If blood cultures are drawn over a period of hours to days in a patient with a prosthetic valve and all or most are positive, there is a high probability of PVE. Bacteremia is continuous, so there is no correlation between the likelihood of positive blood cultures and proximity to fevers. Therefore, the absence of fevers should not be a deterrent to obtaining blood cultures.

The modified Duke criteria was designed for patients with native valve endocarditis and is not as useful for patients with prosthetic valve endocarditis.<sup>2</sup> While TEE is sensitive (92%) and specific (90%) for the diagnosis of vegetations in PVE, it does not perform as well as in patients with native heart valves. Identification of vegetations can be more difficult in the presence of prosthetic valves.<sup>3</sup> TEE is also not very reliable in detecting abscesses and prosthetic valve dehiscence. In one study, the detection rate of abscess by TEE was 48%. In the same study, prosthetic valve dehiscence was missed by TEE in 29%, all in cases involving aortic valve PVE.<sup>4</sup> While the modified Duke criteria is very sensitive in diagnosing infective endocarditis, it should be used as a guideline in conjunction with clinical considerations in the decision to treat bacterial endocarditis. It is important to be aware of subtle and sometimes unexpected presentations of infective endocarditis, to promptly evaluate and treat this potentially life-threatening disease.

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