

Case Report

Native Valve Endocarditis in a Patient with Chronic *Citrobacter* Prostatitis

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Abstract

Importance: *Citrobacter koseri* rarely causes infection in immunocompetent, non-hospitalized hosts and is rarely associated with infective endocarditis.

Observations: We present a single case of a 77-year-old man with known chronic *C. koseri* prostatitis who developed blood culture-negative infective aortic valve endocarditis and *C. koseri* diskitis. Valve replacement was required for definitive treatment.

Conclusions and relevance: Holding cultures for an extended period helped to identify the organism. Chronic prostatitis may be a rare but potentially serious source for infective endocarditis.

Keywords

- Endocarditis
- Citrobacter
- Prostatitis
- Diskitis

ABBREVIATIONS

HACEK: Haemophilus, Aggregatibacter, Cardiobacterium, Eikenella, and Kingella, TEE: Transesophageal Echocardiogram, HD: Hospital Day, MRI: Magnetic Resonance Imaging

INTRODUCTION

Gram-negative bacilli are responsible for 1.3-10% of infective endocarditis cases and are typically associated with intravenous drug use [1] or nosocomial infection (e.g., post-cardiac surgery). HACEK-associated cases (~3%) outnumber non-HACEK (~2%). The most common non-HACEK organisms responsible are *Escherichia coli* and *Pseudomonas aeruginosa* [2,3].

Citrobacter species are gram-negative bacilli found in soil, water, and animal and human intestinal tracts. Infection usually manifests as urinary tract (45-53%), intra-abdominal, respiratory tract, surgical site, or skin and soft tissue infections [4,5]. Infective endocarditis due to *Citrobacter koseri* has been previously reported in only 4 cases [6].

Associated risk factors in those cases included intravenous drug use [7,8] and pacemakers [9]. There was a single prior case report of a patient with an indwelling urinary catheter who developed Methicillin Sensitive *Staphylococcus aureus*-associated prostatic abscess with subsequent discovery of infective endocarditis and pyogenic spondylitis [10].

CASE PRESENTATION

A 77-year-old man with past medical history significant for chronic low back pain and chronic prostatitis with prior urine

cultures positive for *Citrobacter koseri* was admitted for one week of generalized weakness, cough, and new upper back pain. He denied any history of intravenous drug use. Upon examination, his temperature was 37.6 °C, (99.7 °F), his pulse was 115 beats per minute and regular rhythm, his respirations were 20 breaths per minute, and his blood pressure was 143/67 mm Hg. He also had hard palate petechiae, a grade III/VI systolic ejection murmur best heard in the right upper sternal border with radiation to the carotid arteries, and diffuse vague musculoskeletal pain on palpation; neurologic exam was only significant for 4/5 power in lower extremity dorsiflexion.

Initial laboratory data were significant for a neutrophil dominant leukocytosis of $15.2 \times 10^3/\mu\text{L}$ without left shift and urinalysis showing trace leukocyte esterase and moderate bacteria. Portable chest x-ray revealed a retrocardiac opacity.

Three sets of blood cultures were negative, but were drawn after receiving empiric antibiotics of azithromycin and ceftriaxone in the emergency room for suspected pneumonia. Initial urine culture grew *Citrobacter koseri* on hospital day (HD) #3.

Transesophageal echocardiography (TEE) revealed an aortic valve vegetation of 10 mm on the right coronary cusp without abscess. Thoracic magnetic resonance imaging (MRI) revealed diskitis of T9-T10 and phlegmon from T7-T12, which was aspirated for culture on HD #8. A dental consultant commented on chronic carious decay without acute infection or abscess. The patient was continued empirically on ceftriaxone and ciprofloxacin, to which *C. koseri* was sensitive. A seven week course of antibiotics was complicated by adverse drug effects

including thrombocytopenia, neutropenia, and acute kidney injury.

During treatment, his petechiae resolved, but his back pain worsened. Spinal phlegmon aspirate culture had late growth of *C. koseri* on HD #30. Repeat MRI showed an increase in size of phlegmon from C6-T12 (Figure 1). Repeat TEE showed new and mobile vegetations on the non-coronary cusp, 16mm and 13mm (Figure 2), along with a possible aortic root abscess (Figure 3). The patient underwent bioprosthetic aortic valve replacement on HD #49 and had an additional four weeks of antibiotic therapy. The aortic valve was found to have numerous vegetations and a periannular 7-8mm abscess cavity. All valve cultures were negative. The patient improved and was discharged to a rehabilitation facility.

DISCUSSION

The incidence of culture-negative endocarditis increased from 7-10% in the early 1990s to ~20% in the mid-2000s. Less than 45% of cases have antibiotic pretreatment [11]. Literature review about diagnostic yield of extending blood culture incubation times is controversial [12]. There is no data regarding extended phlegmon culture incubation time, however this was requested because of the possibility, albeit low, of isolating the pathogen. The late growth of *C. koseri* in the spinal phlegmon aspirate aided in narrowing antibiotic coverage to avoid further complications.

The patient met the 2008 American College of Cardiology and American Heart Association guidelines for valve replacement based on presence of an aortic abscess, persistent vegetations despite appropriate antibiotic therapy, and mobile vegetations in excess of 10 mm [13]. The decision of optimal timing of valve replacement was difficult in view of extensive diskitis and phlegmon. The neurosurgical consultant felt the patient was not amenable to surgery due to the extent of spinal involvement and stable neurological exam. Despite negative admission blood cultures and aortic valve vegetation and abscess cultures, the patient's persistent *C. koseri* in his urine and spinal phlegmon



Figure 1 Sagittal MRI showing T9-T10 diskitis and extensive phlegmon.

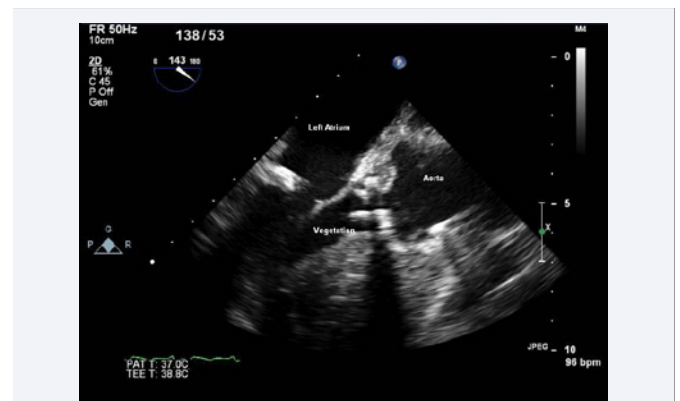


Figure 2 Transesophageal echocardiogram showing a 16mm aortic valve vegetation.

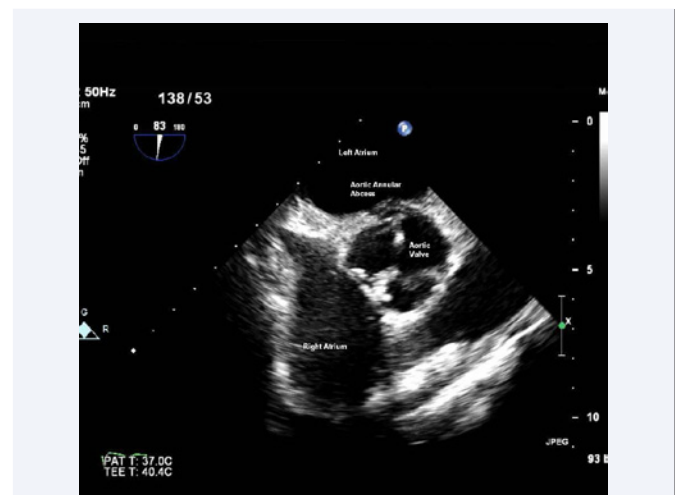


Figure 3 Transesophageal echocardiogram showing an aortic root abscess.

suggested widely disseminated infection with high likelihood of hematogenous seeding and infection of the aortic valve. In this case, the suspicion for an aortic abscess and large vegetation on echocardiogram were enough to take the patient to surgery despite concern that another possible source was not under control and that the replacement valve could become infected.

The limitations of this case include that there were no positive blood cultures, the vegetation and aortic abscess biopsy and culture did not reveal any organism, and that there were multiple infected sites. However, given the patient's history and presentation, we conclude that chronic prostatitis can be a rare but serious cause of infective endocarditis. Controversy exists regarding extending the length of time blood and other cultures are held, but may increase the yield of identifying the suspected pathogen when blood cultures and suspected sites of dissemination are sterile.

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