Expecting the Unexpected: A Case of *Escherichia Coli* Endocarditis Necessitating Extraction of an Implanted Cardioverter-Defibrillator System

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Escherichia coli (E. coli) endocarditis is a rare disease, accountable for only a fraction of the definite endocarditis cases. As such, thorough elimination of endocarditis is not considered to be a common practice in the workup of patients presenting with *E. coli* bacteremia.

The presence of an implanted pacemaker increases the risk for the development of infective endocarditis. Only a few cases of *E. coli* endocarditis associated with a pacemaker or an implantable cardioverter defibrillator (ICD) system have been described in the literature.

We present a case of a male patient with a clinical presentation of a urinary tract infection and persistent *E. coli* bacteremia, which ultimately was diagnosed with endocarditis associated with an ICD system.

PATIENT DESCRIPTION

A 69 year old male presented to the emergency department with a high grade fever and shivering. His medical history included ischemic cardiomyopathy with moderate to severe left ventricular dysfunction (ejection fraction of 35%), congestive heart failure, diabetes mellitus, chronic obstructive pulmonary disease, and arterial hypertension. A cardiac resynchronization was inserted 8 months prior to his hospitalization due to the aforementioned diagnoses. He also had undergone two urologic operations (suprapubic prostatectomy and bladder diverticulectomy) 5 years earlier.

At this hospital admission, along with fever and shivering, the patient complained of painful events of retrograde ejaculation and urinary incontinence for the last few months. He described two episodes of high grade fever and chills in the last month for which he was hospitalized twice at another hospital. During his first hospitalization he was treated with intravenous (IV) empiric antibiotic for 2 days and afterward, due to a positive blood culture of susceptible *E. coli*, was discharged with PO cefuroxime for 10 additional days. After 3 weeks, he was hospitalized again due to fever and chills. This time he was treated for 10 days with IV ceftriaxone, in accordance with the same susceptible *E. coli*, which presented again. In his discharge letter, the attending physician stated that repeated blood cultures were negative and a transthoracic echocardiography (TTE) was conducted without any supporting evidence of endocarditis.

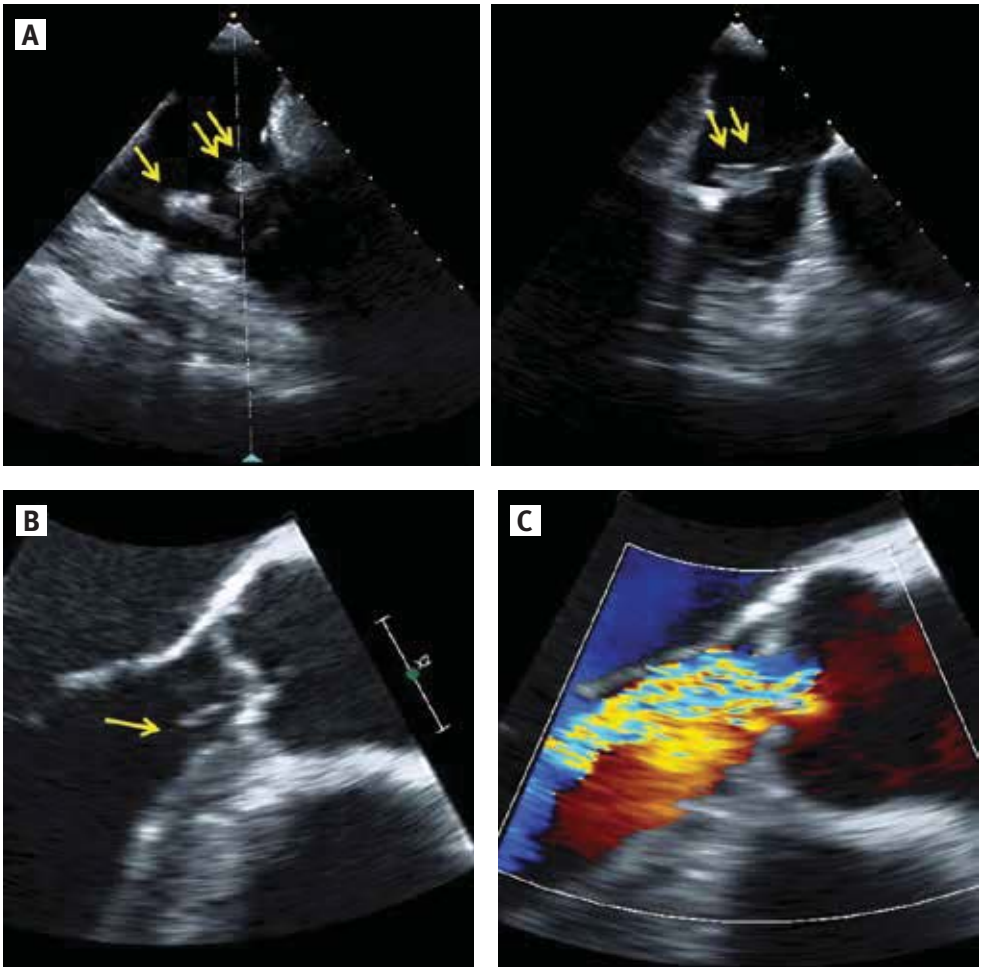
The patient was admitted to our department 7 days after his last hospitalization in a state of septic shock with a high grade fever, which had started 1 day before his admission. His physical examination revealed no overt signs for the source of infection and no stigmata of endocarditis. A chest X-ray was normal. Lab results showed leukocytosis with neutrophilia elevated C-reactive protein (CRP), and acute kidney injury. At admission, 3 blood cultures and urine cultures were taken and empiric IV ceftriaxone and IV saline 0.9% were administered promptly. The main differential diagnosis was urosepsis. During the next few days his white blood count, CRP, and creatinine levels were normalized but the patient's high fever did not subside, and he continued suffering from recurrent shivering episodes. At 48 hours after admission, a positive result of three blood cultures with the same *E. coli* susceptible for beta lactams appeared, and it was decided to continue with the IV ceftriaxone regimen. Urine cultures were negative.

Due to his urinary complaints and urologic history, an ultrasound examination of the genitourinary system was conducted, which did not reveal any anomaly. A transthoracic ultrasound (TTE) was completed without signs suggestive of endocarditis (including an inspection of the pacemaker's electrode). Owing to his persistent bacteremia, with the same pathogen even during treatment with appropriate antibiotics, the patient was transferred for an urgent whole body computed tomography (CT) to determine the appearance of an abscess or other explanation of fever, which was suggestive only of cystitis. A funduscopic examination done by an ophthalmologist was normal. An ultrasound of the pacemaker pocket, intended to rule out a pocket-infection was also normal. Ten days after admission, the patient underwent transesophageal echocardiography (TEE). The echocardiography revealed several right atrium masses, which were consistent with vegetations.

The masses were attached to the cardiac resynchronization therapy defibrillator (CRT-D) electrode (one measured almost 3 cm long) and to the tricuspid valve annulus. A 12 mm mobile mass at the left ventricle outflow tract was seen as well. The mass was attached to the aortic valve, which showed moderate aortic regurgitation [Figure 1]. The patient was transferred to the cardiothoracic surgery department and underwent a total pacemaker-system extraction on the same day without complications. Two days later he underwent another TTE, which showed no evidence of vegetation on the aortic valve and no new valve functional or structural abnormality. He had no fever and his repeated blood cultures came back negative. After a multidisciplinary consultation, a peripherally inserted central catheter line was inserted and he was discharged with treatment of IV ceftriaxone and ofloxacin for 6 more weeks, following the recommendation of an infectious disease specialist.

Figure 1. Transesophageal echocardiography

Transesophageal echocardiography revealed multiple vegetations in the right atrium. **[A]** biplane image of the right atrium and the tricuspid valve demonstrating one mass attached to the pace maker electrode (single arrow head) and a second mass attached to the tricuspid valve annulus (two arrow heads with the orthogonal view). **[B]** Aortic valve vegetation (arrow head) **[C]** Color Doppler showed moderate aortic regurgitation



COMMENT

Although a rare entity, case communications of native valve and prosthetic valve endocarditis caused by *E. coli* have been previously published [1], and were found to be more common in elderly patients with heart disease and diabetes. Urinary tract infection was found to be the most common cause of infection [2,3]. There are few reported cases complicated by complete heart block, and there are also descriptions of endocarditis caused by multi-drug resistant *E. coli* in a nosocomial setting [4].

Pacemaker-associated endocarditis is a well-known complication of permanent pacemakers [5]. In 2006, Villamil-Cajoto and colleagues [1] were the first to publish a case report of pacemaker-related endocarditis caused by *E. coli* bacteremia secondary to gastrointestinal infection.

We describe this patient's clinical course because it shows, time and again, that when searching for the source for a prolonged, recurrent febrile illness, we should always expect the unexpected.

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"Sometimes a scream is better than a thesis"

Ralph Waldo Emerson (1803-1882) American essayist, lecturer and poet, and champion of individualism