Defibrillator Associated Gonococcal Endocarditis

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Abstract

Endocarditis and cardiovascular implantable electronic device (CIED) infection are rare presentations of disseminated gonococcal infection (DGI). We report a case of gonococcal endocarditis with a large vegetation adherent to the tricuspid valve and CIED leads. Surgical intervention was able to be avoided through the use of transcatheter vegetation debulking and CIED extraction.

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Brief Abstract:

Endocarditis and cardiovascular implantable electronic device (CIED) infection are rare presentations of disseminated gonococcal infection (DGI). We report a case of gonococcal endocarditis with a large vegetation adherent to the tricuspid valve and CIED leads. Surgical intervention was able to be avoided through the use of transcatheter vegetation debulking and CIED extraction.

Case Presentation and Management:

A 61-year-old male presented with 4 weeks of dyspnea on exertion, bilateral lower extremity edema and orthopnea. A dual chamber implantable cardiac defibrillator (ICD) was implanted in 2016 for the primary prevention of sudden death in the setting of non-ischemic dilated cardiomyopathy. His other co-morbidities included type 2 diabetes and chronic kidney disease. Transthoracic echocardiography revealed a mobile vegetation at the level of the tricuspid valve. Blood cultures grew Neisseria gonorrhea. Further anamnesis was negative for fever, recent travel or known high-risk exposures, abdominal pain, bleeding diathesis or genitourinary symptoms. His most recent unprotected sexual exposure was more than 1 year prior to presentation. On physical exam, a grade II/VI systolic murmur was present along with bilateral lower extremity edema and large CV waves in the jugular vein. There were no stigmata of distal embolization. Repeat blood cultures remained positive until the fourth day of hospitalization despite treatment with Vancomycin and Ceftriaxone.

The patient underwent transcatheter debulking with CIED extraction on hospital day 10.

Percutaneous debulking was performed using the Penumbra 12Fr Lightning Aspiration System (Penumbra Inc, Alameda, CA) under intra-cardiac echocardiography (ICE) guidance. The aspiration catheter was introduced through a deflectable Arctic front sheath (Medtronic Inc., Minneapolis, MN), which was within a 16-french sheath in the right femoral vein. This approach allowed for increased steerability of the aspiration system. The 16Fr outer sheath allows for the removal of the aspiration catheter and deflectable sheath en-bloc should vegetation become adherent to the aspiration sheath tip. Intracardiac echocardiography along with TEE revealed the presence of two large vegetations, one highly mobile mass adherent to both the tricuspid valve and right ventricular ICD lead (1 x 2 cm), and a second large mass (2 x 3 cm) in the right ventricular apex adherent to the right ventricular ICD lead (Figure 1). One aspiration application was required to remove the vegetation from the tricuspid valve; whereas, three aspiration applications were required to remove the vegetation adherent to the distal portion of the right ventricular lead within the right ventricle (Figure 2, supplemental video). Following transcatheter debulking, TEE and ICE confirmed the absence of any remaining mass and the CIED system was removed in total. There was no evidence of ICD pocket infection and the leads were able to be removed with gentle traction alone.

There were no immediate post-procedural complications. The patient was given a single dose of 1 gram of azithromycin and a 6-week course of intravenous ceftriaxone. He was discharged 3 days after extraction.

Discussion:

Neisseria gonorrhea endocarditis is a rare complication of DGI and represents 0.5 to 3% of such cases[1]. Although CIED pocket infection has been reported in DGI[13], to our knowledge this is the first report of CIED associated gonococcal endocarditis. Acute and subacute CIED infections are typically attributed to coagulase negative *Staphylococcus* where as, chronic infections are largely caused by *S. Aureus* (50%) and coagulase negative staphylococci (50%) in more than 95% of cases.[2] Although rare, gonococcal endocarditis carries high mortality and virulence, which highlights the importance of awareness in the proper clinical context. Notably, initial blood cultures are negative in 50% of disseminated gonococcal infections.[5]

Cardiac involvement in DGI is associated with high morbidity and mortality due to large vegetations, valvular destruction, electrical instability due to conduction system involvement, and rarely myocarditis which can

be associated with malignant arrhythmias and sudden cardiac death.[6-8] Due to antibiotic resistance, large vegetation size, and valvular destruction, gonococcal endocarditis is often managed with surgical debulking and valve repair. However, transvenous catheter based debulking may be a viable alternative in the absence of valvular heart failure or in patients who are not surgical candidates.

Over the last three decades there has been a significant increase in cases of CIED associated endocarditis necessitating lead extraction.[9] When vegetations are > 2cm in size, an open surgical approach is considered. Due to increasing patient age and comorbidity, a number of these patients are not candidates for surgical debulking and repair. Richardson et al. (8 patients) and Mirsa et al. (5 patients) have reported successful thrombus/vegetation debulking (average size of 2 and 3 cm respectively, subsequently decreased to <1cm and 2 cm) with the Penumbra Aspiration System (Penumbra Inc, Alameda, CA) prior to CIED extraction. Major complications of these case series included small septic emboli, sepsis, and death unrelated to the procedure.[10,11]

This case illustrates the potential utility of catheter based vegetation debulking prior to CIED extraction in a condition often treated surgically. We employed joint decision making with our patient, who chose the option of a wearable cardiac defibrillator and close follow-up before possible CIED re-implantation.

Conclusion:

This is the first reported case of Gonococcal CIED associated endocarditis managed with percutaneous debulking followed by system extraction, avoiding the need for surgical intervention. We highlight the need to suspect DGI in the right clinical setting, and to recognize the array of potential cardiac complications. Early diagnosis and treatment is essential to prevent morbidity and mortality in this highly virulent disease.

Figure Legends:

Figure 1: Intraprocedural Intracardiac echocardiography (ICE): ICE image of echogenic mass (arrow) attached to the tricuspid valve with Penumbra Lightning aspiration system directly above it(A). After aspiration the vegetation is no longer present(B). Similarly, a right ventricular mass (arrow head) is seen before(C) and after aspiration(D).

Figure 2: Pre and post procedural TEE imaging.

Figure 3: Example of Aspirated Material.

Supplemental Video: ICE imaging of aspiration of vegetations utilizing the Penumbra aspiration system.

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