

Defibrillator-associated gonococcal endocarditis

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Introduction

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 report

A 61-year-old male patient 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 nonischemic dilated cardiomyopathy. His other comorbidities 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 gonorrhoea*. 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 examination, 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 were negative on the fourth day of hospitalization while the patient was being treated with vancomycin and ceftriaxone.

KEYWORDS Endocarditis; Percutaneous aspiration; Device extraction; Device-associated vegetation; Defibrillator (Heart Rhythm Case Reports 2022; ■:1–3)

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KEY TEACHING POINTS

- Although rare, gonococcal involvement in cardiovascular implantable electronic device (CIED) infections should remain on the differential diagnosis.
- Percutaneous debulking can avoid the need for surgical intervention.
- Early treatment is likely to improve morbidity and mortality of gonococcal CIED infection.

The patient underwent transcatheter debulking with CIED extraction on hospital day 10. Percutaneous debulking was performed using the Penumbra 12F Lightning Aspiration System (Penumbra Inc, Alameda, CA) under intracardiac echocardiography (ICE) guidance. The aspiration catheter was introduced through a deflectable Arctic Front sheath (Medtronic Inc, Minneapolis, MN), which was within a 16F sheath in the right femoral vein. This approach allowed for increased steerability of the aspiration system. The 16F outer sheath allows for the removal of the aspiration catheter and deflectable sheath en bloc should vegetation become adherent to the aspiration sheath tip. ICE along with transesophageal echocardiography revealed the presence of 2 large vegetations: 1 highly mobile mass adherent to both the tricuspid valve and right ventricular ICD lead (1 × 2 cm), and a second large mass (2 × 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 3 aspiration applications were required to remove the vegetation adherent to the distal portion of the right ventricular lead within the right ventricle (Figures 2 and 3, Supplemental Video). Following transcatheter debulking, transesophageal echocardiography 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.

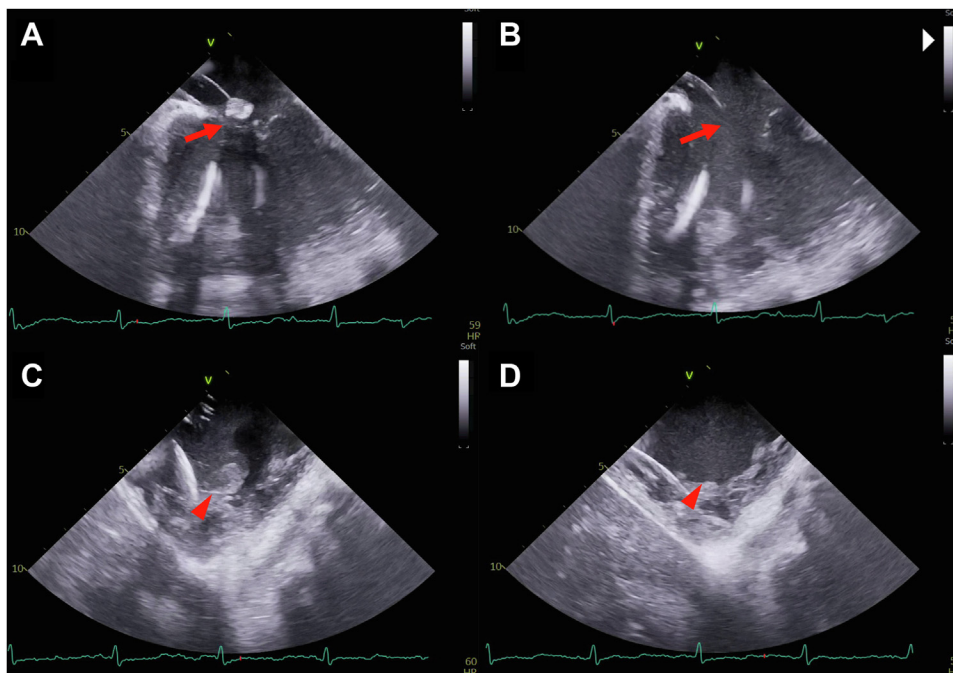


Figure 1 Intraprocedural intracardiac echocardiography (ICE). **A:** ICE image of echogenic mass (arrow) attached to the tricuspid valve with Penumbra Lightning aspiration system (Penumbra Inc) directly above it. **B:** After aspiration the vegetation is no longer present. **C,D:** Similarly, a right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

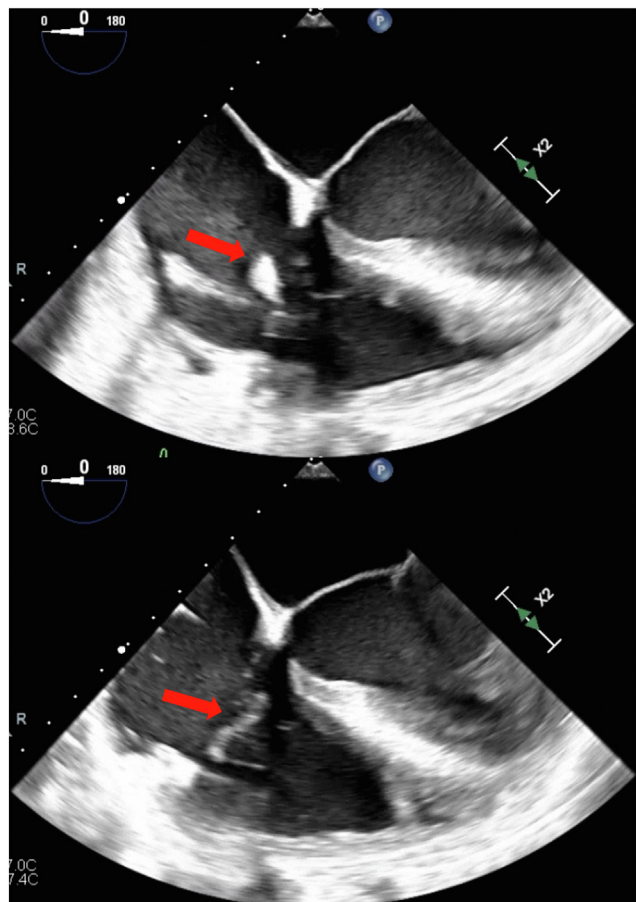


Figure 2 Pre and post procedural transesophageal echocardiography imaging.

There were no immediate postprocedural 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 and followed as an outpatient 1 month later. ICD reimplantation was deferred at that time given his high 1-year mortality and patient preference, with follow-up in 6 months.

Discussion

Neisseria gonorrhoea endocarditis is a rare complication of DGI and represents less than 0.1% of such cases.^{1–3} Although CIED pocket infection has been reported in DGI,⁴ 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*, whereas chronic infections are largely caused by *S. aureus* (50%) and coagulase-negative staphylococci (50%) in more than 95% of cases.⁵ 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.⁶

Cardiac involvement in DGI is associated with high morbidity and mortality owing to large vegetations, valvular destruction, electrical instability owing to conduction system involvement, and, rarely, myocarditis, which can be associated with malignant arrhythmias and sudden cardiac death.^{7–9} Owing to antibiotic resistance, large vegetation size, and valvular destruction, gonococcal



Figure 3 Example of aspirated material.

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 3 decades there has been a significant increase in cases of CIED-associated endocarditis necessitating lead extraction.⁹ When vegetations are >2 cm in size, an open surgical approach is considered. Owing to increasing patient age and comorbidity, a number of these patients are not candidates for surgical debulking and repair. Richardson and colleagues¹⁰ (8 patients) and Misra and colleagues¹¹ (5 patients) have reported successful thrombus/vegetation debulking (average size of 2 and 3 cm, respectively, subsequently decreased to <1 cm 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.

This case illustrates a successful catheter-based vegetation debulking prior to CIED extraction for a condition that commonly necessitates surgical treatment. We employed joint decision-making with our patient, who chose the option of a wearable cardiac defibrillator and close follow-up before possible CIED reimplantation.

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.

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