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Minimally invasive treatment of cardiac device-related infective endocarditis using AngioVac system followed by transvenous lead extraction

Małoinwazyjne leczenie odelektrodowego zapalenia wsierdzia z użyciem systemu Angiovac i przezskórnym usunięciem elektrod

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Case report

Infection is one of the most serious complications of cardiac implantable electronic device therapy and is associated with significant mortality and morbidity [1]. This study presents a case of a patient with cardiac device-related infective endocarditis (CDRIE).

A 67-year-old patient with a past medical history of ischaemic heart failure, and peripheral artery disease, after implantation of cardiac resynchronization therapy defibrillator (CRT-D) and percutaneous coronary interventions was admitted with increased dyspnoea and unexplained fever. The lab test revealed elevated inflammatory markers. Three sets of blood cultures were positive for Streptococcus gallolitycus. Transoesophageal echocardiography (TEE) confirmed the presence of many vegetations (the largest 3,8 cm x 1.7 cm) on the lead in the right atrium (Figure 1A, 1B).

Using the modified Duke Criteria scoring system (positive blood culture and TEE evidence confirming endocardial involvement) infective endocarditis was diagnosed. A specific antibiotic therapy was initiated. The treatment options were discussed by the local Heart Team. Due to high surgical risk, the decision was to remove vegetation mass percutaneously using the AngioVac system (AngioDynamics, Latham, NY, USA) and then lead extraction during one procedure [2]. After informed consent was obtained, the procedure was conducted under general anaesthesia in a hybrid operating room with on-site cardiac surgery support. Under fluoroscopy and ultrasound guidance, a 26 French Dry Seal sheath (Gore Medical) was placed in the right internal jugular vein (suctioning cannula) and a 23 French cannula of the venovenous bypass system was placed into the right femoral vein (re-infusion cannula). Then the suctioning cannula was carefully advanced into the close proximity of the mass (Figure 1C).

The venovenous bypass circuit was started with the centrifugal pump (RotaFlow ECMO system, Maquet Cardiovascular) generating a flow of up to 5 litres per minute and multiple aspirations were done with the successful clearing out of vegetation material (Figure 1E).

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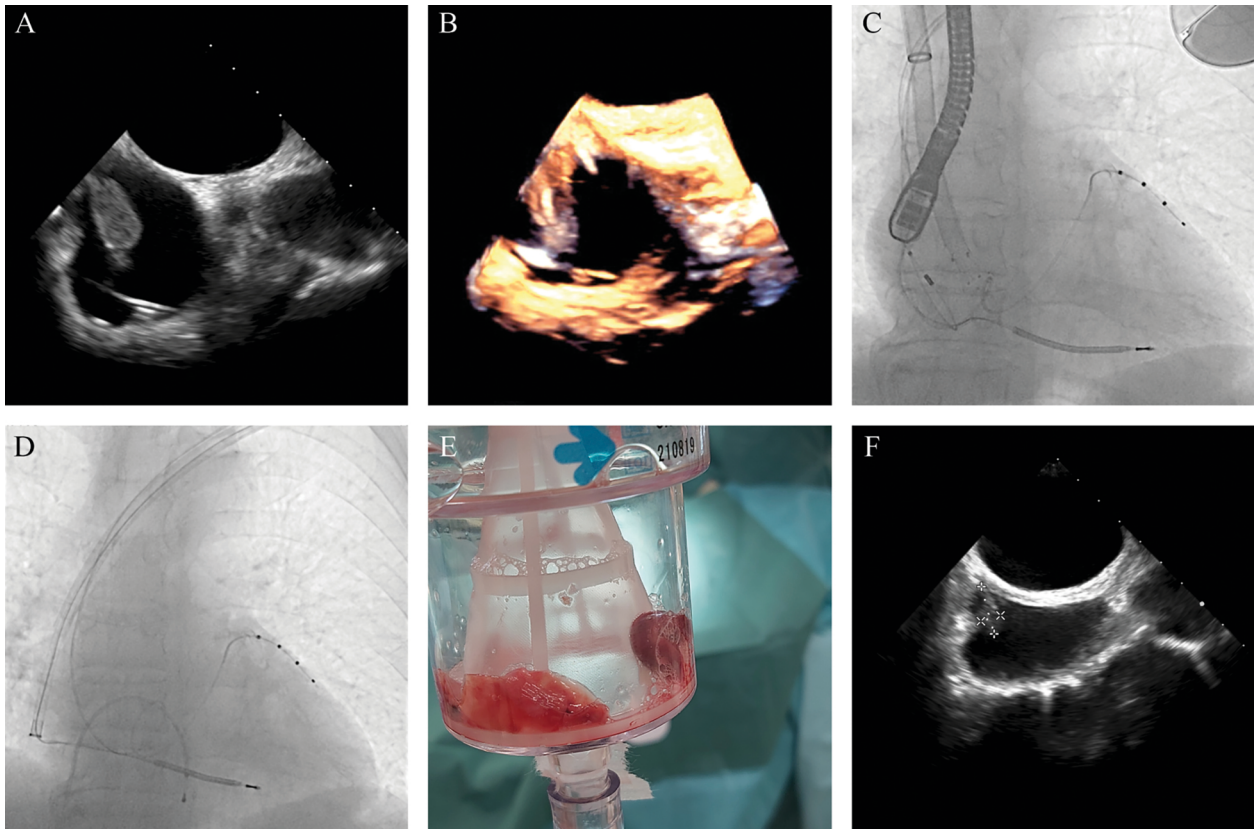

Figure 1. A. 2D transoesophageal echocardiography (TEE) revealed large, mobile mass attached to the cardiac resynchronization therapy--defibrillator lead in the right atrium (RA) **B.** 3D TEE of the mass in the RA **C.** The AngioVac suctioning cannula is inserted into the RA under TEE and fluoroscopy guidance **D.** Transvenous lead extraction is being performed using Evolution RL Lead Extraction tools (Cook Vascular Inc.) **E.** Extracted vegetation in the AngioVAC filter **F.** 30-day follow-up period: 2D TEE showing connective tissue remnants and no signs of endocarditis

A subsequent total lead extraction was performed using Evolution RL Lead Extraction tools (Cook Vascular Inc.) (Figure 1D). Both vascular access sites were successfully closed with Proglides. Postprocedural TEE demonstrated the absence of the mass and no mechanical complication. The patient tolerated the procedure well and was transferred to the intensive care unit for close observation. After surgery, antibiotic treatment was continued for six weeks. Repeated blood cultures were negative. During 30-day and 6-month follow-up no clinical or ultrasound findings of endocarditis were noticed (Figure 1F).

Conclusion

The AngioVac system with subsequent mechanical lead extraction is a minimally invasive and effective procedure in the management of CDRIE patients with large vegetation.

Additional information

Ethics statement

The case report was in adherence with the Declaration of Helsinki. The written informed consent was obtained from the patient for publication of this case report and accompanying images.

Author contributions

All authors contributed to patient diagnosis, management and clinical data analysis. PL wrote the manuscript draft. All authors revised the manuscript.

Conflict of interests

The authors declare no conflict of interest

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