Percutaneous electrode removal in massive lead-related infective endocarditis using the Angiovac system

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STRESZCZENIE

Niniejszy artykuł opisuje przypadek pacjenta wymagającego leczenia inwazyjnego dużej wegetacji bakteryjnej znajdującej się na elektrodzie wszczepialnego kardiowertera-efibrylatora i na zastawce trójdzielnej. Ze uwagi na duże ryzyko chirurgiczne, zespół wielodyscyplinarny podjął decyzję o przezskórnym usunięciu systemu, poprzedzonego usunięciem wegetacji przy użyciu mało inwazyjnego systemu AngioVAC.

Słowa kluczowe: odelektrodowe zapalenie osierdzia, przezskórne usunięcie elektrody, AngioVAC

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ABSTRACT

This paper describes the case of a patient requiring invasive treatment for a significant bacterial vegetation located on the electrode of an implantable cardioverter-defibrillator and on the tricuspid valve. Due to a significant surgical risk, an immediate transcutaneous removal of the implantable cardioverter-defibrillator system, preceded by the vacuum-assisted vegetation removal with the use of low-invasive AngioVAC system was conducted.

Key words: lead related infective endocarditis, transvenous lead extraction, AngioVAC

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Introduction

Lead-related infective endocarditis [LRIE) is a dangerous complication with uncertain long-term prognosis [1–3]. This complication requires aggressive surgical intervention with transvenous lead extraction [TLE) as well as prolonged antibiotic therapy [4]. This paper describes the case of a patient requiring invasive treatment for a significant bacterial vegetation located on the electrode of an implantable cardioverter-defibrillator (ICD) and on the tricuspid valve. On account of a significant surgical risk, an immediate transcutaneous removal of the ICD system, preceded by the vacuum-assisted vegetation removal with the use of low-invasive AngioVAC system was conducted [5].

Case study

A 63-year old male patient with left ventricle systolic dysfunction (LVEF 15%) of an ischemic etiology, with a history of coronary angioplasty and surgical revascularization (CABG), ICD implantation in 2014, with end-stage renal disease which required chronic dialysis was referred from the Nephrology Ward with a suspected LRIE. The Patient's history comprised persistent fever, chills, progressive dyspnoea and a body weight loss with cachexia (BMI 18.2). Blood culture revealed *S. epidermidis*. The transoesophageal echocardiography (TEE) showed clustery structures with the diameter exceeding 3 cm, along the course of the ICD electrode and involving the heart valve (Fig. 1). On account of the amount of the vegetation, the Patient was qualified for a cardiosurgical intervention. Computed tomography

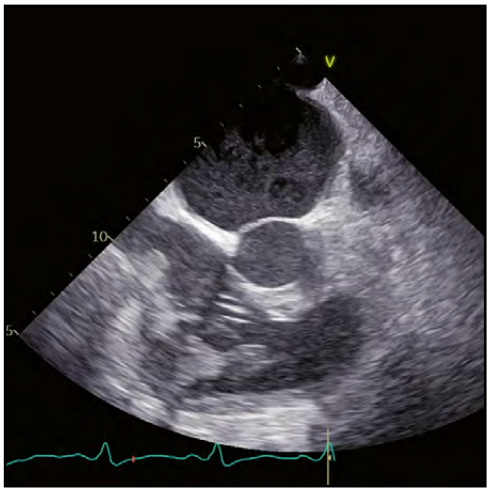

Figure 1.

Figure 2.

confirmed the patency of all the by-pass grafts of the coronary arteries. The course of the bypass to PDA, at the level of the right atrium (RA), collided with the surgical approach to the tri-cuspid valve (Fig. 2). The revision surgery with the use of the extra-corporeal circulation device in the case of this frail and emaciated Patient was burdened with a very high risk. The interdisciplinary Heart-Team discussed all the possible therapeutic options followed by a decision to use the AngioVac system (Angiodynamics, US) in connection with immediate connection of the TLE to the ICD system was taken.

The procedure was performed in general anaesthesia. The working port for the AngioVAC system was the 26F catheter introduced through the right femoral vein. The filtered blood was returned to the circulation through the cannula placed in the left femoral vein. The procedure was performed with the use of heparin, after reaching the safe activated clotting time (ACT) above 250s. The system was positioned and the intervention was visualized with fluoroscopy and TEE. After the introduction of the AngioVAC device and directing it towards the vegetation, the system was started. The vegetations from the ICD electrode and from the tricuspid valve were crushed and suction was applied to remove them (Fig. 3).

Figure 3.

Then effective TLE was performed with the use of Byrd dilators, thus removing the entire infected system. During the maneuver, the AngioVac system was in place and active in the RA for the aspiration of the detaching fragments of the vegetation. Also the dialysis catheter, placed into the right subclavian vein, was removed. The final TEE assessment revealed the tricuspid insufficiency, similar as before the procedure and the supravalvular defect was excluded. A structure with a diameter of about 0.8 cm, in the right ventricle between the tendinous chords remained (Fig. 4). Before the removal of the entire system, heparin was antagonized with protamine. The course of the entire procedure was uncomplicated.

Figure 4.

Discussion

The removal of large vegetations from intravascular electrodes requires invasive treatment. The use of the AngioVAC system makes up an efficient alternative for surgical treatment with the use of extracorporeal circulation. The limitations for the technique comprise degenerative lesions of the tricuspid valve, which determine the necessity of its reconstruction or exchange. A problem might lie in sold structures located in the places which are difficult to access, for example between the tendinous chords of the tricuspid valve. Such remaining structures located in the heart chambers and vessels are described in literature as “ghost”. In our opinion a routine use of AngioVAC during extraction on account of LRIE with the presence of vegetation on the electrode

must be taken into consideration [1, 6]. Such procedure may significantly reduce the risk of pulmonary micro-embolisms with the material detached from the removed infected electrode. The results of the patient treatment with the support of the AngioVAC system are significantly better than those published in other studies [2, 3].

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