

# Lead-dependent infective endocarditis with a large vegetation — is cardiosurgical treatment always necessary?

Odektrodowe zapalenie wsierdza z dużą wegetacją  
— czy leczenie kardiochirurgiczne jest zawsze konieczne?

Krzysztof Boczar<sup>1</sup>, Andrzej Ząbek<sup>1</sup>, Maciej Dębski<sup>1</sup>, Robert Musiał<sup>2</sup>,  
Jacek Lelakowski<sup>1,3</sup>, Barbara Małecka<sup>1,3</sup>

<sup>1</sup>Department of Electrophysiology, John Paul II Hospital, Krakow, Poland

<sup>2</sup>Department of Medical Intensive Care Unit, John Paul II Hospital, Krakow, Poland

<sup>3</sup>Institute of Cardiology, Jagiellonian University Medical College, Krakow, Poland

## Abstract

A 31-year-old patient who had cardiac pacemaker (DDD) implanted at the age of 16 due to complete atrioventricular block was admitted because of suspicion of lead-dependent infective endocarditis (LDIE). Echocardiographic examination revealed a vegetation measuring 31 x 20 mm in connection with excessive loop of atrial lead and endocardium adjacent to tricuspid valve. The patient was qualified for hybrid procedure: surgical removal of the vegetation and transvenous extraction of intracardiac leads. Considering the stable condition of the patient, it was decided to postpone the procedure and intensive treatment with antibiotics and anticoagulation therapy with low molecular weight heparin was continued. Pharmacological treatment resulted in a reduction of vegetation dimensions to 25 x 15 mm, which allowed for changing the qualification of the procedure to transvenous lead extraction (TLE) of the DDD system. The procedure was carried out without complications. After normalization of inflammatory parameters and disappearance of the vegetation, a new stimulation system was implanted on the same side of the chest. During one-year follow-up, there was no recurrence of the infection.

Key words: vegetation, infective endocarditis, pacemaker, complication

Folia Cardiologica 2018; 13, 4: 367–370

## Case presentation

A 31-year-old female had her DDD pacemaker implanted at the age of 16 years due to complete atrioventricular block, and generator change at the age of 22 years. She was admitted due to possible lead-dependent infective endocarditis (LDIE), without pocket infection. Echocardiographic exam revealed vegetation attached to the endocardial lead which was considered as the major Duke criterion. The minor Duke criteria met in this case were the presence of leads and recurrent fever with shivers [1].

Laboratory tests showed elevated inflammatory markers: white blood cells =  $14.13 \times 10^3/\mu\text{L}$ ; C-reactive protein = 51.0 mg/L; procalcitonin = 1.15 ng/mL. Blood cultures drawn on admission were negative. Patient was pacemaker-dependent and pacemaker functioned properly. The size of vegetation assessed in transthoracic echocardiography (TTE) was 31 × 20 mm and was attached to an excessive loop of the atrial lead and to endocardium near tricuspid valve. The loop of atrial lead with vegetation prolapsed through the tricuspid valve during diastole and obstructed right ventricular inflow (Figure 1). Additionally, TTE revealed

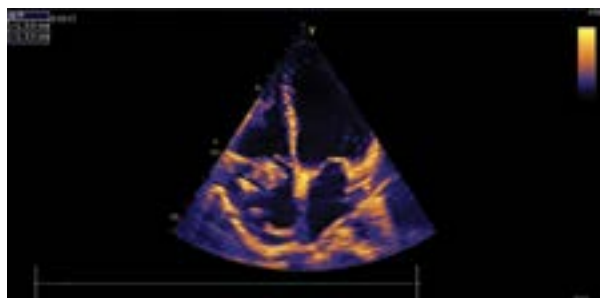


Figure 1. The loop of atrial lead with vegetation



Figure 3. Reduction of vegetation size to 24×15 mm in TEE



Figure 2. The presence of too long loop of atrial lead confirmed in chest X-ray



Figure 4. Small vegetation attached to endocardium after the extraction of the leads in intraoperative TEE

reduced left ventricle ejection fraction of 50%, moderate/severe tricuspid regurgitation, pericardial effusion, and right-sided pleural effusion. Improper placement of leads and the presence of too long loop of atrial lead were confirmed in the chest X-ray (Figure 2). The patient was referred for hybrid procedure: surgical extraction of the large vegetation, transvenous extraction of all the hardware, and insertion of a temporary transvenous ventricular pacing lead to provide antibiotic treatment for several weeks [2, 3]. Since the patient was in stable condition, we postponed the procedure to continue intensive intravenous antibiotic therapy and treatment with low-molecular-weight heparin. The pharmacological treatment lasting for 7 days, resulted in the reduction of vegetation size to 24 × 15 mm (Figure 3). We changed initial qualification to transvenous lead extraction of DDD pacemaker with cardiosurgical backup and the possibility of conversion to open surgical procedure at every stage of the transvenous procedure. TLE procedure was performed without complications. Intraoperative transesophageal echocardiography showed the small vegetation attached to endocardium after the extraction of the leads (Figure 4). The joint decision of the team (cardiologists



Figure 5. Chest X-ray after implantation of the new pacing system

and cardiothoracic surgeons) was to resign from surgical treatment and qualify patient to medical treatment. We did not observe any increase in pulmonary arterial pressure during the procedure and intensive care unit stay. Cultures from the leads collected intraoperatively, at the time of antibiotic treatment, were negative. Empirical antibiotic therapy was continued for six weeks. After normalization of inflammatory markers and vegetation disappearance, a new pacing system was implanted at ipsilateral side of chest (Figure 5). At one-year follow-up, patient remained

in good condition without infection relapse. A follow-up TTE showed normalization of left ventricle ejection fraction, improvement in tricuspid regurgitation severity, and elimination of pleural and pericardial effusion.

## Discussion

The improper placement of pacing leads and the presence of too long loop in the heart are known factors associated with higher risk of LDIE [4, 5, 6]. In the presented case due to the size of vegetation, possible risk of pulmonary embolism during transvenous lead extraction procedure (TLE), lack of sufficient methods to protect the pulmonary circulation [7] – the patient was referred for hybrid procedure. Patient stable condition enable admission of antibiotics in accordance to current recommendations [3]. In addition, the patient received treatment with low-molecular-weight heparin, which is the treatment of choice in our tertiary center for lead extraction. Applied treatment resulted in the reduction of vegetation size. However, in the only published

randomized study, the addition of antiplatelet therapy did not reduce the risk of embolism [8].

## Conclusion

The presented case demonstrates the possible therapeutic approach in stable patients with large vegetations during LDIE. The prolongation of intensive antibiotic and anticoagulant treatment enabled reduction of vegetation size and safe performance of TLE procedure without the need for surgical intervention. Furthermore, it emphasizes the importance of pacemaker implantation technique in order to avoid improper lead placement. Decision of pacemaker reimplantation on the ipsilateral side of the chest in this young patient was made to protect the venous system on opposite side and because of esthetic reasons.

## Conflict of interest

None

## Streszczenie

31-letnia pacjentka po implantacji kardiostymulatora typu DDD z powodu całkowitego bloku przedsionkowo-komorowego w wieku 16 lat, została przyjęta z powodu podejrzenia infekcyjnego odektrydowego zapalenia wsierdza (LDIE). Badanie echokardiograficzne ujawniło obecność vegetacji o wymiarach 31 x 20 mm w łączności z nadmierną pętlą elektrody przedsionkowej i endokardium w okolicy zastawki trójdzielnej. Pacjentkę zakwalifikowano do zabiegu hybrydowego: kardiochirurgicznego usunięcia vegetacji oraz przezżylnego usunięcia elektrod endokawitarnych. Ze względu na stabilny stan pacjentki zdecydowano o odroczeniu zabiegu, jednocześnie kontynuowano intensywne antybiotykoterapię oraz leczenie przeciwkrzepliwe heparyną drobnocząsteczkową. Leczenie farmakologiczne skutkowało redukcją wymiarów vegetacji do 25 x 15 mm, co umożliwiło zmianę kwalifikacji zabiegu na przezżylnie usunięcie (TLE) układu DDD. Zabieg przeprowadzono bez komplikacji. Po normalizacji parametrów zapalnych i zniknięciu vegetacji implantowano nowy układ stymulujący po tej samej stronie klatki piersiowej. W trakcie rocznego okresu obserwacji nie stwierdzono nawrotu infekcji.

Słowa kluczowe: vegetacja, infekcyjne zapalenie wsierdza, stymulacja serca, powikłania

Folia Cardiologica 2018; 13, 4: 367–370

## References

1. Małecka B, Ząbek A. Infectious complications of electrotherapy: theory and practice. *Pol Arch Med Wewn.* 2016; 126(6): 440–442, doi: 10.20452/pamw.3439, indexed in Pubmed: 27305211.
2. Wilkoff BL, Love CJ, Byrd CL, et al. Heart Rhythm Society, American Heart Association. Transvenous lead extraction: Heart Rhythm Society expert consensus on facilities, training, indications, and patient management: this document was endorsed by the American Heart Association (AHA). *Heart Rhythm.* 2009; 6(7): 1085–1104, doi: 10.1016/j.hrthm.2009.05.020, indexed in Pubmed: 19560098.
3. Habib G, Lancellotti P, Antunes MJ, et al. ESC Scientific Document Group. 2015 ESC Guidelines for the management of infective endocarditis: The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM). *Eur Heart J.* 2015; 36(44): 3075–3128, doi: 10.1093/eurheartj/ehv319, indexed in Pubmed: 26320109.
4. Boczar K, Małecka B, Ząbek A, et al. Spaghetti-like leads in the heart - a complication of permanent heart stimulation. *Kardiologia Pol.* 2014; 72(3): 284, doi: 10.5603/KP.2014.0055, indexed in Pubmed: 24677082.

5. Ząbek A, Małecka B, Kołodzińska A, et al. Early abrasion of outer silicone insulation after intracardiac lead friction in a patient with cardiac device-related infective endocarditis. *Pacing Clin Electrophysiol.* 2012; 35(6): e156–e158, doi: 10.1111/j.1540-8159.2010.02954.x, indexed in Pubmed: 21070260.
6. Rydlewska A, Ząbek A, Boczar K, et al. Tricuspid valve regurgitation in the presence of endocardial leads - an underestimated problem. *Postępy Kardiol Interwencyjnej.* 2017; 13(2): 165–169, doi: 10.5114/pwki.2017.68073, indexed in Pubmed: 28798789.
7. Małecka B, Kutarski A, Tomaszewski A, et al. Transvenous removal of endocardial leads with coexisting great vegetation (3.5 cm)–case report. *Europace.* 2010; 12(3): 445–446, doi: 10.1093/europace/eup427, indexed in Pubmed: 20093254.
8. Chan KL, Dumesnil JG, Cujec B, et al. Investigators of the Multicenter Aspirin Study in Infective Endocarditis. A randomized trial of aspirin on the risk of embolic events in patients with infective endocarditis. *J Am Coll Cardiol.* 2003; 42(5): 775–780, indexed in Pubmed: 12957419.