Repositioning of the left ventricular lead with bioresorbable vascular scaffold stabilization

Repozycjonowanie lewej elektrody komorowej z fiksacją stentem bioresorbowalnym

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ABSTRACT

83-year-old man was referred to a clinic due to exacerbation of chronic heart failure. CRT-D interrogation revealed lack of efficient left ventricular pacing. Patient was qualified to the left ventricular lead reposition. Due to anatomical conditions and technical limitations it was decided to stabilize the lead with the bioresorbable vascular scaffold.

Key words: bioresorbable scaffold, resynchronization therapy, lead dislodgement

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STRESZCZENIE

Mężczyzna, 83-letni, został skierowany do kliniki z powodu zaostrzenia przewlekłej niewydolności serca. Interrogacja CRT-D wykazała brak skutecznej stymulacji lewej komory, a pacjent został zakwalifikowany do repozycjonowania lewej elektrody. Ze względu na trudne warunki anatomiczne i techniczne ograniczenia, podjęto decyzję o wykonaniu stabilizacji przy użyciu rusztowania bioresorbowalnego.

Słowa kluczowe: rusztowanie bioresorbowalne, terapia resynchronizująca, dyslokacja elektrody.

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Case report

A 83-year-old man was referred to a clinic due to exacerbation of chronic heart failure (CHF) to New York Heart Association (NYHA) class III. Six months prior to current admission he was implanted with cardiac resynchronization therapy with defibrillator (CRT-D) due to decreased left ventricular ejection fraction (LVEF = 26%), right bundle branch block and paroxysmal 2:1 atrio-ventricular block. His medical history was also positive for myocardial infarction, hypertension and type 2 diabetes mellitus.

CRT-D interrogation revealed lack of efficient left ventricular pacing and chest X-ray confirmed macro-dislocation of a left ventricular lead from postero-lateral branch of coronary sinus. Patient was qualified to the left ventricular (LV) lead reposition. Due to anatomical conditions, phrenic nerve stimulation in the second available lateral vein only the same posterolateral side branch was feasible for LV lead implantation. After introduction of the lead and confirmation of acceptable pacing parameters it was decided to stabilize the lead with the bioresorbable vascular scaffold (BVS). The 2.5 × 8 mm Absorb GT1 (Abbott Vascular) was implanted at 16 atm (Fig. 1). Size of the BVS and its proper expansion were assessed in pre- and postprocedural intravascular ultrasound (IVUS) imaging (Fig. 2).

During 6-month follow-up the patient was found in good general condition with NYHA class II symptoms and stable electrical parameters of LV lead.

Figure 1. Implantation of bioresorbable vascular scaffold to posterolateral branch of coronary sinus

Discussion

Cardiac resynchronization therapy has been established as an effective therapy for patients with symptomatic heart failure with reduced ejection fraction and wide QRS complex mainly with left bundle branch block morphology [1]. CRT should also be considered in patients with indications to antybradycardia pacing with reduced left ventricular function to prevent HF exacerbations [1]. In our case reduced EF and wide QRS complex, although of RBBB morphology, were accompanied by atrio-ventricular conduction disturbances and patient's condition clearly worsened with loss of resynchronization.

Dislodgement of the left ventricular lead occurs in up to 10% of cases and remain one of the main complications of CRT [2]. Active fixation LV leads like Attain Starfix OTW LV (Medtronic, USA) reduced the rate of dislodgements but are not widely used because of potential problems during transcutaneous lead extraction procedures [3].

Target zone for left ventricular pacing is located in basal and mid segments of lateral wall of left ventricle. This location along with passive fixation makes the displacement significantly more likely. However, there is no recognized proper method of stabilization. Well described, but not flawless method is stabilization with metal stent [4–6]. Long-term studies have shown that this technique is safe and only about 5% of patients with coronary sinus side branch stenting stabilization needed additional intervention [7]. Nevertheless, potential complications due to stent implantation like lead damage, injury of the cardiac vein and limitations in lead extraction still remains. Some of these problems may be probably avoided by using the biodegradable scaffold instead of metal stents. This technique, recently described by Wipert et al., seems to have some advantages like thrombotic and fibrotic active fixation, lower risk of future lead damage and easier extractability because of nonpermanent trapping [8]. Proper implantation of vascular scaffold into cardiac vein may be challenging. In our case IVUS was used to confirm the proper size, location and expansion of the scaffold.

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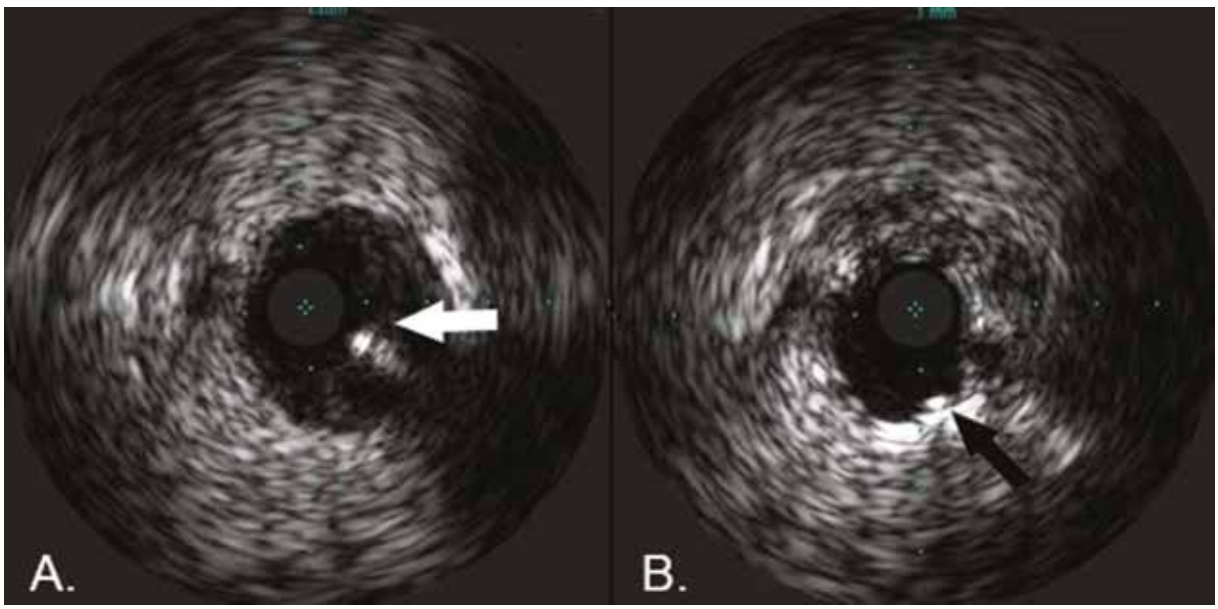

Figure 2. The course of left ventricular lead and stabilization with bioresorbable vascular scaffold shown in IVUS imaging. **A.** Preprocedural imaging showing free-floating LV lead (white arrow); **B.** Image after BVS implantation showing LV lead (black arrow) that is pushed to the vessel wall

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