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NEW ALTERNATIVE APPROACH IN CASE OF PACEMAKER-DEPENDENT PATIENT WITH BILATERAL POCKET INFECTION AND PERSISTENT SUPERIOR VENA CAVA (OR VENOUS DRAINAGE ABNORMALITY)

Abstract

This paper describes the case of pacemaker-depandent male patient with upper body venous dreinage anomaly, who suffered from bilateral pocket infection. This difficult situation made it impossible to implant the device in the subclavian region and forced us to search for an alternative access for right ventricular pacing. Presented case describes new possibilities in electrotherapy which are provided by technological development and miniaturization of medical devieces.

Key words: cardiac pacing, pocket infection, pacemaker-dependency, leadless pacing

For many years, a nightmare of cardiologists handling implanted devices has been a problem of bilateral infection of pacemaker pocket preventing its transvenous reimplantation. Subsequent procedures involved attempting femoral vein access or cardiosurgical placement of epicardial electrodes.

Case study

A 71-year-old patient with a history of paroxysmal atrial fibrillation, arterial hypertension and second/third degree paroxysmal AVB underwent implantation of a VDD pacemaker via left subclavian access through persistent superior vena cava in 2010. Over the years, atrial arrhythmia has become established and the patient has become pacemaker-dependent. 6 years after implantation, the system was removed due to local pocket infection. Intraoperative transesophageal echocardiography revealed occlusion of superior vena cava. Samples taken from the pocket at that time were negative. After a successful procedure of transcutaneous electrode extraction, the patient, secured by a transient stimulation of the right ventricle, was transferred to the implantation center, where on 26 February 2016, via right subclavian vein, a single chamber pacemaker was implanted, placed in an anti-allergic Dacron pouch. 10 years after the procedure a swelling of pocket occurred and allergic reaction was suspected. The patient was consulted by an allergist due to suspected metal sensitization. This was not confirmed and the patient was directed to our site with diagnosed infection of the pacemaker pocket. Due to

Table 1. Chronology of electrocardiostimulation procedures

Date	Type of procedure	Remarks
05/02/2010	VDD implantation	Persistent superior vena cava
23/02/2016	Left-sided pocket infection – system removal	Persistent AF. Diagnosis of superior vena cava occlusion
26/02/2016	Right-sided VVI implantation via persistent superior vena cava	Dacron pouch
20/12/2016	Pocket infection. Removal of the system	
20/12/2016	Temporary pacing	Exploring electrode inserted via persistent vena cava
03/01/2017	Implantation of the leadless system	

pacemaker-dependence, a temporary active fixation electrode was implanted to the right ventricular apex via left subclavian access through the persistent superior vena cava (Fig. 1). At the same time, the system was explanted on the right side with a large amount of pus removed (Fig. 2). Empirical antibiotic therapy was introduced (again it was not possible to culture a pathogen respon-

Fig. 1. Two active fixation electrodes: one comes from the infected system, the other is temporarily implanted in support for leadless pacemaker implantation.

Fig. 2. Pus evacuation from the pacemaker pocket

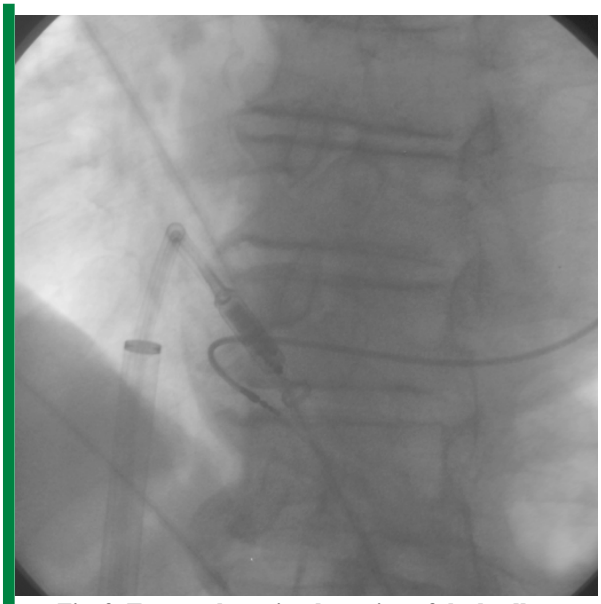

Fig. 3. Transcatheter implantation of the leadless system with the presence of a conventional active fixation electrode – left oblique view

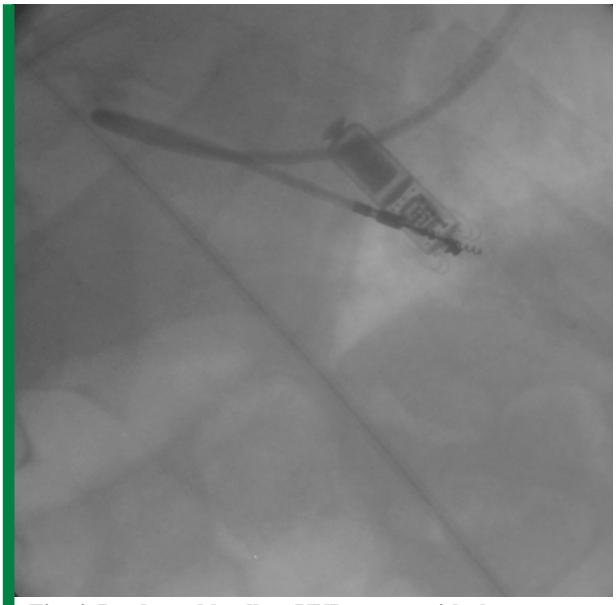

Fig. 4. Implanted leadless VVI system with the presence of a conventional active fixation electrode – AP view

sible for the infection). Following from a negative blood culture, the final solution was applied in the form of a leadless cardiac pacing system – Micra® (Fig. 3, Fig. 4)

Summary

Thanks to technological progress in invasive cardiology there are new treatment options available if there is no subclavian access during the procedure of cardiac pacemaker implantation. This is a quick, low-invasion method with a low percentage of complications, which allows pacing even if there is occlusion of subclavian veins, brachiocephalic veins or superior vena cava [1]. It avoids leaving the pulse generator in skin layers and also removes the necessity of a burdensome procedure if epicardial electrode placement is necessary

It is difficult to find a patient where using leadless pacemaker would be more justified. The patient presented with both bilateral infection and venous anomaly in the form of persistent superior vena cava. Moreover, numerous procedures resulted in occlusion in the right superior vena cava.

The patient also revealed persistent atrial fibrillation, so there was not a dilemma regarding restriction of leadless pacing, i.e. exclusively right-ventricular pacing. Still open question is the use of VVI pacing in patients with sinus rhythm. With a very limited access to right cardiac chambers and/or high risk of a cardiosurgical procedure, VVI pacing and "sacrificing" the sinus rhythm is, in our opinion, acceptable, since it prevents a more complex operation [2].

A yet unexplored issue is a possibility of accelerating the procedure and implanting the leadless pacemaker *ad hoc* during the explantation procedure in a pacemaker-dependent patient, after a previous exclusion of lead-derived endocarditis. Such a strategy would shorten hospitalization and would avoid the risk of complications related to temporary pacing of the right ventricle. We must bear in mind, however, that removal of an (even locally) infected system is associated with a transient bacteremia, i.e. a risk of infection of the newly implanted device.

References

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