Combined therapy with cardiac contractility modulation and subcutaneous implantable cardioverter-defibrillator: the first experience in Poland

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A 65-year-old woman with highly symptomatic (New York Heart Association [NYHA] class III/IV), non-ischaemic cardiomyopathy with severe systolic left ventricular dysfunction (left ventricular ejection fraction [LVEF] of 18%), and not fulfilling the criteria for cardiac resynchronisation therapy (CRT) underwent an implantation of a cardiac contractility modulator (CCM) (Model Optimizer IVs; Impulse Dynamics, Orangeburg, NY, USA) in October 2015. The device was placed typically in the right subclavian position. Three intracardiac leads were inserted via right axillary vein: one to the right atrium and two to the right ventricle (in low and medial septal positions). After the implantation, heart failure (HF) symptoms decreased significantly (to NYHA class III) and remained stable in the following two years; however, no important increase of LVEF was observed. Due to a considerable improvement of HF symptoms the patient rejected the proposal of implantable cardioverter-defibrillator (ICD) implantation. In June 2018 she was hospitalised due to HF symptom worsening (NYHA class III/IV). Comprehensive examinations did not reveal any correctable pathologies. After optimal functional recovery the patient was once again offered an ICD implantation, which she accepted this time. Because the patient had no indication for permanent pacing and there were already three leads in the superior vena cava, a totally subcutaneous ICD (S-ICD) was selected as an optimal treatment option. The patient successfully passed typical electrocardiographic screening for S-ICD sensing, with CCM pacing on and off, both in a horizontal and vertical positions. Implantation of the S-ICD (Model 1010 SQ-RX; Boston Scientific, Marlborough, MA, USA) was performed under general anaesthesia with a two-incision technique. Components of the S-ICD system were placed typically: a generator in the left lateral position over the fifth intercostal space and a defibrillation lead along the left parasternal line (Fig. 1). Periprocedural S-ICD programming with CCM pacing on was unsuccessful due to failure of the sensing configuration. After switching the CCM device off, successful programming was possible. Afterwards, S-ICD sensing was re-checked (with CCM pacing on and off) with excellent results. Eventually, a defibrillation threshold test was performed. The S-ICD successfully sensed and discriminated ventricular fibrillation and terminated the arrhythmia with 65-J shock (Fig. 2). The follow-up period was uneventful. CCM is a relatively new form of therapy dedicated to patients with symptomatic HF with reduced LVEF and QRS duration not fulfilling the criteria for CRT. Until now the device has required implantation of three electrodes and has not included functionality of cardiac pacing or defibrillation. As in the presented case, many patients referred for CCM implantation have LVEF ≤ 35%; therefore, implantation of an ICD is also indicated. S-ICD is an alternative to transvenous ICD in the prevention of sudden cardiac death in patients with no need for cardiac pacing or resynchronisation therapy [1]. S-ICD can be particularly useful in patients with no or complicated venous access because it does not require insertion of transvenous leads. In the presented case, implantation of another intracardiac lead for a transvenous cardioverter-defibrillator report from a successful defibrillation threshold test (65 J).

Figure 1. Chest radiograph with antero-posterior view of the cardiac contractility modulator and subcutaneous implantable cardioverter-defibrillator systems

Figure 2. Subcutaneous implantable cardioverter-defibrillator report from a successful defibrillation threshold test (65 J)

References


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