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Implantation of additional defibrillation lead into the coronary sinus: an effective method of decreasing defibrillation threshold

Wszczepienie dodatkowej elektrody defibrylującej do zatoki wieńcowej: skuteczna metoda obniżenia progu defibrylacji

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Abstract

We report a case of successful implantation of an additional defibrillation lead into the coronary sinus due to high defibrillation threshold (DFT) in a seriously ill patient with a history of extensive myocardial infarction referred for implantable cardioverter-defibrillator implantation after an episode of unstable ventricular tachycardia. All previous attempts to reduce DFT, including subcutaneous electrode implantation, had been unsuccessful.

Key words: additional defibrillation lead, high defibrillation threshold

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INTRODUCTION

High defibrillation threshold (DFT) is a potentially life-threatening complication in patients with implantable cardioverter-defibrillators (ICDs). Although less frequent in the era of high-output ICD devices, this problem still occurs in about 5% of ICD recipients [1].

CASE REPORT

A 54 year-old man was referred for ICD implantation after an episode of unstable ventricular tachycardia which had previously been successfully terminated by external cardioversion. He had a history of extensive antero-lateral myocardial infarction, ischaemic stroke and renal insufficiency with a glomerular filtration rate of 33–40 mL/min due to polycystic kidney disease. Echocardiography showed enlarged left ventricle with dyskinetic apex and ejection fraction of 15%. Coronary angiography revealed an occlusion of the left anterior descending artery and no significant changes in the remaining coronary vessels. The patient was selected for ICD implantation.

A dual chamber high-voltage ICD (Atlas II + DR, St. Jude Medical, Valley View Court Sylmar, CA, USA) with a single-coil active-fixation defibrillation lead (Durata 7122–65 cm, St. Jude Medical, Valley View Court Sylmar, CA, USA) positioned in the right ventricular (RV) apex and an atrial lead inserted in the right atrial appendage, was implanted. The defibrillation test performed after implantation was unsatisfactory despite changing the biphasic defibrillating current polarity and duration of both phases, and finally re-positioning the RV electrode.

During a second attempt, six days later, the single-coil RV electrode was replaced by a dual-coil lead (Durata 7120––65 cm, St. Jude Medical, Valley View Court Sylmar, CA, USA), but ventricular fibrillation could not be terminated even using

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maximal shock energy. Following this, a subcutaneous electrode (SQ 6996–58 cm, Medtronic Inc, Minneapolis, MN, USA) was inserted, but DFT remained higher than device output. Re-positioning of the subcutaneous electrode did not result in an improvement of the DFT.

At this point, to avoid referring the patient for pericardial implantation of defibrillation patches, an attempt to reduce DFT was performed by the implantation of a defibrillation lead into the coronary sinus (CS), a tested but often overlooked procedure [1] which has been described in medical textbooks [2]. This was performed via the insertion of a defibrillation 'floating' lead into the CS (6937–110 cm, Medtronic Inc, Minneapolis, MN, USA) using ScoutPro 8 F (Biotronik, Berlin, Germany) delivery system (Fig. 1). In consequence, ventricular fibrillation was terminated using 25 J, with a 11 J safety margin. The patient was successfully discharged, and one year follow-up confirmed stable CS lead position and did not reveal any complications.

This case report underlines the importance of making all possible efforts to reduce DFT before opting for surgery. The implantation of a floating defibrillation lead into the CS is one of the options.

Conflict of interest: *Dr Maciej Sterliński has received consulting fees from Biotronik, Medtronic, Sorin and St. Jude Medical. The remaining authors have no conflicts of interest to disclose.*

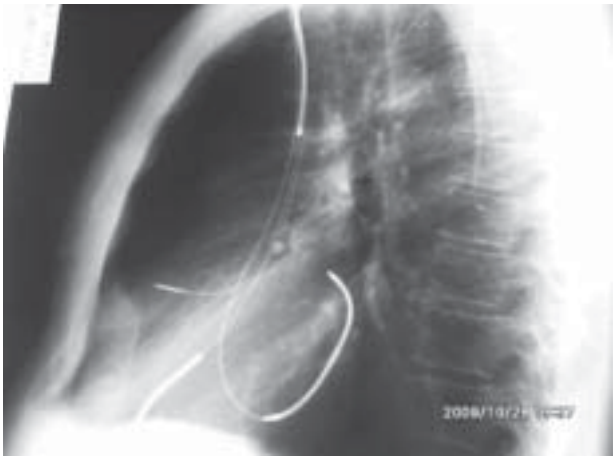

Figure 1. Lateral chest radiograph showing the ICD system after final implantation of additional floating defibrillation lead into the coronary sinus

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