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Additional coronary sinus shocking lead improved defibrillation threshold

A 61-year-old man was referred for treatment of recurrent syncopal ventricular arrhythmias, including two documented episodes of ventricular fibrillation (VF) due to alcohol-induced dilated cardiomyopathy. The patient had been taking amiodarone for 8 months. In addition he was taking an ACE inhibitor and spironolactone. A standard 12-lead ECG showed normal sinus rhythm with a QRS duration of 118 ms. Echocardiography confirmed the presence of severely impaired left ventricular function with an ejection fraction of <20%.

A dual-chamber, high-output ICD device (St Jude Medical, AtlasTM +DR, 46 J stored; 36 J delivered) using a transvenous defibrillation lead with distal RV apex coil (anode) and a proximal SVC coil (cathode) was implanted. VF was induced by 50 Hz burst pacing. The device delivered 36 J shocks, which failed to restore sinus rhythm, and external cardioversion was required. Despite reversal of shocking polarity, disconnecting the SVC coil and manipulation of the shock wave form, the defibrillation threshold (DFT) remained unacceptably high (>30 J). The possibility of a high DFT due to amiodarone treatment was considered and amiodarone was replaced with sotalol, which has been shown to improve DFT.

The patient underwent repeat DFT testing 1 month later. VF was induced with 50 Hz burst pacing and the device delivered a 36 J shock, which again failed to restore sinus rhythm. We subsequently positioned a Medtronic-TRANSVENE-SVC lead in the coronary sinus by shaping a stylet to facilitate introduction (see panel). The SVC coil was capped. Repeat testing showed a dramatic reduction in DFT with successful cardioversion on two consecutive occasions at 18 J.

This case demonstrates the benefit of an additional left-sided shocking lead in decreasing the DFT. This is a less invasive procedure than a subcutaneous array or an epicardial patch. Studies to look for alternative locations for defibrillator electrodes showed successful defibrillation with electrodes

placed in the coronary sinus. However, in these studies, patients with conventional right-sided defibrillators had DFTs within the accepted normal range, whereas our patient had an unacceptably high DFT with the initial implantation. In conclusion, the addition of a left-sided shocking coil lead may achieve a marked reduction in defibrillation threshold.

P Saravanan, D Bennett, N Davidson
drplsuk@yahoo.co.uk