Active-Can Implantable Cardioverter Defibrillator Placement from a Femoral Approach

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GIUDICI, MD., ET AL,: Active-Can Implantable Cardioverter Defibrillator Placement from a Femoral Approach. This report describes a case of an active-can ICD placed in the thigh. A 74-year-old man on chronic renal dialysis had no venous access from cephalic, subclavian, or jugular approaches. Using long active-fixation leads the device was placed from a femoral approach with good sensing, pacing, and defibrillation parameters. (PACE 2003; 26:1297-1298)

Introduction

In the early 1990s, implantable cardioverter defibrillators (ICDs) began to be implanted from a transvenous approach with long leads tunneled from the subclavian or cephalic venous access site to the abdomen, where the device was placed. By the late 1990s, the devices had become small enough that pectoral implant was feasible, ICD leads were shortened to 65-70 cm and the "active-can" devices were developed with the ICD itself being one pole of the shocking vector along with one or two shocking coils on the lead(s).

There was some initial concern that active-can devices needed to be placed on the left side of the chest to achieve an optimal defibrillation vector. A study by Roberts et al.' showed optimal defibrillation thresholds (DFTs) with the can on the left side in a pig model whereas clinical studies by Flaker et al. demonstrated similar DFTs with left or right pectoral implants.

This report describes a case where the active-can ICD was placed in the left thigh with good pacing, sensing, and defibrillation functions.

Case Report

The patient is a 74-year-old man who had a history of insulin dependent diabetes mellitus, hypertension, coronary artery disease, peripheral vascular disease, bilateral above-the-knee amputations, and end-stage renal disease on chronic hemodialysis. He had numerous vascular procedures in his chest for dialysis access over the years and was currently dialyzed through a right femoral catheter. His ejection fraction was 0.22. He presented with poorly tolerated ventricular tachycardia and was initially treated with amiodarone which exacerbated his baseline conduction disease (left bundle branch block and first-degree atrioventricular [AV] block) with resultant symptomatic episodes of complete heart block.

He was taken to the electrophysiology laboratory where central venous access was attempted from the left and right subclavian, cephalic, and internal jugular veins. Using contrast venography from peripheral intravenous lines in each arm, only a blush of small collaterals could be seen on each side. The procedure was terminated at that point.

Two days later, the patient was brought back to the laboratory and his left groin and thigh were prepped and draped. The left femoral vein was cannulated twice at the crease of the groin using a Cook needle/Seldinger wire technique. A horizontal incision was made in the thigh 4 cm below the crease of the groin and a pocket was produced superficial to the quadriceps muscle. Dissection was then carried cephalad with the guidewires brought down to the pocket. Using standard tearaway sheaths, long atrial and ventricular active-fixation leads (Guidant 0015-atrial and 156-ventricular, St. Paul, MN, USA) were advanced through the inferior vena cava and placed in a Bachmann's bundle location in the atrial septum and a right ventricular outflow septal position without difficulty (Fig. 1).

The leads were fixed to the muscle in the thigh and the ICD (Guidant Prizm DR, Guidant CRM) was placed in the pocket in the usual fashion. Measured P/R waves were 3.2 mV and 15.0 mV, respectively. Two successful DFT tests were performed at 23 J, with 34-Q resistance.

The patient was discharged the next day and has had no complications in 6 months of follow-up. He has received one appropriate ICD discharge without sensing problems. He is paced 100% in the atrium and ventricle.

Discussion

This is a case report of an active-can ICD being placed in the thigh. There was no problem...
with venous access from a femoral approach in this patient, but there was no access from above. It was interesting to see the ease of lead manipulation from the femoral approach with "straight shots" to atrial septal and ventricular septal locations. It also suggests that device location does not have a major effect on DFTs. For those unusual cases with poor venous access a femoral approach could be considered before proceeding to a thoracotomy for device placement.

References


Figure 1. Radiographs of the implantable cardioverter defibrillator system demonstrating lead placement in the atrial septum and right ventricular outflow septum, and device placement in the left thigh.