DEVICE THERAPY

RESEARCH ARTICLE

Cephalic Vein Cutdown for Left Ventricular Lead Placement in Biventricular Device Upgrades

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Introduction

Cephalic vein (CV) cutdown is a safe and effective technique for right atrial and ventricular lead placement in patients receiving pacemakers and implantable cardioverter defibrillators (ICDs). However, bleeding complications can limit its use during initial biventricular device implantations due to back bleeding as a result of elevated filling pressures in patients with congestive heart failure. The purpose of our study is to evaluate the feasibility of the CV cutdown technique for addition of a left ventricular (LV) lead in patients requiring upgrade of pre-existing devices to biventricular devices.

Methods

We performed a retrospective analysis of implanted devices at the Zablocki VA Medical Center between September 2003 and January 2008. The patient population included 10 patients who underwent upgrade of a pre-existing device (initially implanted using the subclavian vein) to a biventricular device via the CV cutdown technique. After approval from the institutional review board, the medical records of these 10 patients were reviewed. Operative reports, hospital discharge summaries, and follow-up visits were reviewed to obtain data including type of existing device, type of device upgrade, number of leads added, location of leads added, venous access used for device upgrade, length of hospitalization, time to follow-up, and occurrence of any complication including bleeding, device pocket hematoma, device infection, pneumothorax, hemothorax, lead fracture, and increased length of hospitalization.

Results

Ten patients met the above-mentioned criteria and the CV was easily identified in every patient during the procedure. In 8 of the 10 patients (80%), the CV was utilized for successful LV lead placement. In the other two patients, a venogram revealed occlusion of the CV; therefore, access was obtained via the innominate vein in one patient and the axillary vein in the other patient. Of the eight successful CV upgrades, four underwent upgrade of dual-chamber ICD to biventricular ICD, two had upgrade of dual-chamber pacemaker to biventricular pacemaker, and two with upgrade of single-chamber ICD to atroventricular ICD. The right atrial (RA) lead was placed via the same CV in the last two (Figure 1). No complications occurred. Notably, there were no bleeding complications and no hematomas requiring evacuation.

Discussion

The CV cutdown has been previously described and used for many years as a safe and effective method for percutaneous placement of pacemakers and defibrillators. With the advent of the introducer sheath, the incidence of
subclavian access for device implantation has increased and is used in up to 75% of device implantations.³ Complications that arise with the use of the subclavian approach include pneumothorax, hemothorax, and lead fracture.⁴ To avoid these complications the cephalic vein cutdown technique is favored by some electrophysiologists for device implantation; however, the major downside to this technique during initial implant for biventricular devices is bleeding. This phenomenon is due to elevated filling pressures in patients with congestive heart failure causing back bleeding into the cephalic vein. Our hypothesis was that in patients with existing devices, cephalic vein cutdown would be a successful and safe approach to device upgrade as the pre-existing leads would prevent back bleeding and thus prevent complications. Although the sample size is small, the results of our study suggest that the cephalic vein cutdown is a safe and effective technique for the addition of an LV lead to existing devices with a success rate of 80% and no complications.

Conclusions
The CV cutdown approach is feasible and can be safely utilized in LV lead placement in patients requiring the addition of one or even two leads for upgrade of existing devices. There were no procedural complications, including excessive blood loss, which prohibits its use in the initial LV lead implant procedures. This is likely to be due to pre-existing leads preventing back bleeding. This technique should be considered for implantation of additional leads to an existing pacemaker or defibrillator.

References