

Subcutaneous Implantable Cardioverter-Defibrillators:

Expanding the Scope of Technology

Mohammad Saeed, MD

Implantable cardioverter-defibrillators (ICDs) have improved greatly since their first clinical use in the 1980s. Abundant data now support their life-saving role in patients who have congestive heart failure. Over the years, the devices have shrunk in size and improved in functionality while extending patients' lives. However, traditional transvenous ICDs can still be improved. Mechanical complications related to the leads placed in the vascular system occur far too frequently, often with a heavy cost to the patient. Device-related infections also continue to adversely affect morbidity and mortality rates. Invasive implantation procedures and the need for more device replacement increase the risk of device infection.

Subcutaneous ICD (S-ICD) technology was developed to overcome some of these problems. The initial challenge in the evolution of S-ICD systems was to prove that they were as effective in detecting and treating ventricular tachycardia and ventricular fibrillation as were traditional transvenous ICDs. The results of large clinical trials have confirmed the safety and efficacy of S-ICDs in treating ventricular arrhythmias.¹ The next hurdle pertained to oversensing and the resultant inappropriate shocks, which occurred more often in S-ICD use than in transvenous ICD use during the early clinical experience.² Optimization of the S-ICD sensing algorithm, with the use of dual zones for detection, has yielded substantial improvement in the inappropriate-shock rate, which is now comparable to that of transvenous ICDs.³ The lack of pacing in S-ICDs currently limits their use to a population of patients who do not need antitachycardia pacing or cardiac resynchronization therapy. Despite these limitations, the implantation rate of S-ICDs is increasing, and new patient populations are being added.

In the next pages, Gupta and colleagues⁴ report the first case of S-ICD implantation in a patient who already had a HeartMate II[®] left ventricular assist device (LVAD). Of note, the authors observed no sensing or shock-delivery interference between the S-ICD and the LVAD. This is good news, and the benefits of this approach are obvious. By avoiding intravascular leads, some of the typically associated sequelae might be minimized or eliminated. In this high-risk patient population, a device-related pocket infection can still be treated; conversely, device-related bacteremia and systemic infection can be very costly. This is a welcome first report, but more data need to be gathered. Practicing physicians might hesitate in recommending S-ICD implantation to their LVAD patients until they see the results of more cases and longer durations of monitoring.

From: Division of
Cardiology, Department
of Medicine, CHI St. Luke's
Health—Baylor St. Luke's
Medical Center, Houston,
Texas 77030

Address for reprints:
Mohammad Saeed, MD,
6624 Fannin St., Suite 2480,
Houston, TX 77030

E-mail: mohammadsaeed@
yahoo.com

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Institute, Houston

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