ICD therapy in paediatric practice

S. Termeosov, R. Garipov, I. Bich, and Y. Volkova
Institute of Pediatry and Pediatric surgery, Russia

The life-threatening arrhythmia is a main reason of sudden cardiac death (SCD). Different modifications of hereditary channelopathia are the main indication in paediatrics. The aim of this study is assessment of our experience of ICD implantation in children.

Materials and methods: The group of the patients includes 51 children, age from 3 to 17 years old with life-threatening arrhythmias. In 23% also registered a different type of SVT. Most patients (85.7%) were implanted dual-chamber ICDs and electrodes with one coil and active fixation. In one case, we used epicardial ICD system with subcutaneous shock coil. In one patient, we implanted ICD and performed cryomodulation of the AV-node to decrease AV conduction. After ICD implantation, all patients prolong AAT. In 6-year follow-up, 51% of patient had an ICD therapy. In this period of time, 171 appropriate shocks were registered, 4 patients had ‘arrhythmic storm’ with 106 shocks, 29 inappropriate shocks during SVT episodes, and 13 inappropriate shocks with T-wave oversensing. In 10 patients, electrode replacement was performed due to dislocation or fracture reason. In six children with often appropriate shocks, left-sided sympathectomy was performed as a second stage of the surgical treatment.

Conclusion: Dual-chamber ICD implantation is an optimal tactic due to the best algorithms of supraventricular and ventricular arrhythmias discrimination. In case of detection of supraventricular arrhythmias with high AV conduction, it is reasonable to use medicamental or interventional correction of AV conduction.

No benefit of a dual coil over a single-coil ICD lead: evidence from the sudden cardiac death in heart failure trial

Pierre S. Aoukar, Jeanne E. Poole, George W. Johnson, Jill Anderson, Anne S. Hellkamp, Daniel R. Mark, Kerry L. Lee, and Guist H. Bardy
University of Washington, USA

Background: Dual coil ICD leads [with a superior vena cava (SVC) electrode] have been standard of care, based upon little data suggesting improved defibrillation efficacy. But dual coils increase complexity, cost, and complications. The purpose of this study was to compare all-cause mortality, appropriate shocks, and first shock efficacy for ventricular tachyarrhythmias, and implant defibrillation test energies in recipients of dual-coil vs. single-coil ICD leads in the Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT).

Methods: In SCD-HeFT, 811 patients received a single-lead ICD and underwent protocol-driven defibrillation testing. Selection of dual- vs. single-coil lead systems was as per the implanting physician. Complete data were available in 717 patients.

Results: A dual-coil lead was used in 563 patients and a single-coil in 246 patients. After a median follow-up of 45.5 months, mortality was 20.6 vs. 22.8% (dual vs. single) adjusted HR = 0.95 (0.69, 1.33) P = 0.79. Appropriate shocks were 21.3% (120 of 563) vs. 25.2% (62 of 246) (dual vs. single) adjusted HR = 0.79 (0.58, 1.09), P = 0.15. First shock efficacy was 82.5 vs. 91.9% (dual vs. single) OR = 0.41 (0.11, 1.66), P = 0.073. Mean DFT was 12.2 vs. 12.8 ± 4.8 J (dual vs. single), P = 0.807 and DFT did not differ by lead type.

Conclusions: In patients who received a primary prevention ICD, the addition of an SVC coil for left-sided implants did not improve outcomes. We advocate a return to the single-coil RV ICD lead for left-sided ICD implantation as the standard of care.

Implantable cardioverter defibrillator (ICD) in children and young adults: experience in Hong Kong

T.C. Yung, K.S. Lun, K. Fan, and L.C. Cheng
Queen Mary Hospital, Hospital Authority, Hong Kong

Introduction: ICD therapy is increasingly used in children and young adults. The purpose of this single-centre study in Hong Kong is to evaluate the indications, underlying heart disease, efficacy, outcome, and complications involved with ICD therapy in this group of patients.

Methods and results: The hospital records of all patients aged 30 years who underwent ICD implantation were reviewed retrospectively. From 1996 to 2010, 31 patients (mean age 15.6 years, range 4 years 8 months to 29 years) underwent ICD placement. The ICD was implanted for aborted cardiac arrest (35), syncope due to ventricular arrhythmia (5), and primary prevention of sudden cardiac death (1). The underlying cardiac diseases were congenital long-QT syndrome (3), idiopathic ventricular fibrillation (1), hypertrophic cardiomyopathy (1), and post-operative Tetralogy of Fallot (1). Ten patients had the ICD system implanted transvenously, and 1 had the ICD lead placed subcutaneously. Two youngest patients had the generator placed at the abdominal position. The mean follow-up duration was 4 years 2 months, range 7 months to 14 years. Three patients received appropriate shocks for ventricular arrhythmias at a mean duration of 6 months after ICD implant. One patient had anti-tachycardia pacing for fast ventricular tachycardia. Complications occurred in two patients. They had inappropriate shocks because of sinus tachycardia and lead fracture in one, and atrial fibrillation in the other. Three patients required reintervention: generator replacement in two, generator plus ICD lead replacement in the other. One patient died because of congestive heart failure 9 months after ICD implant, otherwise there was no ICD- or arrhythmia-related mortality.

Conclusions: The mid-term outcome of ICD therapy for prevention of sudden cardiac death in children and young adult is good. The ICD implant procedure is safe in this age group.

Effect of gender on posttraumatic stress disorder, major depression, and anxiety disorder among patients with implantable cardioverter defibrillator

Kocaeli University, Turkey

It is known that psychological problems associated with implantable cardioverter defibrillator (ICD) decreases the quality of life of the patients. Studies showed that women are more likely to develop depression and stress disorders. The aim of this study is to show gender difference on posttraumatic stress disorder (PTSD), major depression, and anxiety disorder among patients with ICD. Eighty-two patients (69 men, 13 women; mean age 59 ± 14 years) who had undergone ICD implantation were included in the study. Patients with known psychiatric diseases and recently (<3 months) implanted ICD were excluded. Patients answered the sociodemographic questionnaire, traumatic event question form, DSM-IV post-traumatic stress disorder (PTSD), anxiety disorder, and major depressive disorder questionnaire and a psychiatrist checked patients’ answers to the questionnaire and evaluated. Women were younger; however, there was not any statistically significant difference (61 ± 14 years vs. 51 ± 18 years). 25% of male and 46% of female patients had major depression. Generalized anxiety disorder was more common in women (6 vs. 31%, P = 0.006). Panic disorder with agoraphobia and without agoraphobia was in 12 (17%) male and 2 (15%) female patients. PTSD related to ICD shocks were more common in female patients (38%) in males, 69% in females, P = 0.04. Major depression and anxiety disorder, posttraumatic stress disorder (PTSD) related to mortal ventricular arrhythmias are common in patients with ICD. Generalized anxiety disorder and PTSD are more common in female patients with ICD.
The long-term efficacy of amiodarone in patients receiving implantable cardioverter-defibrillator therapy

Hidetaka Suenaga, and Shigeru Saito
Shonan-kamakura General Hospital, Japan

Background: Implantable cardioverter-defibrillator (ICD) therapy has been shown to reduce cardiac mortality. However, the efficacy of adjunctive medical therapy with amiodarone in patients receiving ICD for primary prevention of sudden cardiac deaths remains unknown.

Methods: We retrospectively reviewed the long-term outcomes of 44 consecutive patients receiving ICD for primary prevention. Eighteen patients received amiodarone (Group 1), and 26 did not (Group 2). Clinical events, including deaths, re-hospitalization, and ICD interventions, were compared between the two groups.

Results: There were no significant differences in baseline left ventricular ejection fraction between Group 1 (45 ± 15%) and Group 2 (52 ± 15%). During the follow-up (Group 1: 1016 ± 501 days vs. Group 2: 1361 ± 896 days, P = ns), three deaths (17%) were observed in Group 1 and 3 in Group 2 (12%, P = ns). These included two cardiac and four non-cardiac deaths. Hospital admission resulting from non-cardiac causes was more frequently observed in Group 1 than Group 2 (6 vs. 2, P < 0.05). The incidences of appropriate ICD treatment [2 (14%) vs. 3 (12%), P = ns], inappropriate shock [2 (14%) vs. 7 (27%), P = ns] did not differ between Groups 1 and 2.

Conclusion: For primary prevention, amiodarone did not provide long-term benefit in patients receiving ICD, but increase hospital admission due to non-cardiac causes.