First experience with a new totally subcutaneous ICD (Cameron Health) in five high risk patients with complex congenital heart disease (CHD)

Peters B. (1), Rosenthal E. (2), Schmitt B. (1), Schoof S. (3), Berger F. (1)
German Heart Center Berlin, Germany (1); Evelina Children’s Hospital, London, UK (2); Hannover Medical School, Hannover, Germany (3)

Introduction: Implantable cardioverter-defibrillator (ICD) therapy for prevention of sudden cardiac death has been increasingly adopted in the CHD population. In this group, conventional transvenous systems are often not applicable due to specific anatomic situations. Therefore we describe our preliminary experience with a new totally subcutaneous ICD (S-ICD, Cameron Health, USA) in a high risk patients group.

Patients and clinical outcome: In 5 patients (8.9-51.2 years) the S-ICD system (69 cc, 145 gram) was implanted for secondary prevention of sudden death. Patient weights ranged from 34-130 kg. 3 patients with an intracardiac right-to-left-shunt had a contraindication to transvenous lead placement: two with Eisenmenger syndrome and one with pulmonary atresia and VSD. In one patient with Ebstein’s anomaly, transvalvular lead passage was not appropriate. In the youngest patient (8.9 y) with severe ventricular dysfunction, transvenous access was limited by a Glenn shunt. No patient had an antibradycardiac pacing indication. 3 procedures were performed with general anaesthesia and two with conscious sedation. In 4 patients the device was submuscular and in one (130 kg) subcutaneous. Post implantation DFT testing showed effective ICD function. Good cosmetic results without patient discomfort were achieved in all. During a median follow up of 11.9 months 4 of the 5 patients did not experience any shocks. In the patient with Ebstein’s anomaly with complete right bundle branch block (RBBB), two inappropriate shocks occurred during exercise; this was due to a change of T-wave morphology at higher heart rates leading to ‘double counting’.

Conclusions: The new S-ICD is a good choice for complex CHD patients, in whom transvenous lead placement is not applicable. The minimally invasive approach avoids epicardial lead placement via thoracotomy - a major advantage in patients with high preoperative risk factors. Unfortunately the S-ICD has no anti-bradycardiac pacing option, which substantially limits its use in CHD patients. Despite the bulky size of the device, which restricts the use to patients above 30 kg, good cosmetic results can be achieved if the device is placed submuscularly. For pre-implantation ECG screening, exercise testing should be considered to rule out T-wave oversensing at increased heart rates especially with RBBB.