Implantable Cardioverter-Defibrillator therapy in children: a single-centre 10 year experience

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Background
The use of implantable cardioverter defibrillator (ICD) therapy is increasing in paediatric patients. Whilst ICD therapy prevents sudden cardiac death (SCD) in children, this occurs at the expense of a high rate of complications. This study represents the largest single centre series of ICD implantation in children.

Methods and Results
52 consecutive patients (31 male [60%]) underwent ICD implantation between November 2002 and March 2012. Median age at implantation was 14.7 years (range 2.9 – 18.4 years). Diagnosis was hypertrophic cardiomyopathy in 36 (69%), long QT syndrome in 6 (11%), arrhythmogenic right ventricular cardiomyopathy in 3 (6%) and repaired congenital heart disease in 3 (6%). One patient each (2%) had dilated cardiomyopathy, catecholaminergic polymorphic ventricular tachycardia, idiopathic ventricular fibrillation and coronary artery disease secondary to Kawasaki disease. 39 patients (75%) underwent ICD implantation for primary prophylaxis whereas 13 patients (25%) underwent ICD implantation for sustained ventricular arrhythmia or following cardiac arrest (secondary prophylaxis). Over a median follow-up of 3.2 years (range 0.2-7.8 years), 13 patients (25%) had at least one appropriate discharge; median time to first appropriate shock was 0.42 years (0.4-6.9 years). Appropriate shocks occurred more commonly in the secondary prevention group (46% vs. 18%; annual rate 44% vs. 4%; p<0.05). Complications included inappropriate shocks in 7 patients (14%), infective endocarditis (n=3, 6%) and psychological effects (n=11, 22%). 1 patient died from incessant ventricular arrhythmia and 2 underwent cardiac transplantation.

Conclusion
ICD therapy is effective at reducing the rate of SCD in children. Appropriate shock rates are substantially higher in patients with previous cardiac arrest, but complication rates are high. This study highlights the need for psychological support and vigilance against infection in children undergoing ICD implantation.