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Arrhythmias

RISK FACTORS FOR IMPLANTABLE CARDIOVERTER-DEFIBRILLATOR LEAD FAILURE IN CHILDREN AND YOUNG ADULTS

Poster Contributions

Poster Sessions, Expo North

Saturday, March 09, 2013, 3:45 p.m.-4:30 p.m.

Session Title: Arrhythmias: Devices I - Identification and Avoidance of Complications Associated with Implantable Devices

Abstract Category: 8. Arrhythmias: Devices

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Background: The population of children and young adults with implantable cardioverter-defibrillators (ICDs) has grown over the last decade, in part due to the development of smaller leads and devices. Although the ICD can be life-saving, it carries a significant risk of morbidity, including lead-related complications. Recent reports have called attention to high rates of ICD lead failure in adults with small caliber leads. The impact of small lead caliber on lead survival in children has not been examined. This study sought to identify risk factors for ICD lead failure in the pediatric population.

Methods: Subjects ≤ 30 years with transvenous right ventricular ICD leads implanted at our center between 1/1/1995 and 10/1/2011 were included. Lead pacing, sensing, and impedance parameters were analyzed from the time of implant to the most recent patient encounter. Lead failure was defined as fracture or impending fracture, dislodgement or perforation, or sensing failure necessitating revision. Lead survival was modeled with Kaplan-Meier analysis. Cox regression was used to evaluate the effect of patient and lead-related variables on lead survival.

Results: 120 RV ICD leads were implanted in 101 patients (46% primary arrhythmia, 34% cardiomyopathy, 20% congenital heart disease (CHD); 66% primary prevention) at a mean age of 15.5 \pm 4.9 years. There were 47 small caliber (< 8 Fr) and 73 standard caliber (≥ 8 Fr) leads. There were 25 documented lead failures, yielding an overall failure prevalence of 21%, with a mean time to failure of 41.2 \pm 32.6 months. Small caliber leads had lower 3-year (69% vs. 92%) and 5-year (48% vs. 86%) survival probabilities than standard caliber leads. In multivariate Cox regression, small lead caliber conferred the greatest hazard ratio (HR) for lead failure (HR = 3.99, 95% CI = 1.67-9.60, $p < 0.01$). CHD was protective (HR = 0.15, 95% CI = 0.03-0.77, $p = 0.05$), when compared to primary arrhythmia. Age, linear growth, and dual coil leads were not significantly associated with lead failure.

Conclusions: In this pediatric study, we have demonstrated that small lead caliber is significantly associated with ICD lead failure. Linear growth did not significantly impact lead survival.