

Cardiac Resynchronization Therapy in Pediatric and Congenital Heart Disease Patients: A Long-Term Single Center Experience

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Introduction: Cardiac resynchronization therapy (CRT) is a promising treatment for selected young patients with systemic ventricular dysfunction. The long-term benefits of this therapy are as yet unknown.

Methods: A retrospective single center review of our experience with pediatric CRT.

Results: A total of 25 patients underwent CRT since 2003, as adjunct to optimal heart failure therapy. Six patients had CRT as preemptive therapy and were excluded from data analysis. The median age at time of CRT was 9.2 years (range 1 to 24 years). Mean (SD) duration of follow-up was 3.4 (2.2) years. The diagnosis was congenital heart disease (CHD) in 10 (52.6%) patients including 3 patients with systemic right ventricle and 1 with single ventricle. Cardiomyopathy was present in 8 patients (42.1%) and congenital complete heart block in 1 patient (5.3%). 13 patients (68%) had permanent pacemaker implanted prior to CRT and 4 had a combined CRT and implantable cardioverter-defibrillator. Three patients had concurrent cardiac surgery with CRT. Patients underwent dyssynchrony assessment by tissue Doppler for optimization of CRT. Among 19 patients with established ventricular dysfunction at the time CRT was initiated, the mean (SD) baseline (pre-CRT) QRS duration was 139.7ms(30.1). The mean (SD) pre-CRT systemic ventricular ejection fraction (EF) was 30.7% (11.4), 37.5% (10.5) after a mean follow-up duration of 0.5 (0.4) years and 48.2% (10.7) after a mean of 3.4 (2) years of follow-up ($p < 0.006$ by paired comparison with baseline value). The baseline and latest EF did not differ according to the underlying diagnosis. Two patients died at 6 weeks and 4 months post CRT and no patient has so far undergone heart transplantation. Three (15.8%) patients were non-responders based on lack of improvement in EF. Five patients needed revision of their CRT device. Survival after CRT was 88.8% at 1 year, 85.7% at 2 years and 83.3% at 4 years.

Conclusions: CRT in selected children with systemic ventricular dysfunction can be associated with long-lasting benefit, including survival and improved ventricular function. The benefits are apparent in children with structurally normal hearts and those with congenital heart disease.