Resynchronisation pacing in patients with a congenital heart disease

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Introduction: Biventricular pacing (CRT) has become an option in young patients with a congenital heart disease. The mechanisms of ventricular dis-synchrony in these patients cannot be deduced from the adult patient. So alternative strategies had to be invented and are still under evaluation. We retrospectively analyse our patients in regards of safety and positive effects for the cardiac function.

Methods: We report on 21 patients with a mean age at time of device implantation of 16.3 years [1.9 to 33.2 years]. The observation period ranges from 3 months up to 5 years (mean 2.1 years) and summarizes up to 44 patient years. A transvenous approach was chosen in 8 patients (age from 14.8 up to 33.2, mean 25.7 years). Biventricular defibrillator (CRT-D) systems were used in 2 patients. Indications were set primarily according to the guidelines for conventional pacing systems. Decision making for a CRT system based on inter- or intra-ventricular contractile delays in echocardiography (echo) with a reduced overall myocardial function. Resynchronisation was programmed under echo guidance with optimisation of the AV-period at rest and an interventricular delay to best achieve a simultaneous contraction of the anterior and posterior ventricular wall.

Results: Five system revisions were performed because of lead failure (early n=1, late n=3) and one because a lead removal had become necessary causing tricuspid regurgitation. One patient with a Mustard palliation died 2.5 years after the implantation of a CRT-D system while waiting for heart transplantation. Significant improvement with restoration of normal cardiac function was found in two of the youngest patients. Significant improvement in echo could be followed in 10 patients and unchanged function in 7 patients.

Conclusions: CRT in congenital heart disease is a multivariate therapeutical approach in optimizing reduced cardiac function and has to follow the individual requirements of the patients. The underlying heart disease and arrhythmia, the age of the patients, the location for lead placement, the history of the myocardial dysfunction and the results of surgical procedures seem to play an important role in achieving improvement. Exchange of all experience available has to stimulate further refinement and optimisation of this therapeutical approach.