Effects of carvedilol therapy on cardiac autonomic control, QT dispersion and ventricular arrhythmias in children with dilated cardiomyopathy

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Introduction: The purpose of this study was to examine the effects of carvedilol therapy on autonomic control of the heart and QT-interval dispersion (QTd) as an arrhythmia marker among children with idiopathic dilated cardiomyopathy (DCM) whose symptoms were not adequately controlled with standard congestive heart failure (CHF) therapy.

Methods: A total 34 patients with idiopathic DCM were analyzed in the study. All patients had undergone carvedilol in addition to standard therapy for at least 6 months. Clinical, echocardiographic, electrocardiographic parameters, and 24-h Holter records of patients were evaluated before and after carvedilol treatment.

Results: After the six months of carvedilol therapy, the Ross clinical scales significantly decreased from, left ventricular ejection fraction (LVEF) and left ventricular fractional shortening (LVFS) significantly increased, left ventricle end diastolic dimensions (LVEDd) and left ventricle end systolic dimensions significantly decreased. There were statistically significant increases in mean SDNN, SDANN, rMSSD, and pNN50 after carvedilol therapy. Baseline SDNN was significantly correlated with baseline HR and total premature ventricular contraction (PVCs). After carvedilol, SDNN was correlated with the clinical score of CHF, heart rate, LVEF, LVFS and total PVCs. In addition, rMSSD and pNN50 were correlated with heart rate, LVEF and LVFS after carvedilol therapy. A significant reduction was observed in the terms of QTc min, QTc max and QTd values after carvedilol treatment. QTd was slightly higher in patients with a lower clinical score than in those with a higher clinical score, however, the difference was not statistically significant after carvedilol treatment. QTd was significantly related to total PVCs. Although eight patients had PVCs before treatment, they disappeared in four patients and PVC decreased in two patient after treatment. Sustained ventricular tachycardia was not observed in any patients before and after treatment. Before carvedilol therapy, five patients had ventricular couplets and two patients had nonsustained ventricular tachycardia. A trend toward a decrease in ventricular couplets and nonsustained ventricular tachycardia did not reach statistical significance after six months.

Conclusions: We concluded that the addition of carvedilol to standard medical regimens can improve clinical symptoms, heart rate variability in association with improved left ventricular function and reduce in arrhythmia markers in children with DCM.