Improvement of Brain Natriuretic Peptide Levels 48 Hours Following Cardiac Resynchronization Therapy

Background: Brain natriuretic peptide (BNP) levels are a marker of left ventricular dysfunction in heart failure. High BNP levels after optimal medical management of heart failure are an independent predictor of prognosis. Cardiac resynchronization therapy (CRT) or dual ventricular chamber pacing improves quality of life, exercise capacity and cardiac function. A small previous study showed improvement in BNP levels with chronic CRT (15±8 weeks). We investigated the short term effects of CRT on BNP levels.

Methods: 36 patients with a mean EF 23±7% and LBBB (mean QRS 170±25ms) were investigated. BNP levels were checked immediately prior to and 48 hours after CRT. BNP levels were measured using the Triage BNP test/ Biosite Diagnostics, USA.

Results: The paired t-test on the log transformed data indicates that the difference between baseline BNP and 48 hours BNP is statistically significant (p=0.0006). The average change on the log scale is -0.3956 which is 0.673 when converted to a proportion. The 95% confidence interval for the average change is 0.546-0.832. The figure shows the ratios of 48 hours/baseline BNP levels plotted in increasing order of the ratio, for the 36 patients. 75% of the patients had a reduction in BNP.

Conclusions: There is a statistically significant reduction in BNP levels 48 hours following CRT.

In the Rapid Pacing Canine Model of Heart Failure, Left Ventricular Stimulation Resynchronizes Better the Left Ventricle Compared to Biventricular or Right Ventricular Stimulation: An Echocardiographic-Hemodynamic Correlation of Systolic and Diastolic Function

Background: Resynchronization therapy is effective for patients with left ventricle (LV) dysfunction, but the underlying mechanisms are not well understood. We studied acute hemodynamic effects of RV, LV and biventricular (BIV) and established the correlation with LV resynchronization assessed with echocardiography and tissue Doppler. Methods: A total of 17 dogs were paced at high rate for a minimum of 4 weeks to create LV dysfunction. Transvenous pacing electrodes were implanted in the right atrium, the right ventricle (RV) and in a lateral branch of the coronary sinus (LV). Aortic, LV and pulmonary pressure were continuously monitored and because dogs have short PR intervals, complete AV node ablation was performed to assess the isolated effect of the different modes of stimulation, with no participation of intrinsic conduction. Results: All the animals developed severe heart failure (mean LVEF=28.7%), none with a wide QRS. LV stimulation was associated with better LV hemodynamic parameters than BIV (5–10%) which was superior to RV stimulation (10–20%, p<0.05). Echocardiographic evaluation showed that LV pacing was associated with improved LVEF, less mitral regurgitation and less intraventricular systolic and diastolic LV dysynchrony.

Conclusions: 1- In a canine model of heart failure, LV stimulation was found to result in better LV systolic and diastolic performance compared to BIV and RV stimulation. 2- The superior LV performance with LV pacing is associated with improved LVEF, less mitral regurgitation and less intraventricular systolic and diastolic LV dysynchrony.

Pulmonary Vein Isolation for Treating Atrial Fibrillation

Background: The long-term safety and efficacy of segmental ostial ablation to isolate the pulmonary veins in patients with atrial fibrillation (AF) have not been well-defined. Methods and Results: Pulmonary vein isolation by ostial applications of radiofrequency energy guided by pulmonary vein potentials was performed in 187 consecutive patients (mean age = 52 ± 11 years) with paroxysmal (167) or persistent (20). The left superior, left inferior, and right superior pulmonary veins were targeted in all patients, and the right inferior pulmonary vein also was targeted in 73 patients (39%). Successful isolation was achieved in 96% of targeted pulmonary veins. A repeat ablation procedure was performed in 11% of the patients. At 2 years of follow up, 70% of patients with paroxysmal AF and 25% of patients with persistent AF were free of recurrent episodes of AF, in the absence of antihyrrhythmic drug therapy (p<0.001). Among patients with paroxysmal AF, vagotonic AF was the only independent predictor of recurrent AF. Complications consisted of pericardial tamponade (0.5%), left atrial flutter (0.5%), transient ischemic attack (0.5%), and unilateral quadrantanopsia (0.5%). No patient had symptomatic pulmonary vein stenosis.

Conclusions: The long-term efficacy of pulmonary vein isolation is 70% in patients with paroxysmal AF, and the risk of complications is low. Alternative ablation strategies should be considered to improve long-term efficacy, particularly in patients with persistent or vagotonic AF.