Introduction Pacing is seen as an alternative treatment for patients with end-stage heart failure (HF). Echocardiography has been proposed for optimizing hemodynamics. The aim of the present study was to evaluate quantitatively the performance of the left ventricle using different V-V intervals.

Patients and methods: 5 patients with dilated cardiomyopathy (1 ischemic, NYHA class III or IV, QRS duration range from 120-211 msec, EF (LV) range from 14-24%, and maximal mechanical asynchrony of basal regions of the left ventricle range 72-136 msec received a dual chamber biventricular pacemaker (Medtronic Insync III) with programmable interventricular delay. Echocardiography was used for V-V optimization by measuring both aortic VTI and Index of myo-cardial performance (IMP) as sum of the isovolumic times divided by ejection time. All patients were in sinusrhythm. The Echocardiography were carried out at 5 or 7 interventricular delay intervals with either LV lead preactivation or RV lead preactivation.

Results: All the animals developed severe heart failure (mean LVEF=24%), none with a wide QRS. LV stimulation was associated with better LV hemodynamic parameters than BiV stimulation (p=0.02) whereas BiV stimulation was associated with a 2.7% better LVdP/dt than BiV stimulation (p=0.07) and BiV stimulation was associated with a 16-20% improvement over RV stimulation (p=0.01). AV delay variation within the dogs’ physiological values (50-100 ms) was associated only with a minor difference in LVdP/dt (2.8-3.5%) (p=NS), while AV delays longer than 100 ms resulted in a deterioration of the LVdP/dt for all 3 modes of stimulation.

Conclusions: 1- In a canine model of heart failure, LV stimulation was found to result in slightly better LV performance compared to BiV stimulation. 2- RV stimulation has a very negative impact on LV function. 3- AV delay variation within physiological values (50-100 ms for dogs) has a limited impact on LVdP/dt. These results suggest that resynchronization therapy in patients may perhaps be improved by alternate modes of stimulation over the effect of AV delay optimization.

P-412 SELECTION OF PATIENTS AND OPTIMIZATION OF PUMP FUNCTION IN RESYNCHRONIZATION THERAPY BASED ON INTERVENTRICULAR ASYNCHRONY

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Cardiac resynchronization therapy (CRT) can increase pump function in patients with heart failure and conduction disorders, but the 50% non-responders indicate that selection of patients and/or application of the therapy can be improved.

Objective: To investigate whether interventricular asynchrony (interVA) can be used for patient selection and individual optimization of CRT. Hypothesis: optimal LV function is reached by fusion of RV and LV generated depolarization waves, which results in an interVA equal to the average of intrinsic interVA (X) and interVA during LV pacing at short AV-delay (Y).

Methods: In 29 patients (PATH-CHF study) LVdP/dtmax, pulse pressure (PP) and interVA were measured during left (LV), right (RV) and biventricular (BiV) pacing with 5 AV-delays. InterVA was quantified as the time delay between the upslope of LV and RV pressure curves.

Results: In patients with a significant hemodynamic response to CRT (n=22), intrinsic interVA was significant (>50±17 ms, RV earlier) whereas it was not significantly different from zero (±5±10 ms) in non-responders (n=7). In responders, peak improvement in LVdP/dtmax and PP was 26±13% and 15±10% respectively. InterVA at peak improvement varied widely between patients (range: 42ms to 51ms), but was predicted by (X+Y)/2 with an accuracy of 2.6 and ±12 ms for LVdP/dtmax and PP, respectively. At equal interVA, LV and BiV pacing produced equal hemodynamic response, but in 11/22 responders BiV pacing improved interVA insufficiently to reach the maximum hemodynamic response obtained with LV pacing.

Conclusion: The presence of significant interVA predicts responders to CRT. InterVA can be used to optimize CRT at individual basis.