in patients with LV lead not on MDW (SD 54.55±23.3 ms before VS 42.28±19.2 ms after, P=NS). 77.8% (n=7) of ischemic and 28.5% (n=6) of idiopathic heart failure had no LV lead on MDW.
Conclusions: MDW was the left lateral wall in only half of patients. LV lead positioning on MDW seems to be particularly relevant to improve LV global synchronization. This results emphasize the potential important role of echocardiography for management of biventricular stimulation, especially in ischemic heart failure.

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Is the optimized V-V interval rate dependent in patients with chronic atrial fibrillation?

B.M. Van Gelder[1], F.A. Bracke[2], P. Van der Voort[2], A. Meijer[2]
[1]Nuenen, Netherlands; [2]Catharina Hospital, Cardiology, Eindhoven, Netherlands

Background: The optimal hemodynamic effect of the interventricular (V-V) pacing interval may be influenced by the stimulation rate.
Methods: We studied the hemodynamic effect of V-V timing at 3 different heart rates in 9 patients (3 females, age 71.3±8.6 years) with heart failure class III to IV, in spite of optimal drugs therapy. All patients were in chronic atrial fibrillation (AF), with intrinsic rhythms below 70 bpm at the time of implant of the biventricular pacing system. The pacing rate was varied from 70 to 90 and 110 ppm. At each rate the optimal V-V interval was determined by invasive measurement of LV dP/dtmax derived from left ventricular intracavitary pressure recorded with a 0.014" pressure tipped guide wire. The V-V interval was varied in 9 steps of 20 ms from +80 ms (LV first) to -80 ms (RV first).
Results: The average LVdP/dtmax at the optimized V-V interval was 895 ± 200, 959±183 and 1001±184 mmHg/s at pacing rates of respectively 70, 90 and 110 ppm (p<0.02). The percentage increase of LVdP/dtmax was 16.2±7.6%, 25.2±12.3% and 30.9±13.5% for these stimulation rates respectively. The corresponding optimal V-V interval was 42±26, 28±23, and 30±33 ms respectively, however differences in V-V interval were not significant. The variation in LV dP/dtmax (difference between highest and lowest value as function of the V-V interval at a given pacing rate) at all 3 stimulation rates was also determined for all patients. Variation was 12.7%±6.6%, 10.6±6.2% and 13.4±6.2% of the corresponding maximum value at the different pacing rates.
Conclusion: There is a significant rise in LVdP/dtmax with higher stimulation rates. There is a trend that the optimal V-V interval is shorter a higher rates but the differences are not significant and there is a non uniform variation in the individual patients. Mismatch of the V-V interval has more effect on the lower than on higher pacing rates.

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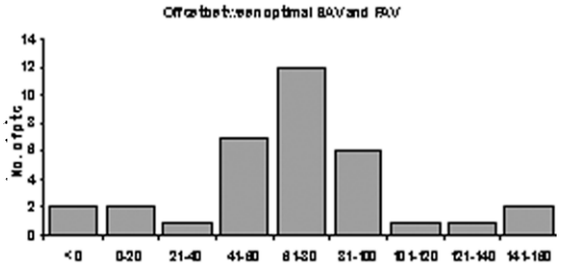
Is nominal AV delay offset optimal for heart failure patients receiving cardiac resynchronization therapy?

M. Gold[1], R. Leman[2], I. Niazi[3], M. Giudici[4], M. Kim[5], Y. Yu[6], S. Arcot-Krishnamurthy[6], J. Strakna[6]
[1]Medical University of SC, Division of Cardiology, Charleston, United States of America; [2]Medical University of South Carolina, Division of Cardiology, Charleston, United States of America; [3]St. Lukes Medical Center, Division of Cardiology, Milwaukee, United States of America; [4]Genesis Medical Center, Davenport, United States of America; [5]Rush Presbyterian-St. Luke's Med Ctr, Chicago, United States of America; [6]Guidant CRM, St. Paul, United States of America

AV delay offsets are programmable in all modern pacemakers. Typically, nominal programmed offset between sensed AV delay (SAV) and paced AV delay (PAV) is about 30 ms, which is based on studies of patients (pts) undergoing right ventricular pacing. The optimal AV offset for CRT is unknown.
Methods: 50 pts (age:68±11 years, QRS: 153±28ms, NYHA: 49 class III/1 class II, LVEF 27±7%, 38 LBBB/12 RBBB) were analyzed. Each patient received BV CRT acutely (RV apex + LV free wall region) with 4 AV delays (from 0ms to 30 ms less than intrinsic AV interval). Each atrial configuration (paced or sensed) and AV delay combination was randomly repeated 4 times in a 6-paced-beat/14-non-paced-beat sequence. Changes in maximum LV pressure derivative from sinus baseline (%LV dP/dtmax) were calculated for each AV delay and the estimated optimal AV delay was determined for atrial sensing and pacing, respectively.
Results: 41 pts had valid hemodynamic data in both pacing modes. The optimal SAV was 136±43 ms (69 – 262 ms), and the optimal PAV was 206±58 ms (101 – 340 ms). The optimal offset averaged 68±37 ms (-7 – 157 ms). %LV dP/dtmax increased 12±11% (-6.6 – 40.5%) using optimal SAV with nominal offset of 30 ms. %LV dP/dtmax increased 16±12% (-0.5 – 45.1%) with optimal PAV (p < 0.0001).



Conclusion: The optimal AV offset for CRT is significantly longer than nominal values in commercial devices.
Further studies are warranted to assess if adjusting AV offset in individual patient will improve clinical outcomes.

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Is there a relation between the haemodynamic effects of right and left ventricular pacing and the optimal V-V interval in biventricular pacing?

B.M. Van Gelder[1], F.A. Bracke[2], A. Meijer[2], J.P.G. Janssen[3], N.H.J. Pijls[2]
[1]Nuenen, Netherlands; [2]Catharina Hospital, Cardiology, Eindhoven, Netherlands; [3]Bakken Research Center, Maastricht, Netherlands

Aim: To investigate the relationship of right and left ventricular pacing and the optimal interventricular pacing interval (V-V interval) in biventricular (BiV) pacing in patients with chronic atrial fibrillation (AF).
Methods: 31 patients (21male, age 67±18.3 years) with heart failure class III - IV, optimal medical treatment, left ventricular (LV) asynchrony and right ventricular (RV) pacing as baseline rhythm had BiV systems implanted. All patients were in chronic AF. Ventricular leads were positioned in the apex or mid septum of the RV, and in one of the postero-lateral branches of the coronary venous system for LV pacing.The hemodynamic effect of pacing was evaluated by invasive measurement of left ventricular (LV) dP/dtmax, performed by a pressure sensor tipped 0.014" guide wire positioned in the LV cavity. LV dP/dtmax was measured during RV, LV and BiV pacing and BiV pacing with optimization of the V-V interval (BiVopt). Correlation between the logarithm of the ratio between RV and LV pacing and the optimal V-V interval was evaluated by Pearson correlation and Kendall's tau correlation statistics.
Results: The Pearson correlation between the logarithmic LV versus RV maximum dP/dt ratio and the optimal V-V interval is 0.55 (p=0.0013). There is also a strong relationship between the superiority of LV pacing over RV pacing and the optimal V-V interval being positive (Kendall's tau = 0.68, p=0.0002)
Conclusion: In patients with chronic AF there is a clinical significant correlation between the ratio of LV dP/dtmax during LV and RV pacing and the optimal V-V interval. Further study is necessary to determine whether this relationship can be used for optimizing the V-V interval in BiV pacing by measuring the effect of RV and LV pacing separately.