

# Variation in Optimal Haemodynamic Atrio-ventricular Delay of Biventricular Pacing with Different Endocardial Left Ventricular Lead Locations using Precision Haemodynamics

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## Abstract

**Background:** It is not known whether the optimal Atrioventricular delay ( $AV_{opt}$ ) varies between left ventricular (LV) pacing site during endocardial biventricular pacing (BiVP) and may therefore needs consideration. **Methods:** We assessed the haemodynamic  $AV_{opt}$  in patients with chronic heart failure undergoing endocardial LV lead implantation.  $AV_{opt}$  was assessed during atrio-biventricular pacing (BVP) with a “roving LV lead”. Up to four locations were studied: mid lateral wall, mid septum (or a close alternative), site of greatest haemodynamic improvement and LV lead implant site. The  $AV_{opt}$  was compared to a fixed AV delay of 180ms. **Results:** Seventeen patients were included (12 male, aged 66.5 +/- 12.8 years, ejection fraction 26 +/- 7%, 16 left bundle branch block or high percentage of right ventricular pacing (RVP), QRS duration 167 +/- 27 ms). In most locations (62/63),  $AV_{opt}$  increased systolic blood pressure during BiVP compared with RVP (relative improvement 6 mmHg, IQR 4-9mmHg). Compared to a fixed AV delay the haemodynamic improvement at  $AV_{opt}$  was higher (1mmHg, IQR 0.2-2.6mmHg,  $p < 0.001$ ). Within most patients (16/17), we observed a difference in  $AV_{opt}$  between pacing sites (median paced  $AV_{opt}$  209 ms, IQR 117-250). Within this range, the haemodynamic impact of these differences was small (median loss 0.6 mmHg, IQR 0.1-2.6mmHg). **Conclusion:** Within a patient, different endocardial LV lead locations have slightly different haemodynamic  $AV_{opt}$  which are superior to a fixed AV delay. The haemodynamic consequence of applying an optimum from a different lead location is small.

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