Cardiac Resynchronization Therapy can be achieved with biventricular (BV) or left ventricular (LV) only pacing. Results of previous studies regarding the preferred pacing configuration are inconsistent, possibly in part due to differences in atrial pacing and AV delays (AVD). Accordingly, the CRTAVO study was designed as a prospective, multicenter, randomized trial to compare hemodynamic response (LV dP/dt) and AV optimization of BV and LV pacing in both atrial sensed (AS) and paced (AP) modes.

Methods: We studied 31 LBBB patients with NYHA Class III. LV and BV pacing were delivered with four equally spaced AVDs in AS and AP modes in a random order. Changes in LV dP/dt from sinus baseline (%LV dP/dt) were plotted against AVDs, from which the maximum %LV dP/dt and optimal AVD were determined.

Results: The study cohort was 74% male, with a mean age of 68±11 years, EF of 26±7% and QRS duration of 150±33 ms. The hemodynamic response was larger during AP in both pacing configurations (P's < 0.0001). However, LV and BV pacing achieved similar %LV dP/dt responses and OptAVDs during AS and AP (Table). The differences in OptAVD between LV and BV pacing were 1.8±33.0 ms for AS and 6.5±41.4 ms for AP.

Conclusions: LV and BV pacing improved LV dP/dt, although the magnitude of response was larger in AP mode. The improvement in LV dP/dt and the optimal AVDs were similar between LV and BV pacing, suggesting that LV pacing may be a viable alternative to BV pacing and the optimal AV delays may be interchangeable between the two pacing configurations.