1550462

Intra- and Inter-Observational Variability Using Different Doppler Modalities in Echocardiographic Optimization of Cardiac Resynchronization Therapy

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Echocardiographic optimization in the setting of cardiac resynchronization therapy is routinely performed using the time-velocity integral (VTI) of the left ventricular outflow tract to assess changes in stroke distance at different settings. We sought to assess the intra-observational and inter-observational variability at different settings, and to assess if continuous wave Doppler reduces this variability.
Methods: We reviewed 45 optimizations performed between 2007 and 2009. Patients with prosthetic valves, hypertrophic obstructive cardiomyopathy , and incomplete measurements were excluded. Of the remaining 27 patients, 14 were performed with continuous wave Dopper and 13 with pulse Doppler. Each set of measurements involved the calculation of 3 VTIS at a given pacemaker setting, and for selected settings, more than one set of measurements was performed..
Results: The coefficient of variation for all samples was 5.9%, and was 5.2% in the continuous wave group and 6.5% in the pulse wave group, p=.13. Correlation between different sets of measurements performed at same setting but at a different time in the course of the study was high: 0.96 for continous wave Doppler and 0.93 for pulse wave Doppler.
Conclusions: Echocardiographic measurement of VTI performed for optimization of biventricular pacemakers has a low coefficient of variation, suggesting that it is a robust and reproducible measure of stroke distance. Although no statistically significant difference was seen between optimizations performed with pulse Doppler vs. continuous wave Doppler in this small sample, this warrants further investigation.