Title: Three Dimensional Echocardiography to Assess Mechanical Dyssynchrony Among Patients with Narrow QRS Duration

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Specific Aim: To identify the proportion of patients with advanced heart failure and narrow QRS complex that have mechanical dyssynchrony by three dimensional echocardiography. Also, to compare the use of three dimensional echocardiography with tissue doppler imaging (TDI) in evaluating mechanical dyssynchrony.

Background/Hypothesis: Previous small studies have demonstrated that the effectiveness of cardiac resynchronization therapy (CRT) can be predicted by tissue doppler imaging techniques for mechanical dyssynchrony. Importantly, the same predictive factors were also found among patients previously excluded from CRT trials, specifically patients with narrow QRS complexes. Three dimensional echocardiography is a novel tool in echocardiography labs and can also assess mechanical dyssynchrony. We hypothesized that a large proportion of patients with advanced heart failure and narrow QRS complexes would have mechanical dyssynchrony by three dimensional echo.

Methods: We recruited inpatients and outpatients who underwent routine echocardiography at Yale New Haven Hospital. The majority of patients were excluded for having ejection fractions >35%. We also excluded patients in the intensive care units with sepsis, acute MI, or pressor dependence. All eligible patients were evaluated for mechanical dyssynchrony using tissue doppler imaging and three dimensional echocardiography techniques. Mechanical dyssynchrony was defined as septal to lateral wall delay greater than 65ms using tissue doppler imaging. We used a systolic dyssynchrony index (SDI) greater than 8.3% to define mechanical dyssynchrony on three dimensional echocardiography.

Results: A total of eleven patients were evaluated for mechanical dyssynchrony using both TDI and 3D echo. Ten patients demonstrated an EF <35%, but none were found to have advanced heart failure based on classification from the NYHA. Our preliminary results do not show any significant degree of mechanical dyssynchrony among the patients evaluated in our study either by TDI or 3D echo.

Discussion: Because of inadequate recruitment, we cannot draw any conclusions about the use of three dimensional echocardiography among patients with advance heart failure and narrow QRS complex. Among patients with mild heart failure, we did not find any significant degree of mechanical dyssynchrony. Three dimensional echocardiography performed similar to tissue doppler imaging in this cohort of patients. The results are not unexpected as patients with mild heart failure are not likely to benefit from CRT.