Cardiac Resynchronization Therapy: What's Ticking at UMass

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Cardiac Resynchronization Therapy (CRT), or Bi-Ventricular pacing, is a novel therapeutic intervention for patients with heart failure. It is thought that disorganized, dyssynchronous, myocardial contraction may contribute to the progression and pathophysiology of heart failure. CRT, by synchronizing the myocardial electrical-contraction apparatus with pacing leads in both the right and left ventricle, can improve left ventricular mechanical function. In a majority of patients, CRT improves ejection efficiency, reduces heart failure symptoms, and improves overall quality of life. LV reverse-remodeling may occur as well, as evidenced by a decreasing LV chamber size and end diastolic volume after pacer implantation.

Traditionally, a prolonged QRS duration on surface ECG has been used to diagnose cardiac dyssynchrony and select patients for CRT. However, up to 40% of thus selected patients do not respond to the treatment, indicating the potential need for better methods to evaluate for the presence of dyssynchrony. QRS prolongation does not necessarily correspond with dyssynchrony and significant levels of dyssynchrony can be demonstrated in patients without QRS prolongation. In other words, patients with significant dyssynchrony irrespective of QRS duration may benefit from CRT and Bi-V pacing.

Echocardiography has emerged as a potentially powerful screening tool for the rapid and accurate diagnosis of mechanical dyssynchrony. It could soon represent a new standard of care in diagnosing dyssynchrony and selecting patients for CRT. This project represents an overview of CRT, and explores the ongoing studies, some of which are occurring here at UMass, regarding the use of novel echocardiographic technologies to diagnose dyssynchrony and select patients for CRT. Furthermore, it highlights future plans for the creation of a CRT clinic here at UMass. A dedicated clinic can ensure quality and cost-effective care for this patient population, as well as provide a systematic template for the development of a large patient database from which further investigations can be made into the unanswered questions of this new and developing field.