Harmonizing Hearts: Investigating Cardiac Resynchronization Therapy's Potential in Left Bundle Branch Block Management

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This literature review examines the role of cardiac resynchronization therapy (CRT) in treating left bundle branch block (LBBB) in patients with adult congenital heart disease (ACHD). This study focused on CRT implantations over the past decade, excluding patients under 18 years old, those undergoing concomitant cardiac surgery, and studies lacking reported outcomes. CRT, based on biventricular pacing, aims to rectify ventricular dyssynchrony by pacing the right ventricle endocardially and the left ventricle epicardially.

Clinical guidelines prioritize biventricular pacing for patients with LVEF ≤ 35%, LBBB QRS morphology, and indications for ventricular pacing or high-degree atrioventricular block. Historically, studies like MUSTIC and PATH-HF laid the groundwork for assessing CRT's safety and efficacy. PATH-HF notably demonstrated LV reverse remodeling post-CRT, improving functional capacity and quality of life. Trials like COMPANION and CARE-HF further solidified CRT's role in managing heart failure, reducing mortality and HF events.

Understanding LV function variability regarding AV delays is crucial for optimizing device therapy .In the first case, a 45-year-old female undergoing CRT-D upgrade experienced a fatal cardiac arrest due to an inadvertent atrial lead puncture into the adjacent aortic wall. Post- mortem findings revealed underlying myocarditis, complicating the situation. This highlights the importance of meticulous procedural planning and patient selection, particularly considering anatomical factors like atrial wall thinness and proximity to the aorta. In the second case, a 71-year-old woman with severe dilated cardiomyopathy and a history of mitral valve replacement underwent dual-chamber ICD implantation. Utilizing the NAVHS algorithm, RV-septal pacing was optimized to achieve septal preexcitation and significantly shorten QRS duration. This demonstrates how NAVHS can improve outcomes for patients with conduction anomalies in heart failure by optimizing pacing techniques. Lastly, two patients with severe heart failure underwent upgrades from ICDs to CRT-D due to deteriorating clinical states. Venography revealed occluded subclavian veins, prompting innovative procedural approaches involving left extra-thoracic subclavian punctures. Utilizing the Groshong central line kit facilitated lead placement and wound closure. These findings underscore the significance of tailored strategies in CRT-D implantations for patients with venous occlusion, aiming to improve patient outcomes in advanced heart failuremanagement. In conclusion, CRT represents a cornerstone in managing heart failure, offering significant benefits in cardiac function, symptoms, and patient outcomes. Ongoing research aims to refine CRT techniques and improve patient responses to therapy.

Keyword

CRT, LBBB, biventricular pacing, ventricular dyssynchrony