Restoration of electrical diastole with bi-ventricular pacing

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Cardiac resynchronization therapy (CRT) has been shown to improve quality of life, increase cardiac output, enhance functional class, and reduce mortality in patients with cardiomyopathy and mechanical dyssynchrony. For pacemaker-dependent patients, the addition of a left ventricular (LV) lead most often leads to a reduction of QRS morphology of \( \geq 30\% \), compared with right ventricular pacing alone.

We report a 70-year-old man with a history of ischaemic dilated cardiomyopathy (LVEF < 0.15) and high-grade AV block, who underwent implantation of dual-chamber ICD 8 years prior to presentation. He subsequently developed symptoms of progressive congestive heart failure and chronic orthostatic intolerance associated with baseline sustained hypotension (SBP = 75 mmHg). He was referred for an upgrade to a CRT ICD system with the implantation of an LV lead. The patient’s electrolytes, including potassium, were within normal limits.

His baseline rhythm was normal sinus rhythm with high-grade AV block and atrial sensing and 100% right ventricular pacing (Panel A). Electrocardiogram demonstrated a markedly prolonged QRS interval of \( \geq 500 \) ms without discernable electrical diastole. An epicardial LV lead was placed into a lateral tributary of the coronary sinus, and bi-ventricular pacing was established. Electrocardiogram obtained during normal sinus rhythm with atrial sensing and bi-ventricular pacing (Panel B) demonstrated a remarkable reduction in QRS duration and the restoration of electrical diastole. Systolic blood pressure increased to 100 mmHg and orthostatic intolerance resolved.

Figure 1

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