A 66-year-old woman, with a history of severe idiopathic dilated cardiomyopathy and an implantable cardioverter defibrillator for ventricular tachyarrhythmia, presented with New York Heart Association (NYHA) class IV congestive heart failure (CHF). Her medical regimen had been optimized with maximally tolerated doses of ACE inhibitors, \( \beta \)-blockers, loop diuretics, spironolactone, and digoxin. Initially, her ECG showed a first-degree atrioventricular block (PR duration, 280 ms) and intraventricular conduction delay (QRS duration, 180 ms). Subsequently, she developed symptomatic sinus node dysfunction with junctional escape rhythm. Because the patient had recurrent exacerbations of CHF, a dual-chamber pacemaker with a left ventricular pacing lead positioned in the lateral branch of the coronary sinus was placed to optimize atrioventricular synchrony.

Real-time 3D echocardiographic-derived stroke volumes were measured during atrial (cine loop 1) and atrioventricular (cine loop 2) pacing at 80 bpm. The Figure shows the end-diastolic and end-systolic frames during the respective pacing modes. Stroke volume was augmented from 42 mL · s during native sequence activation to 58 mL · s during atrioventricular pacing. Over the next 3 months, the patient had improved CHF with NYHA class III symptoms.

This case illustrates the potential early benefit of resynchronization therapy as a nonpharmacological adjuvant in the management of patients with severe CHF. Real-time 3D echocardiography may be a useful noninvasive tool to predict those patients who may benefit most from this new therapeutic modality.

Three-dimensional echocardiographic left ventricular end-diastolic and end-systolic frames during atrial (AAI) and atrioventricular (BiVent) pacing. RV indicates right ventricle; LV, left ventricle; RA, right atrium; and LA, left atrium.
Resynchronization Therapy in Dilated Cardiomyopathy: Confirmation of Hemodynamic Improvement With Real-Time Three-Dimensional Echocardiography
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