Right Ventricular Pacing for Right Ventricular Outflow Tract Obstruction in a Man with Biventricular Hypertrophic Cardiomyopathy

A 40-year-old man with known hypertrophic cardiomyopathy presented with syncope after coughing. Physical examination revealed a systolic murmur that was accentuated by the Valsalva maneuver. An electrocardiogram suggested biventricular hypertrophy and biatrial enlargement (Fig. 1). Echocardiograms revealed asymmetric septal hypertrophy with a diastolic septal thickness of 2.3 cm, and evidence of flow acceleration across the right ventricular outflow tract (RVOT) and left ventricular outflow tract (LVOT) (Figs. 2 and 3).

Cardiac magnetic resonance images confirmed noncontiguous hypertrophy involving the basal septal, basal anterior, and apical walls of the left ventricle, as well as the inferior and free walls of the right ventricle (RV). A prominent muscle band in the RVOT contributed to dynamic obstruction across the RVOT (Figs. 4 and 5). Patchy hyperenhancement in the septum, visible in delayed-enhancement sequences after
gadolinium administration, was consistent with myocardial fibrosis (Fig. 6). The subendocardium was not involved, suggesting a cause other than coronary disease.

Angiography was performed to measure and characterize the gradient across the RVOT. There was a hemodynamically significant gradient of 54 mmHg (mean, 33 mmHg). When the patient coughed and then performed the Valsalva maneuver, the peak gradients increased to 94 mmHg and 106 mmHg, respectively. Potentiation of the peak gradient across the RVOT was observed after a premature ventricular contraction (Fig. 7). Because of the patient's unexplained syncope, a cardioverter-defibrillator was implanted for the primary prevention of sudden cardiac death. An atrial lead was also implanted to accommodate any future need for atrioventricular synchronous pacing. Transthoracic echocardiography was performed to evaluate the effect of RV pacing on the RVOT gradient. The peak gradient across the RVOT was 17 mmHg with RV pacing and 37 mmHg without RV pacing (Fig. 8).

**Comment**

Right ventricular involvement has been reported in hypertrophic cardiomyopathy; however, its prevalence is variably described. Dual-chamber pacing has produced favorable hemodynamic effects in patients with symp-
Tomatic LVOT obstruction. In comparison, RV pacing reduced the gradient across our patient’s RVOT.

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References