The Brockenbrough-Braunwald-Morrow sign

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The Brockenbrough-Braunwald-Morrow sign was first described in patients with obstructive hypertrophic cardiomyopathy (HCM) by Brockenbrough and colleagues1 in the 1960s. This sign is characterized by a decrease in arterial pulse pressure after a premature ventricular contraction (PVC), accompanied by a significant increase in peak left ventricular (LV) systolic pressure. In patients without dynamic outflow obstruction, the longer filling period after a PVC increases LV end-diastolic volume; this and postextrasystolic potentiation increase both stroke volume and arterial pulse pressure.1,2 In patients with obstructive HCM, provocation with a PVC leads to a paradoxical decrease in pulse pressure. Maneuvers to elicit the Brockenbrough-Braunwald-Morrow sign are frequently used to establish the diagnosis of obstructive HCM during cardiac catheterization and to assess the adequacy of septal reduction after surgical myectomy or alcohol septal ablation.3,4

The Brockenbrough-Braunwald-Morrow sign is characteristic of dynamic LV outflow tract obstruction, as is seen in obstructive HCM, but is uncommon in fixed valvular or subvalvular obstruction.

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HCM (Figure 1, A), with a significant decrease in arterial pulse pressure after a PVC. The sign disappeared after septal myectomy, and pulse pressure remained stable after provocation (Figure 1, B). In the 2 patients with aortic stenosis and subvalvular stenosis (Figures 2 and 3), prebypass arterial pulse pressure did not change after PVC. As expected, the Brockenbrough-Braunwald-Morrow sign could not be elicited in these patients.

**FIGURE 2.** Left ventricular pressure tracing superimposed on aortic pressure tracing in a patient with valvular aortic stenosis. A, In this patient, pulse pressure did not change after a premature ventricular contraction. B, No post–premature ventricular contraction changes in pulse pressure are seen after aortic valve replacement. Red line indicates left ventricular pressure tracing; blue line indicates aortic pressure tracing; brackets indicate pulse pressure before and after premature ventricular contraction. Electrocardiogram.

**FIGURE 3.** Left ventricular pressure tracing superimposed on aortic pressure tracing in a patient with membranous and tunnel subaortic stenosis. A, No post–premature ventricular contraction change in pulse pressure was seen before the operation. B, After membranectomy and myectomy, there was a slight widening of arterial pulse pressure after premature ventricular contraction. Red line indicates left ventricular pressure tracing; blue line indicates aortic pressure tracing; brackets indicate pulse pressure before and after premature ventricular contraction. Electrocardiogram.

**References**