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EDITORIAL COMMENT

Asymptomatic Aortic Stenosis

From Flights of Stairs to Exercise Testing to Exercise Echocardiography?*

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More than 25 years ago, I saw a 65-year-old man, Mr. A, who was referred for evaluation of an "asymptomatic" heart murmur. His family physician heard a loud systolic murmur and referred him for a transthoracic echocardiogram, which revealed severe calcific aortic stenosis. Even after being told of the echocardiographic findings, Mr. A insisted he felt fine, and his wife confirmed that.

I am not sure why, but for some reason I suggested that we try walking up 2 flights of stairs. This was before it was considered acceptable or safe to send patients with aortic stenosis for stress testing, but I felt comfortable taking Mr. A up a couple of flights of stairs. He told me not to worry—he could handle stairs with no problems. We walked up the two flights. I felt fine. Mr. A's wife felt fine. Mr. A did not feel fine: he was winded and "very dizzy."

Armed with this experience, my surgical colleague agreed to operate on Mr. A for severe symptomatic aortic stenosis. Two months later, Mr. A saw me for a post-operative follow-up visit, smiling. "I had no idea, Doctor, just how badly I felt. I haven't felt this good in years!"

Much has changed since then. We now know that it is safe to exercise asymptomatic patients with severe aortic stenosis. Exercise testing has, of course, traditionally been used to assess patients with suspected coronary artery disease. Clinicians have primarily focused on ST-segment changes as a marker of stress-induced ischemia. Published reports on exercise testing in aortic stenosis are less mature, but there is greater focus on symptoms and blood pressure response than on ST-segment changes. Current guidelines advise clinicians that, in the setting of aortic stenosis, "exercise testing is reasonable to confirm symptom status" (1).

SEE PAGE 787

In this issue of *iJACC,* Goublaire et al. (2) describe their modern-day experience with 148 patients with isolated asymptomatic aortic stenosis who were referred for exercise echocardiography. Nearly one-fourth (n = 36) had concerning exercise test findings, including real symptoms, fall in blood pressure, or ST-segment depression. These patients were referred for aortic valve replacement. Among the patients with "negative" exercise test results, one-third (n = 38) had abnormal echocardiographic findings, including an exercise-induced increase in mean pressure gradient >20 mm Hg and a peak systolic pulmonary artery pressure >60 mm Hg. Not surprisingly, there was a strong correlation (r = 0.84) between resting and exercise mean pressure gradients, but there was only a weak correlation (r = 0.17) between resting mean pressure gradient and the increase in mean pressure gradient during exercise.

During 14 months of follow-up, 30 patients had an aortic stenosis-related event, including heart failure symptoms. In a multivariable survival analysis, resting mean pressure gradient predicted events, but the exercise-induced change in mean pressure gradient and the exercise systolic pulmonary artery pressure were not predictive. Goublaire et al. (2) conclude that their findings argue against using exercise-echocardiographic findings for risk stratification of asymptomatic patients.

The findings of Goublaire et al. (2) offer an important contribution to the growing literature on asymptomatic aortic stenosis. First, they confirm that many asymptomatic patients are not asymptomatic—remember Mr. A. The symptoms of chronic valvular

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disease develop insidiously, so much so that many patients do not notice them or implicitly assume that their declining functional capacity is an inevitable consequence of aging. Second, these investigators found that even among patients who are truly asymptomatic, at least by conventional exercise testing, many patients exhibit worrisome physiological changes, and substantial numbers develop symptoms that lead to aortic valve replacement. Third, these results confirm and extend our appreciation that findings of severe aortic stenosis at rest have prognostic meaning. Even in the absence of symptoms, patients with higher resting mean pressure gradients are more likely to experience problems.

It is not clear why exercise-induced changes in mean pressure gradient failed to predict clinical course. Previous work has suggested that stress echocardiography may enhance prognostic assessment: prognosis may be worse with greater increases in mean pressure gradient, lesser increases in left ventricular ejection fraction, and higher systolic pulmonary artery pressure (3). As Goublaire et al. (2) appropriately acknowledge, theirs is a relatively small, single-center study, with only a small number of patients manifesting echocardiographic abnormalities. It is possible that their study was underpowered to detect an association if one truly exists. It is also possible that the findings suggest a case where "less is more"—exercise testing alone may be enough to determine optimal patient management. It would be helpful if Goublaire et al. (2) could pool their data with investigators from around the world to develop a robust database of the outcomes of asymptomatic patients with aortic stenosis with abnormal exercise-induced echocardiographic findings.

The management of asymptomatic aortic stenosis continues to evolve. At this time, it is—consistent with current guidelines—eminently reasonable to refer patients for exercise testing, mainly to confirm asymptomatic status. Goublaire et al. (2) may well be right that we are not yet at the point where routine exercise echocardiography is appropriate. However, we would hope that centers around the world that refer large numbers of asymptomatic patients for exercise echocardiography gather their data and systematically follow the clinical courses of their patients. By embedding rigorous and robust observation into practice, we can advance our knowledge to the point where we will know whether it is reasonable to measure changes in mean pressure gradient with exercise routinely. Moreover, we will be working within an environment of learning health care systems, systems where we can rely on data a bit more robust than a quick walk up the stairs.

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