metabolic milieu that accelerates atherosclerosis, valvular disease, heart failure, and arrhythmias, which invariably leads to higher rates of cardiac and noncardiac death. Having recognized chronic kidney disease (or impaired renal organ reserve) as an independent cardiovascular risk state, the real challenges now are to develop new diagnostic and therapeutic targets to better care for this rapidly growing segment of our cardiovascular population.

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Heart Rate Recovery After Exercise Is Not Demonstrated as a Predictor of Mortality: Maybe After Treadmill-Exercise

Regarding the elegant and innovative study by Vivekananthan et al., entitled “Heart Rate Recovery After Exercise Is a Predictor of Mortality, Independent of the Angiographic Severity of Coronary Disease” recently published in JACC (1), I must object that the title of such a good report is substantially wrong. In fact, the word “exercise” should have been more precisely substituted with the words “treadmill-exercise.” This is definitely not a trivial correction, for no study has ever demonstrated that heart rate recovery (HRR) after any type of exercise other than treadmill has any relation with mortality. My group has completed a study of 1-min HRR after cycloergometer-exercise test as a predictor of mortality in a cohort of 1,420 real-life exercise-test candidates; we found substantial differences compared to the treadmill-derived parameter. I can surely state that no evidence has ever been published in the peer-reviewed medical literature linking HRR and mortality using any exercise modality other than treadmill-exercise. This should be emphasized, as many clinicians could be tempted to apply these results to other clinical exercise settings.

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REPLY

Dr. Gaibazzi is correct in stating that current evidence linking heart rate recovery with death has been derived from cohorts of patients undergoing treadmill-exercise testing. As previous work has shown that heart rate responses during exercise are different when using a bicycle (1), it will be important to perform future research involving very large cohorts of patients undergoing this type of test modality. Of note, recent work has shown that vagal activity plays an important role in heart rate recovery after mental stress (2), suggesting that the concept linking heart rate recovery with prognosis may transcend the type of stress.

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Pulmonary Venous Flow by Doppler Echocardiography: Usefulness of Diastolic Wave Deceleration Time in Predicting Filling Pressures

I read with great interest the study by Tabata et al. (1), which reviews all the current applications of measuring pulmonary venous flow by Doppler echocardiography. As reported by the investigators, measurement of pulmonary capillary pressure and left ventricular end-diastolic pressure may utilize either the systolic fraction or the difference between pulmonary venous atrial reverse-wave duration and mitral inflow atrial-wave duration. Noninvasive assessment of filling pressures with Doppler methods represents a promising tool in diagnosing and monitoring heart failure (2); thus, it appears of interest to point out the clinical usefulness of the deceleration time of the pulmonary venous diastolic flow, which has been well correlated to invasive pulmonary capillary pressure in several studies regardless of left ventricular systolic function and rhythm (3–7). Furthermore, a recent work by Kinnaird et al. (8) has reported its better accuracy than the pulmonary artery occlusion pressure in predicting left atrial pressure. At present, the usefulness of the deceleration time of pulmonary venous diastolic flow is limited in practice by the difficulty to record the pulmonary venous flow from apical windows in critically ill patients (7); nevertheless, the steady improvement of the quality of Doppler echocardiographs will increase its feasibility in the coming years.

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REPLY

We thank Drs. Arques and Roux for their comments concerning the increasing use of the deceleration time of the pulmonary venous early diastolic flow (PV-DT) in published reports. We agree that the PV-DT is a useful tool for estimating pulmonary capillary wedge pressure (PCWP) as a measure of the left ventricular (LV) filling pressure, especially in patients with normal sinus rhythm. As mentioned in our study (1), it is important to recognize the influence of several factors regarding use of pulmonary venous flow velocities in clinical practice.

When evaluating PV-DT to estimate PCWP, the influences of heart rate, mitral regurgitation (MR), atrial fibrillation (AF), and LV systolic function have to be taken into account. Of those factors, heart rate may have the largest influence on the PV-DT. Chirillo et al. (2) specifically paid attention to the two components of the deceleration slope of PV-DT. They speculated that the first component was mainly dependent on the initial driving pressure of the pulmonary venous flow, and the second component was affected by the duration of LV relaxation, LV compliance, and heart rate as reported by Little et al. (3). They found a strong correlation between the initial deceleration slope of PV-DT and PCWP during chronic AF with controlled ventricular rates. With faster heart rates, it would be difficult to separate the first and second components. Thus, PV-DT can estimate PCWP only when the heart rates are relatively slow. Matsukida et al. (4) have also reported that the PV-DT accurately predicted PCWP in patients with AF, whereas they only included patients with a heart rate of 60 to 80 beats/min. Both of the above investigators (2,4) excluded patients with AF and a rapid ventricular rate. It is well recognized that the loading conditions during AF are constantly changing; therefore, even when an average of consecutive several cardiac cycles of PV-DT is used, the value would vary depending on the selected beats.

The final issue is the effect of MR. Pozzoli et al. (5) reported that the PCWP can be reliably estimated by combining mitral inflow and pulmonary venous flow velocities even when MR was present. Although they have not evaluated PV-DT, the investigators have reported that the correlation between mitral deceleration time and PCWP was stronger in patients without MR. Furthermore, they have limited their results to apply to patients without atrial arrhythmias or tachycardia.

Thus, we conclude that the evaluation of the PV-DT for estimating PCWP is most useful in patients without MR with sinus rhythm and a relatively slower heart rate. As suggested by Drs. Arques and Roux, we believe that the improvement in the quality of pulmonary venous Doppler flow profile obtained by transthoracic techniques will enhance the future use of PV flow in clinical practice.

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Glycoprotein IIb/IIIa Inhibitors and the Guidelines for Treatment of Non–ST-Elevation Myocardial Infarction

In a recent study published in the Journal (1) Peterson et al. found that with regard to use of glycoprotein (GP) IIb/IIIa inhibitors there was a low adherence to American College of Cardiology/American Heart Association guidelines (published in 2000) for treatment of non–ST-elevation myocardial infarction (2), and they