Doppler Echocardiographic Index of Global Right Ventricular Function

To the Editor:

In pulmonary disease, right ventricular dysfunction has an important bearing on prognosis.1 Incalzi et al.2 recently demonstrated the prognostic implications of electrocardiographic signs of chronic cor pulmonale in patients with chronic obstructive pulmonary disease. Two electrocardiographic features in particular, an S1-S3-S1 pattern and a P-wave axis of >90”, suggesting right atrial overload, predicted mortality over 13 years of follow-up. This well-conducted study illustrates the importance of an inexpensive diagnostic technique in risk stratification and is of particular value since the clinical signs of cor pulmonale are too insensitive for routine clinical application. It has been preceded by a wealth of work highlighting the considerable effort that has gone into the identification of a prognostic marker that is widely applicable, noninvasive, and easily interpretable and repeatable.

Of note, the authors indicate the failings of echocardiographic evaluation of the right heart in this setting. They refer to the technical difficulties of transthoracic studies in patients with lung hyperinflation and to the high error when pulmonary artery pressure is estimated based on a tricuspid regurgitant jet, which is present in only a minority of patients. Tei et al.3 recently described a Doppler echocardiographic index of global right ventricular function based on tricuspid and pulmonary flow dynamics. Assessment of right ventricular function has been confounded by the asymmetrical geometry of the chamber, but since this index is derived from pulsed-wave Doppler measurements, evaluation can be made independently of 2-D imaging, a further advantage given poor patient echogenicity. The index is reproducible and not affected by heart rate or the severity of tricuspid regurgitation. Among a variety of clinical and echocardiographic variables, the index was the most powerful predictor of prognosis in a study of patients with primary pulmonary hypertension.4 We have calculated the index in patients with interstitial5 and a wide range of other pulmonary conditions, including chronic obstructive pulmonary disease, without any technical difficulties. A useful inverse correlation exists between the index and arterial oxygen tension, and it is both a sensitive and specific indicator of the presence of pulmonary arterial hypertension.

Like the authors, we strongly advocate the use of noninvasive indicators of right ventricular performance in patients with pulmonary disease as a means of identifying those at high risk. This new echocardiographic technique, which can be incorporated into a conventional transthoracic study, may be more practical for this purpose.
