Doppler Echocardiographic Index of Global Right Ventricular Function

To the Editor:

In pulmonary disease, right ventricular dysfunction has an important bearing on prognosis. Incalzi et al 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 S1S3 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 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. We have calculated the index in patients with interstitial 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.

Malcolm I. Burgess, MRCP
Simon Ray, FRCP, MD, FACC
Northwest Regional Cardiac Centre
Wythenshawe Hospital
Manchester, United Kingdom

Nesrin Mogulkoc, MD
Jim Egan, MRCP, MD
Northwest Lung Centre


Response

We have read with great interest the letter by Dr Burgess and colleagues. The proposed method of assessing right ventricular function looks quite promising, especially because of its alleged applicability in various clinical and hemodynamic conditions. The authors demonstrated that this index is easily measurable both in chronic obstructive pulmonary disease (COPD) and in interstitial lung disease and qualifies as a reliable indirect measure of pulmonary hypertension. However, the available evidence supports its role as a prognostic tool only in primary pulmonary hypertension, which is a relatively uncommon condition. Thus, we think that efforts should be made to verify whether this index carries autonomous prognostic implications in COPD as well as in pulmonary hypertension complicating congestive heart failure. Eventually, the response of this index to acute changes in pulmonary artery pressure should be assessed to clarify its predictive power.

Raffaele Antonelli Incalzi, MD
Leonello Fuso, MD
Salvatore Basso, MD
Gabriella Pagliari, MD
Riccardo Pistelli, MD
Respiratory Physiology Department
Catholic University
Rome, Italy

Doppler Echocardiographic Index of Global Right Ventricular Function
Malcolm I. Burgess, Simon Ray, Nesrin Mogulkoc and Jim Egan

Circulation. 2000;101:e117
doi: 10.1161/01.CIR.101.12.e117

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/101/12/e117

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org/subscriptions/