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Reply

We thank Dr. Breithardt for his comment on our study on cardiac resynchronization therapy (CRT) in patients with narrow QRS complexes and coexisting systolic asynchrony by echocardiography (1). Our report suggested the potential beneficial role of CRT for heart failure patients with narrow QRS complexes if they exhibited systolic asynchrony by tissue Doppler imaging. This included the improvement of exercise capacity, symptoms as well as echocardiographic findings of left ventricular (LV) reverse remodeling, and gain in systolic function. The findings are corroborated by the study of Bleeker et al. (2) in the same issue of the *Journal* and in 2 previous reports (2–4). Of note, the lack of control group was pointed out by Dr. Breithardt. We agree this is a potential limitation, although the data from the aforementioned studies support the design of a multicenter, randomized, controlled clinical trial, as stated in our study. In fact, we also provided additional information to illustrate the independent benefit of CRT in the narrow QRS group.

First, the study was designed with a pacing "off" period. During such a period, the benefits of pacing on cardiac function and LV reverse remodeling disappeared gradually. Second, those patients in the narrow QRS group who had significant systolic asynchrony responded more than did those with minimal asynchrony. Third, our study also included a group of wide QRS patients, and the magnitude of response was similar in both the narrow and wide QRS groups. Intriguingly, we have shown that for a similar level of systolic dyssynchrony, the magnitude of reverse remodeling response is nearly identical in both groups.

As similar to the wide QRS group, we optimized atrioventricular interval by the Ritter method for patients in the narrow QRS group. As previously mentioned, we did not find any difference in the optimized atrioventricular interval between the 2 groups. However, we ensured patients had successful biventricular capture by examination of a 12-lead electrocardiogram. Arguably, some patients might have fusion beats, though pacing by both ventricular leads remains present even in fusion beats; hence, pacing efficacy should not be affected.

In conclusion, our study does not suggest abandoning the electrocardiogram as a selection criterion for CRT, but recommended the need for multicenter trials for heart failure patients with a narrow QRS complex by using echocardiography for screening of systolic asynchrony. It is hoped that this may extend the benefit of CRT to more heart failure patients beyond the scope of using wide QRS complex as a surrogate marker for the presence of systolic asynchrony.

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Cardiac Imaging in Patients With Chronic Obstructive Pulmonary Disease and Chronic Heart Failure

We read with interest the recent study by Le Jemtel et al. (1) on the diagnostic and therapeutic challenges in patients with coexistent chronic obstructive pulmonary disease (COPD) and chronic heart failure (CHF). In the proposed diagnostic algorithm, the investigators suggested radionuclide ventriculography (RNV) in patients with technically inadequate echocardiographic study.

Although RNV provides an accurate and reproducible method of assessing ventricular function (2,3) it involves the use of radiation and the need for peripheral venous access. In addition, the myocardium itself is not seen, and the spatial resolution is low.

Cardiovascular magnetic resonance (CMR) has become the gold standard for determination of left ventricular (LV) volumes and LV ejection fraction (LVEF) (4). It compares favorably to available reference methods and has high intraobserver, interobserver, and test-retest reproducibility (5,6). Moreover, CMR does not involve the use of ionizing radiation, and LV evaluation by cine white blood imaging technique can be done without a peripheral venous access. Cardiovascular magnetic resonance may also provide tissue characterization of the diseased myocardium and prognostic information (7). Furthermore, both right ventricular (RV) volume and function by CMR have been validated in a large, multiethnic study (8). This is of particular importance in COPD patients, because RV hypertrophy determined by CMR may provide the earliest sign of RV pressure overload in COPD (9).

Presently, CMR is considered by professional societies to be an appropriate test for evaluation of LV function in heart failure patients with technically limited echocardiogram images (10). Therefore, we believe CMR should be part of any algorithm for evaluation of COPD patients with concurrent CHF.

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Reply

We appreciate the interest of Drs. Ntim and Hundley for our recent study (1) and agree with their helpful comments. We did not mention cardiovascular magnetic resonance (CMR) as an alternative imaging approach in patients with a technically inadequate echocardiographic study because CMR is not as readily available to cardiologists as is radionuclide ventriculography. When readily available and not contraindicated, CMR can certainly provide the needed information.

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