

Filling Patterns in Left Ventricular Hypertrophy: A Combined Acoustic Quantification and Doppler Study

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Abstract

Objectives

The purpose of this study was to evaluate the potential of acoustic quantification compared with Doppler echocardiography for assessment of left ventricular diastolic dysfunction.

Background

Diastolic dysfunction usually accompanies left ventricular hypertrophy. Although Doppler echocardiography is widely used, it has known limitations in the diagnosis of diastolic abnormalities. The ventricular area-change waveform obtained with acoustic quantification technology may provide an alternative to assess diastolic dysfunction.

Methods

Potential acoustic quantification variables (peak rate of area change and mean slope of area change rate during rapid filling, amount of relative area change during rapid filling and atrial contraction) were obtained and compared with widely used Doppler indexes of ventricular filling (isovolumetric relaxation time, pressure half-time, peak early diastolic velocity/peak late diastolic velocity ratio, rapid filling, atrial contribution to filling) in 16 healthy volunteers and 30 patients with left ventricular hypertrophy.

Results

Criteria for abnormal relaxation were present in 68% of patients by acoustic quantification and in 64% of patients by Doppler echocardiography. However, abnormal relaxation was identified in 89% of patients by one or both methods. Acoustic quantification indicated abnormal relaxation in the presence of completely normalized Doppler patterns and in patients with mitral regurgitation or abnormal rhythm with unreliable Doppler patterns.

Conclusions

Acoustic quantification potentially presents a new way to assess diastolic dysfunction. This technique may be regarded as complementary to Doppler echocardiography. The combined use of the methods may improve the diagnosis of left ventricular relaxation abnormalities