OBJECTIVES: This study sought to establish normal values for real-time 3-dimensional echocardiography (RT3DE)-derived left ventricular (LV) dyssynchrony index (LVDI) and determine its age dependency, and to compare dyssynchrony in patients with normal LV function and patients with dilated cardiomyopathy (DCM), with and without left bundle branch block (LBBB). BACKGROUND: Cardiac resynchronization therapy is known to be ineffective in one-third of patients with heart failure, highlighting the need for alternative techniques to assess LV dyssynchrony. METHODS: Datasets from RT3DE were analyzed to calculate LVDI using 16- and 17-segment models. First, 135 normal subjects were studied to establish LVDI abnormality threshold (mean + 2 SD) and to study the relationship with age. Then, 3 groups of patients (N = 16 each: DCM with and without LBBB, normal LV function with LBBB) were compared with 50 age-matched normal control subjects. RESULTS: In normal subjects, the 16-segment model resulted in a lower LVDI abnormality threshold than the 17-segment model (4.0% vs. 4.5%). In patients with normal LV function, LVDI was significantly lower than in those with DCM, irrespective of LBBB. Although LBBB resulted in a nearly 2-fold increase in LVDI in patients with normal LV function, its effects were nonsignificant in DCM. All patients with DCM and ejection fraction <35%...
had abnormally high LVDI, likely as a result of low signal-to-noise ratio in low-amplitude regional volume curves hampering accurate determination of regional ejection time. CONCLUSIONS: Normal values established in this study resulted in indiscriminate diagnosis of abnormal dyssynchrony in all patients with reduced LV function. The value of RT3DE-derived LVDI in the evaluation of dyssynchrony in patients with reduced LV function needs to be critically reassessed because of the inability to accurately detect end-ejection in low-amplitude regional volume curves. Alternative indices of dyssynchrony need to be developed to address this limitation.