

Left Ventricular Regional Contraction Abnormalities by Echocardiographic Speckle Tracking in Combined Right Bundle Branch with Left Anterior Fascicular Block Compared to Left Bundle Branch Block

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INTRODUCTION Left bundle branch block (LBBB) causes an electrical activation delay which results in corresponding mechanical abnormalities between the interventricular septum and left ventricular (LV) lateral wall. Patients with LBBB by ECG and heart failure have been shown to respond well to cardiac resynchronization therapy (CRT). Risum et al. demonstrated that the presence of a “classical contraction pattern” of opposing LV wall motion in LBBB patients using echocardiographic speckle-tracked strain, was predictive of a beneficial response to CRT in 92% of patients. Less is known about patients with both right bundle branch block and left anterior fascicular block (RBBB + LAFB) regarding LV deformation and the potential role for CRT. These patients may have a conduction delay between the inferior and anterior LV walls, providing a potential target for CRT. The aim of this study was to investigate whether patients with combined RBBB and LAFB morphology on ECG showed echocardiographic mechanical strain abnormalities between the inferior and anterior LV walls, similar to the mechanical strain abnormalities between septal and lateral LV walls noted in patients with LBBB.

METHODS Ten volunteers without bundle branch block (no-BBB), 28 LBBB and 27 RBBB+LAFB patients were included in this retrospective study. Conduction was determined by ECG and all patients had an echocardiographic study performed between 2011 and 2013. Two-dimensional longitudinal regional strains were obtained by echocardiographic speckle-tracking. Response was defined as a classical, borderline or “other abnormality” pattern in any chamber view. Number of occurring patterns between LBBB and RBBB+LAFB groups were compared using a χ^2 -test ($p < 0.05$).

RESULTS The number of classical patterns in the LBBB group was significantly higher than in the RBBB+LAFB and no-BBB groups ($p < 0.001$ for both groups). Contrary, the RBBB+LAFB group showed a significantly higher number of borderline patterns compared to the other groups (LBBB: $p = 0.033$, no block: $p = 0.015$) and a significantly higher number of “other abnormality” strain pattern compared to the LBBB group ($p = 0.042$).

DISCUSSION Patients with RBBB+LAFB morphology on ECG showed abnormal echocardiographic wall motion between the inferior and anterior LV walls, similar to those with LBBB between septal and lateral LV walls. However, a classical mechanical delay pattern by echo was significantly less prevalent in RBBB+LAFB patients compared to LBBB patients. Even though the influence of scar needs to be assessed in a future study, the results indicate a potential role for CRT in some patients with RBBB+LAFB.