

Associations of 2013 and 2021 ESC definitions of left bundle-branch block with mechanical dyssynchrony and CRT-induced reverse remodeling

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Background: In 2021, a new and stricter ECG-based definition of LBBB was proposed and implemented in the European Society of Cardiology (ESC) guidelines on cardiac pacing and cardiac resynchronization therapy (CRT).

Aim: To investigate the association between the 2021 and the 2013 LBBB definitions with CRT-induced left ventricular (LV) reverse remodeling, as well as mechanical dyssynchrony.

Methods: CRT patients (n=191) were retrospectively investigated. Pre-CRT digitally stored ECGs were analyzed and categorized according to the LBBB definition of 2013 (LBBB-2013) and the 2021 (LBBB-2021). Mechanical dyssynchrony (Dyss) was assessed pre-CRT using 2D-echocardiography and was defined as the presence of apical rocking and/or septal flash. CRT-induced LV reverse remodeling was measured as the relative change of left ventricular end systolic volume (LVESV) at 12 ± 6 months after CRT compared to baseline.

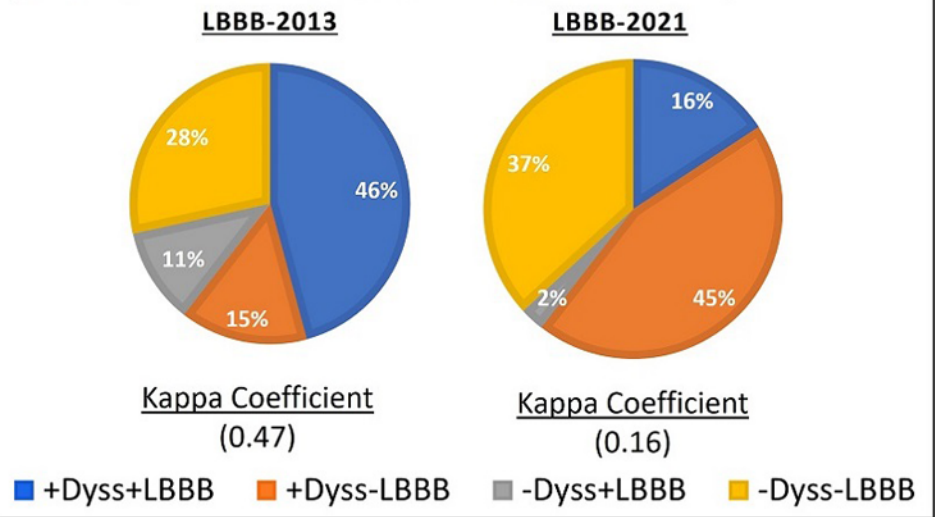
Results: Patients' characteristics were as follows; age 70 ± 10 years, 69% males and NYHA class 2.7 ± 0.5. QRS width was 156 ± 18 ms and LVEF 33 ± 11%, and 52% had ischemic etiology. Dyss was present in 59% of the population.

The percentage of the cohort that was considered to have LBBB was considerably lower according to the LBBB-2021 than according to the LBBB-2013 (18 vs. 57% respectively). Similarly, percentages of patients with LBBB+Dyss were 16 and 46% according to LBBB-2021 and LBBB-2013 respectively, with a respective Kappa coefficient of 0.16 and 0.47 (Figure A).

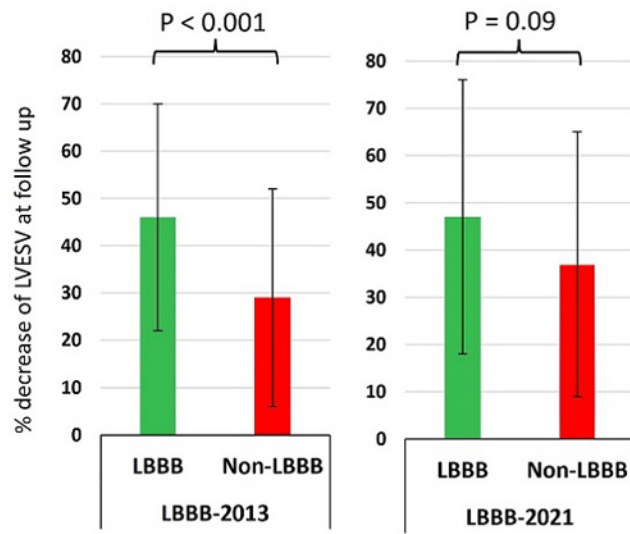
At CRT follow up, LBBB-2013 patients showed significantly more LV reverse remodeling compared to non-LBBB patients (P < 0.001), while there was no significant difference between patients with LBBB-2021 and non-LBBB (P = 0.09, Figure B).

Conclusion: The LBBB definition proposed in the 2021 ESC guidelines excludes many patients from a class I indication for CRT. It is less associated with mechanical dyssynchrony and with CRT-induced LV reverse remodeling than the 2013 LBBB definition. Therefore, the new LBBB definition appears to be counterproductive with regards to selection of CRT patients.

A. Agreement between ECG-LBBB definitions and Dyss



B. CRT induced LV reverse remodeling at follow-up



Dyss: Mechanical dyssynchrony, LVESV: Left ventricular end systolic volume