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Impact of different left bundle branch definitions on cardiac resynchronization therapy response and clinical outcomes.

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Background

Left bundle branch block (LBBB) morphology is a strong predictor of response to cardiac resynchronization therapy (CRT). However, there is no unanimity about the electrocardiographic (ECG) diagnosis of LBBB and the impact of different LBBB ECG criteria on CRT response is unclear.

Purpose

To investigate the relationship between different ECG diagnostic criteria of LBBB and response to CRT according to echocardiographic parameters and clinical outcomes.

Methods

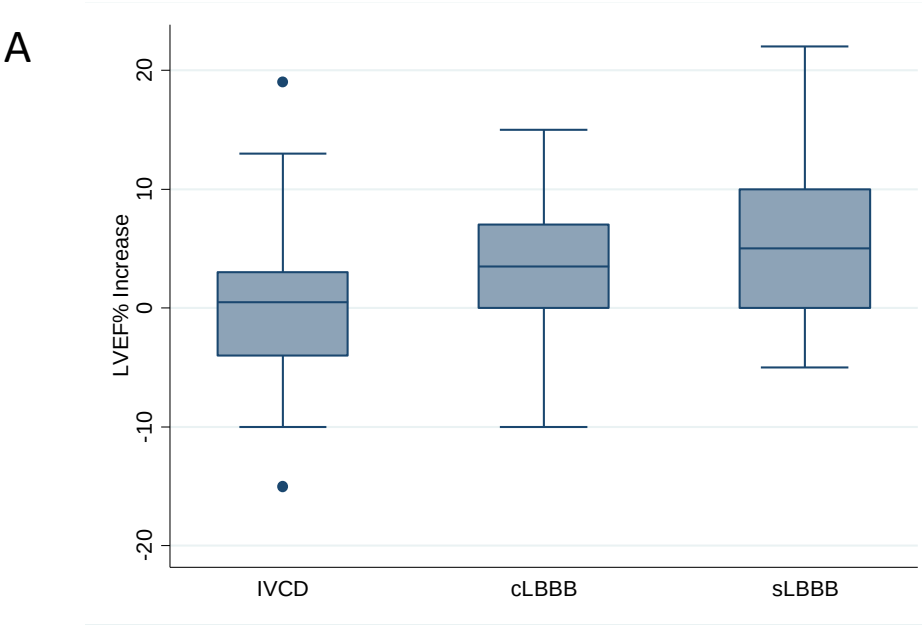
Conventional LBBB (cLBBB) was defined as a wide (≥120 msec) QRS, QS, or rS in lead V1, a monophasic R wave with no Q waves in leads I and V6 and R peak time greater than 60 ms in leads V5 and V6. A QRS duration ≥130 msec and presence of mid-QRS notching or slurring in at least two of leads V1, V2, V5, V6, I, aVL defined stringent LBBB (sLBBB). Intraventricular conduction delay (IVCD) was diagnosed in case of wide (≥120 msec) QRS that did not meet criteria for LBBB. Patients experiencing a decrease ≥10% in left ventricular end-systolic volume (LVESV) from baseline were considered CRT responders. The occurrence of the composite of death for any cause and hospital admission for heart failure was also evaluated.

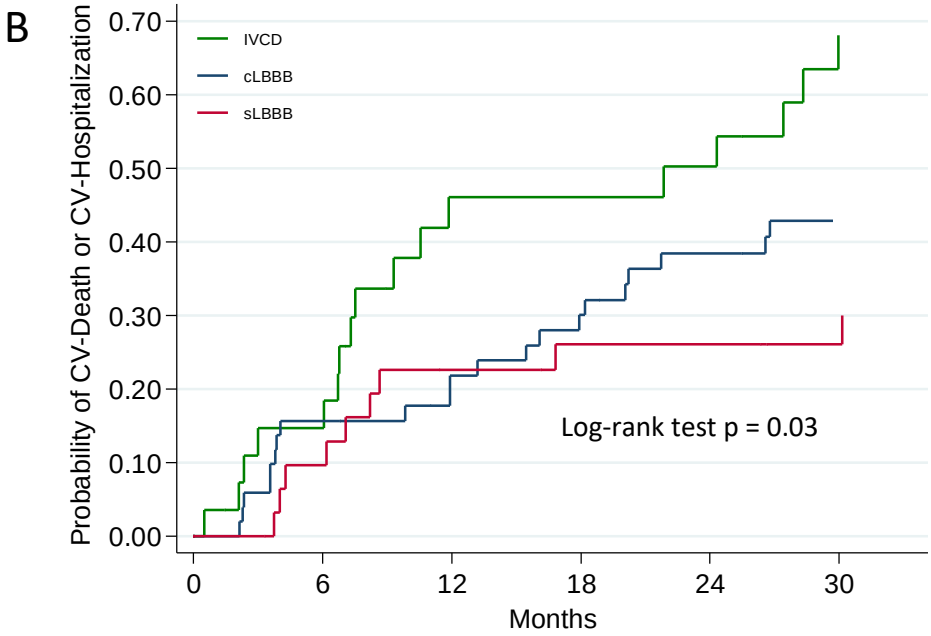
Results

Overall, 111 patients (age 67.6 ± 9.3 years; males, 90%; NYHA at baseline 2.4 $\pm$ 0.5, ischaemic aetiology, 46%) were included and followed-up for a median of 27 months (IQR 9–62). Mean left ventricular ejection fraction (LVEF) before CRT implantation was 28.1% $\pm$ 6.6%. According to QRS morphology patients were classified as follows: IVCD n=28 (25.2%), cLBBB n=51 (46%), sLBBB n=32 (28.8%). Patients with sLBBB showed significantly greater echocardiographic reverse remodelling (Fig. A) and higher CRT response (n=26, 81.3%) vs. cLBBB (n=35, 68.6%) or IVCD (n=13, 46.4%) patients. During follow-up patients with cLBBB experienced lower rates of the composite outcome (Fig. B). At multivariable analysis cLBBB was significantly associated with better prognosis (HR 0.34, 95% CI 0.14-0.81).

Conclusions

Selection of CRT candidates according to more stringent LBBB ECG criteria seems associated with greater treatment response and better outcomes. These findings need to be confirmed in larger clinical trials.





Number at risk

IVCD	28	23	13	13	12	7
Conventional LBBB	51	43	38	34	29	25
Stringent LBBB	32	28	23	21	21	19