

Incomplete Left Bundle Branch Block ECG criteria

Incomplete Left Bundle Branch Block (iLBBB) was described in 1917 by Rothberger and Winterberg in canine studies (**Rothberger, C. J. , & Winterberg, H. (1917). Experimentelle Beiträge zur Kenntnis der Reizleitungsstörungen in den Kammern des Säugetierherzens. Zeitschrift Für Die Gesamte Experimentelle Medizin, 5, 264.**), tend to progress to Complete Bundle Branch Block (cLBBB). In this single-center registry of iLBBB patients, 30% of patients reveal evolution to cLBBB in follow-up of 21 months. The presence of QRS notching/slurring in the lateral leads during iLBBB was the strongest predictor for progression toward cLBBB, independent of the used cLBBB definition. As such, the presence of QRS notching/slurring during iLBBB on the twelve-lead ECG identifies a population at high risk for the development of cLBBB. (**Ellie Senesael, MD, corresponding author 1 Simon Calle, MD, 1 Victor Kamoen, MD, 1 Roland Stroobandt, MD, PhD, 1 Marc De Buyzere, MSc, 1 Frank Timmermans, MD, PhD, 1 and Jan De Pooter, MD, PhD 1. Progression of incomplete toward complete left bundle branch block: A clinical and electrocardiographic analysis Ann Noninvasive Electrocardiol. 2020 Jul; 25(4): e12732. doi: 10.1111/anec.12732 PMID: 31823461**)

The ILBBB is an electrocardiographic entity, having well defined criteria, yet is a frequent cause of misinterpretation.

- The R>L septal depolarization results in loss of the normal left ventricular q wave, being replaced by an initial r wave: Absence of Q /q waves in lateral leads, is caused by reversal septal activation and consequente elimination of lateral Q /q waves
- QRS duration (QRSD) ≥ 110 and < 120 ms in adults, between 90 and 100 ms in children aged 4 to 16 years and between 86 and 90 ms in children younger than 4 years.
- Negative QRS complex in leads V1 and V2: deep QS complex with no preceding R wave);
- Prolonged R-Wave Peak Time(RWPT) ≥ 60 ms in I, aVL, V4, V5, and V6 (any of two) (**GE Healthcare (2008). Marquette™ 12SL™ ECG analysis program - physician's guide. Retrieved from <https://www.gehealthcare.co.uk/en-GB/products/diagnostic-cardiology/marquette-12sl> [Google Scholar]**)
- Absence of normal septal q-wave in leads V4, V5, V6, I and aVL. (any of two) because Septal activation is thus reversed eliminating lateral q/Q waves; (**Sodi-Pallares, D. , Estandia, A. , Soberon, J. , & Rodriguez, M. I. (1950). The left intraventricular potential of the human heart. II. Criteria for diagnosis of incomplete bundle branch block. *American Heart Journal*, 40(5), 655–679. 10.1016/0002-8703(50)90198-0) (Willems, J. L. , Robles de Medina, E. O. , Bernard, R. , Coumel, P. , Fisch, C. , Krikler, D. , ... Wellens, H. J. J. (1985). Criteria for intraventricular conduction disturbances and pre-excitation. World Health Organizational/International society and federation for cardiology task force ad hoc. *Journal of the American College of Cardiology*, 5(6), 1261–1275. 10.1016/s0735-1097(85)80335-1)**)

- (Surawicz, B. , Childers, R. , Deal, B. J. , & Gettes, L. S. (2009). AHA/ACCF/HRS recommendations for the standardization and interpretation of the electrocardiogram: Part III: Intraventricular conduction disturbances: A scientific statement from the American Heart Association Electrocardiography and Arrhythmias Committee, Council on Clinical Cardiology; the American College of Cardiology Foundation; and the Heart Rhythm Society: Endorsed by the International Society for Computerized Electrocardiology. *Circulation*, 119(10), e235–240. 10.1161/CIRCULATIONAHA.108.191095) (Surkova, E. , Badano, L. P. , Bellu, R. , Aruta, P. , Sambugaro, F. , Romeo, G. , ... Muraru, D. (2017). Left bundle branch block: From cardiac mechanics to clinical and diagnostic challenges. *Europace*, 19(8), 1251–1271. 10.1093/europace/eux061)
- In electromechanical experiments in dogs with varying degrees of mechanically induced iLBBB, reversal of septal activation (right to left activation) could be documented if sufficient degree of iLBBB was accomplished (Rodriguez, M. I. , & Sodi-Pallares, D. (1952). The mechanism of complete and incomplete bundle branch block. *American Heart Journal*, 44(5), 715–746. 10.1016/0002-8703(52)90099-9)