

Diagnosis of acute myocardial infarction in the presence of left bundle branch block

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Abstract

Objective: Patients with suspected acute myocardial infarction (AMI) in the setting of left bundle branch block (LBBB) present an important diagnostic and therapeutic challenge to the clinician.

Methods: We prospectively evaluated the incidence of AMI and diagnostic performance of specific ECG and high-sensitivity cardiac troponin (hs-cTn) criteria in patients presenting with chest discomfort to 26 emergency departments in three international, prospective, diagnostic studies. The final diagnosis of AMI was centrally adjudicated by two independent cardiologists according to the universal definition of myocardial infarction.

Results: Among 8830 patients, LBBB was present in 247 (2.8%). AMI was the final diagnosis in 30% of patients with LBBB, with similar incidence in those with known LBBB versus those with presumably new LBBB (29% vs 35%, $p=0.42$). ECG criteria had low sensitivity (1%-12%) but high specificity (95%-100%) for AMI. The diagnostic accuracy as quantified by the receiver operating characteristics (ROC) curve of hs-cTnT and hs-cTnI concentrations at presentation (area under the ROC curve (AUC) 0.91, 95% CI 0.85 to 0.96 and AUC 0.89, 95% CI 0.83 to 0.95), as well as that of their 0/1-hour and 0/2-hour changes, was very high. A diagnostic algorithm combining ECG criteria with hs-cTnT/I concentrations and their absolute changes at 1 hour or 2 hours derived in cohort 1 (45 of 45 (100%) patients with AMI correctly identified) showed high efficacy and accuracy when externally validated in cohorts 2 and 3 (28 of 29 patients, 97%).

Conclusion: Most patients presenting with suspected AMI and LBBB will be found to have diagnoses other than AMI. Combining ECG criteria with hs-cTnT/I testing at 0/1 hour or 0/2 hours allows early and accurate diagnosis of AMI in LBBB.

Trial registration number: APACE: [NCT00470587](#); ADAPT: [ACTRN12611001069943](#); TRAPID-AMI: [RD001107](#); Results.

Keywords: ECG/electrocardiogram; acute coronary syndromes; acute myocardial infarction.

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