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The prognostic value of a new left bundle branch block in patients with acute myocardial infarction: A systematic review and meta-analysis

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ABSTRACT

Objective: To assess the prognostic value of new left bundle branch block (LBBB) in patients with acute myocardial infarction (AMI).
Background: LBBB develops in many cardiac conditions, including AMI. The empirical evidence for the contribution of LBBB to mortality in AMI is not consistent.
Methods: Medline, PubMed, CINAHL, and EMBASE were searched. Inverse variance meta-analysis was performed with odds ratios as the effect estimates. The I^2 statistic and risk of bias were assessed.
Results: Eight studies involving 105,861 participants were eligible. New LBBB was associated with higher mortality at 30 days (OR: 2.10, 95% CI 1.27 to 3.48) and 1-year follow up (OR: 2.81, 95% CI 1.64 to 4.80), and increased heart failure risk (OR: 2.64, 95% CI 1.84 to 3.77).
Conclusions: AMI patients with new LBBB are a high risk group and must be treated accordingly. Yet, more research is needed given the limitations of studies.

Introduction

Many studies have shown that patients with acute myocardial infarction (AMI) who present with bundle branch block (BBB) may have a worse prognosis than AMI patients who have normal conduction.[1–5] Yet investigators of these studies did not compare the effects of right versus left BBB. A recent systematic review[6] showed that patients with right BBB and AMI were at more than 2-fold higher risk of all-cause mortality at 30 days of follow up compared to those with no block. On the other hand, the literature on left bundle branch block (LBBB) is not consistent. Indeed, a number of investigators of cohort studies found that LBBB is associated with, and may be an independent predictor of higher mortality among patients with AMI.[7–14] However, other investigators did not find LBBB to be an independent predictor of mortality; they attributed the higher mortality in this population to other risk factors and co-morbidities.[15–18]

The American Heart Association (AHA) and European Society of Cardiology (ESC) in their guidelines consider AMI patients with new LBBB a high risk group and recommend for their treatment early reperfusion therapy with percutaneous coronary intervention (PCI) or fibrinolytic therapy.[22,23] Yet both organizations acknowledge that it is difficult to diagnose ST elevation MI in the setting of LBBB and ascertain whether the LBBB is old or new, considering that oftentimes no prior ECG is available for comparison.[19,20] Wong et al[21] found significantly higher mortality rates in AMI patients with definite new LBBB compared to those with no LBBB, but no difference when LBBB was present at baseline versus no LBBB; this suggests that the time of onset of LBBB is significant in estimating associated mortality. In light of the above, and in an attempt at quantifying the independent contribution of new LBBB to patient outcomes in AMI patients, we conducted a systematic review and

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meta-analysis in order to assess the prognostic value of new LBBB in patients hospitalized with AMI, in terms of risk for 30-day and one-year mortality, and risk of heart failure.

Methods

We published the protocol of this study in PROSPERO (Registration number: CRD42014015286). The eligibility criteria of the included studies were:

- Design: Observational studies, including cohort and case – control studies.
- Population: Patients with acute myocardial infarction.
- Exposure: New LBBB compared to no new LBBB.
- Outcomes: The primary outcomes were in-hospital mortality (or mortality within 30 days) and one-year mortality. Secondary outcomes were heart failure, atrio-ventricular block (AV block) that developed after LBBB, and placement of a pacemaker. We included studies that reported adjusted or unadjusted risk estimates.

This systematic review followed the PRISMA guidelines. We decided to exclude from the analysis studies conducted prior to 1980 because the introduction of revascularization therapy, which started in the 1980s, have led to significant reduction in mortality rates in AMI patients.[22] Only 2 studies conducted prior to 1980 fit our inclusion criteria.

The first author (B.A.) and a medical librarian searched PubMed, Medline, EMBASE, and CINAHL starting the date of their inception. The search terms for Medline were: myocardial infarction, bundle branch block, prognosis, survival analysis, and related synonyms. The full search strategy is provided in the online supplement. In addition, the references cited in the included studies were screened for relevance. No restrictions were made by language.

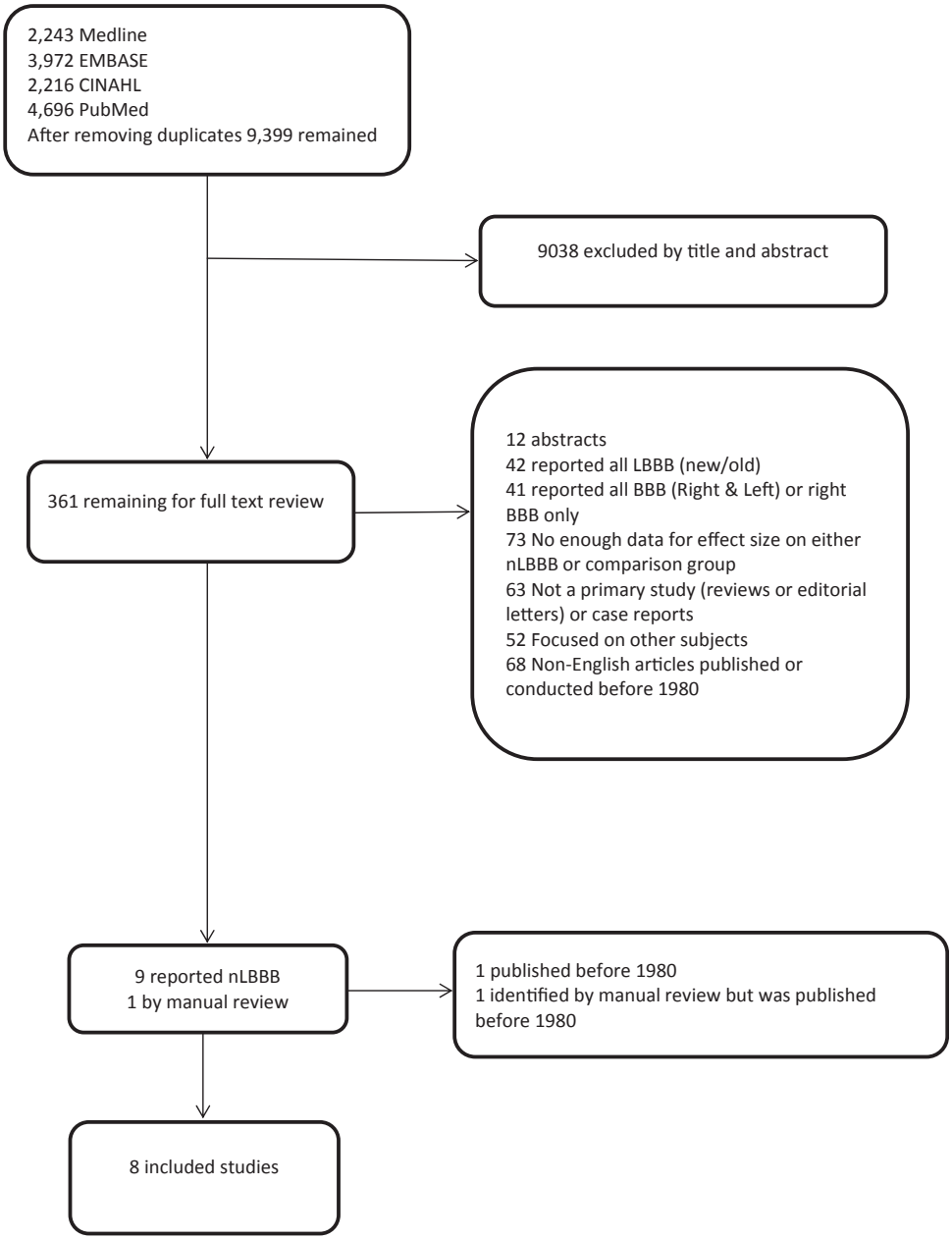

Fig. 1. Study flow.