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Reference: Meyers et al. Evaluation of T-wave morphology in patients with left bundle branch block and suspected acute coronary syndrome. *JEM*. 2016; 51(3):229-237

Question: Is there a specific T wave morphology in patients with LBBB that predict non-ST-segment elevation myocardial infarction?

Introduction: Over 6 million patients present to the ED with symptoms suspicious for ACS each year. In patients with LBBB accurate ECG interpretation may be obscured which can lead to delayed diagnosis, inappropriate resource utilization and adverse outcomes. Diagnosis of AMI in patients with LBBB is dependent on appropriate discordance (Sgarbossa criteria). In normal LBBB the ST segment and T wave should be discordant to the majority of the QRS. Either concordance or excessive discordance of the ST segment is associated with an MI, this has a high specificity but lower sensitivity. A modified Sgarbossa criteria was developed to increase the sensitivity.

Methods: Retrospective cohort study performed by chart review at a university tertiary care center ED. All patients with a LBBB and serum K⁺ less than or equal to 5.5 mEq/L between May 2009 and June 2012 with a CC of chest pain, SOB, or a symptom that was a potential anginal equivalent or consistent with a patient's prior MI symptoms were included in the study. ECGs were collected and T wave morphology was classified into five qualitative categories. Primary outcome was sensitivity and specificity of the proposed T wave morphology finding for NSTEMI. A primary abstractor (third year medical student) initially viewed the ECGs, and a second investigator then reviewed the ECGs. Interobserver agreement was calculated by simple agreement and kappa values.

Results: 246 patients were included in the study. Of these, 32 had an acute MI and 23 had an NSTEMI. Simple agreement was 89% and kappa value was 0.77 for the T wave classification. 72 patients had two or more contiguous leads with terminally or completely concordant T waves on presentation ECG. 9 were new, 33 old and 30 presumed new as there was no prior ECG available. Sensitivity was 19% and specificity was 68% for NSTEMI. Incidentally, during review of the ECGs they found that a pattern of new, profound or progressively deepening and reversible terminal T wave inversions in anterior or inferior leads was predictive of reperfused ACO.

Discussion: This study found no clinically useful relationship between T wave concordance or morphology and MI in the population studied. It did find a T wave morphology indicative of coronary reperfusion. This study highlights the need to understand ECG findings in LBBB and also to correlate ECGs with patient presentation as the presence of a LBBB can make ECG interpretation difficult. It is important to note that there were limitations to this study, one being that the principal investigator was a third year medical student who designed the study and did the primary data collection and ECG interpretation. The authors felt that any further studies should focus on a different population and set of findings.
