Combining Sgarbossa and Selvester ECG Criteria to Improve STEMI Detection in Presence of LBBB

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Background: ECG detection of ST-segment Elevation Myocardial Infarction (STEMI) in presence of left bundle-branch block (LBBB) has long been a challenge. The Sgarbossa ECG criteria have been validated and tested by researchers in a number of studies, but criticized due to low sensitivity. The purpose of this study was to compare Sgarbossa criteria with Selvester criteria (the 10% rule) and propose a new algorithm with combined Sgarbossa and Selvester criteria for improved detection of STEMI in LBBB.

Method: The study population (n = 382) with 144 acute MI and 238 controls includes data from multiple sources. One was computer algorithm selected LBBBs (n = 209) from patients with discharge diagnosis of acute MI (n = 100) and non- acute MI (n=109). The second set included acute MI (n = 43) and control (n=70) cases with selection criteria similar to the first set. Additional controls were added from the CSE diagnostic set (n=12) and a community based population (n=48). Elements of the Sgarbossa criteria (discordant ST elevation of 5mm, concordant ST elevation of 1mm, ST depression in V1-V3) and Selvester criteria (discordant ST elevation $\geq$ 10% of |R-S| plus STEMI limits) were tested separately and in a combination with the Sgarbossa discordant ST elevation replaced by the Selvester discordant ST elevation 10% rule. ECG criteria were compared by sensitivity, specificity, positive likelihood ratio (LR+) and negative likelihood ratio (LR-).

Results: Applying Sgarbossa criteria alone resulted a 30% sensitivity, 88% specificity, 2.5 LR+ and 0.80 LR-. Combined Sgarbossa and Selvester criteria increased the sensitivity to 39% with a specificity of 89%, 3.6 LR+ and 0.68 LR-.

Conclusion: Replacing the Sgarbossa discordant ST elevation criterion with the Selvester 10% rule improves the sensitivity without losing specificity. The ST elevation threshold relative to QRS amplitude works better than an absolute ST elevation threshold.