STEMI classification in acute ischemia: dependence on the position of the ST deviation measurement relative to the J point

Sumche Man, C. Cato Ter Haar, Arie C. Maan, Martin J. Schalij, and Cees A. Swenne

Cardiology Department, Leiden University Medical Center, Leiden, the Netherlands

INTRODUCTION Currently, ST-elevation / ST-elevation equivalent (STEMI) or non-ST elevation (NSTEMI) classification of ECGs made in acute coronary syndrome (ACS) patients is essential to triage the patient for percutaneous coronary intervention (PCI). The guidelines dictate that STEMI classification is done by using ST-deviation measurements at the J point. However, the J-point amplitude can be obscured because of ischemia-induced conduction delays and/or ischemia-induced early repolarization. Measurement if the ST deviations at a fixed time-interval after the J point is one of the often-suggested solutions. However, the impact of the position of the ST-deviation measurement on the STEMI classification is not known. In our current study we investigate if STEMI classification of ACS ECGs depends on the position of ST deviation measurement relative to the J point.

METHODS We analyzed ECGs of 53 ACS patients scheduled for primary PCI and with an angiographically demonstrated completely occluded culprit artery. In each ECG, ST deviation was measured at the J point and at 10 fixed time intervals relative to the J point (-20, -10, +10, +20, +30, +40, +50, +60, +70 and +80 ms). ECGs were analyzed by using our custom-made LEADS program [1]. Four STEMI classifications (STEMI strict; STEMI strict + STEM equivalent; STEMI extended + STEMI equivalent; STEMI extended + STEMI equivalent extended) were used. For each ST deviation, STEMI classification was done. Finally, the percentages STEMI-classified ECGs were computed per ST-deviation measurement.

RESULTS The study group consisted of 13/40 female/male, 59.6±14.9 years (mean±SD). Percentages STEMI-classified ECGs per STEMI classification (STEMI strict; STEMI strict + STEM equivalent; STEMI extended + STEMI equivalent; STEMI extended + STEMI equivalent extended) per ST deviation were almost steady between J+10 to J+40 ms (83, 88, 90, 96%, respectively).

DISCUSSION The impact of the position of the ST-deviation measurement on the STEMI classification is minimal when measured in the J+10 to J+40ms range, while early measurement bear the risk of underdiagnosis. Further investigation including ACS-negative ECGs is needed to investigate the trade-off between false-positives and false-negatives.

[1] Draisma HHM, et al, Comput Cardiol 2005 ;32:515-518, online available : http://www.cinc.org/archives/2005/pdf/0515.pdf