Quantitative Point-of-Care Troponin T Measurement for Diagnosis and Prognosis in Patients With a Suspected Acute Myocardial Infarction

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Improvement of prehospital triage is essential to ensure rapid management of patients with acute myocardial infarction (AMI). This study evaluates the feasibility of prehospital quantitative point-of-care cardiac troponin T (POC-cTnT) analysis, its ability to identify patients with AMI, and its capacity to predict mortality. The study was performed in the Central Denmark Region from May 2010 to May 2011. As a supplement to electrocardiography, a prehospital POC-cTnT measurement was performed by a paramedic in patients with suspected AMI. AMI was diagnosed according to the universal definition of myocardial infarction using the ninety-ninth percentile upper reference level as diagnostic cut point. The paramedics performed POC-cTnT measurements in 985 subjects with a symptom duration of 70 minutes (95% CI, 35 to 180); of whom, 200 (20%) had an AMI. The prehospital sample was obtained 88 minutes (range, 58 to 131) before the sample made on admission to the hospital. The sensitivity for detection of patients with an AMI was 39% (95% CI, 32% to 46%) and the diagnostic accuracy of the POC-cTnT values was 0.67 (95% CI, 0.64 to 0.71). Adjusted survival analysis showed a strong significant association between elevated prehospital POC-cTnT level above the detection level of 50 ng/L and mortality in patients with a suspected AMI irrespective of whether an AMI was diagnosed. In conclusion, large-scale quantitative prehospital POC-cTnT testing by paramedics is

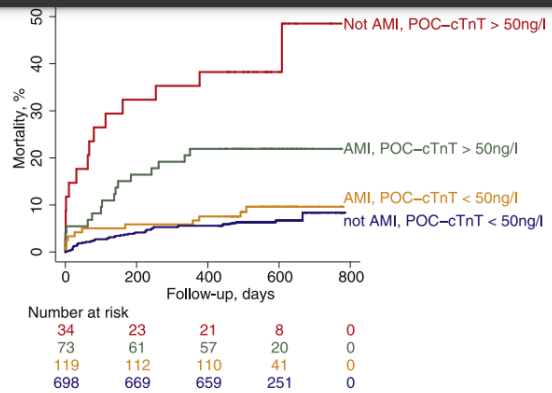

Figure 1. Kaplan-Meier cumulative long term mortality curve of patients stratified by combinations of presence or absence of AMI and prehospital point-of-care cardiac troponin T values above or below the detection level of 50 ng/L, n = 924 subjects. Median follow-up time: 18.7 months (interquartile range 16.5 to 20.7).

approved by the Danish Data Protection Agency and the Danish National Board of Health.

Laboratory technicians instructed 9 supervising paramedics in blood sampling and analysis. These paramedics trained the approximately 125 remaining paramedics. Analyses were performed in 25 ambulances. Peripheral

adjudicators (HEB and KT) reviewed the cases to reach consensus. The definitive diagnosis of AMI was established in accordance with the universal definition of myocardial infarction.[9] Myocardial necrosis was confirmed by detection of at least 1 value above the ninety-ninth percentile upper reference level (14 ng/L) of the routine high-sensitivity cTnT assay (Troponin T hs, Roche Diagnostics GmbH, Mannheim, Germany). The criterion for an increase and/or a decrease in high-sensitivity cTnT values was met at >20% change (>50% if the first cTnT measurement was below the ninety-ninth percentile).[10] Roche Diagnostics has released a technical bulletin regarding a calibration issue with this high-sensitivity cTnT assay.[11] We used recalculated high-sensitivity cTnT data for diagnosis adjudication.[11] Patients with an AMI were classified as STEMI or non-STEMI. The diagnosis of unstable angina pectoris was established in patients with an acute ischemic episode that did not fulfill the AMI criteria. Patients without AMI or unstable angina pectoris were categorized as "nonacute coronary syndrome," and a primary discharge diagnosis was established for this group.

The chi-square test, Kruskal-Wallis test, 1-way analysis of variance, and 2-sample *t* test were used to test the distribution of binomial and continuous data as appropriate. Differences of proportions were tested using 2-proportion Z-test. Categorical data are shown as absolute numbers (valid cases, percentages). Continuous variables are presented as medians with interquartile ranges, unless otherwise noted. Diagnostic proportions are presented with 95% confidence