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Letters to the Editor

High-sensitivity cardiac troponin T in patients with ST-segment elevation myocardial infarction

Keywords:
High-sensitivity cardiac troponin T
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I read the article by Ndrepepa et al. on the evaluation of predictive ability of high-sensitivity cardiac troponin T (hs-cTnT) for mortality in patients with ST-segment elevation myocardial infarction (STEMI) [1]. Primary percutaneous coronary intervention (PPCI) was applied and hs-cTnT was measured at preprocedural and peak postprocedural point. Adjusted hazard ratios (HRs) [95% confidence intervals (CIs)] of preprocedural and peak postprocedural hs-cTnT value for mortality were 1.08 (1.03–1.12) and 1.06 (1.04–1.08), respectively. In combination with C-statistic values, preprocedural or peak postprocedural hs-cTnT could predict independently for mortality in patients with STEMI undergoing PPCI. I have two concerns on their study.

First, Than et al. conducted a 5-year prospective study to evaluate the effect of serum hs-cTnT on all-cause mortality in patients with possible acute coronary syndrome [2]. HR (95% CI) of hs-cTnT for mortality was 2.3 (95% CI, 1.7–3.1). They also selected major adverse cardiovascular events (MACE) as another endpoint, and reported superiority of hs-cTnT against high-sensitivity cardiac troponin I (hs-cTnI) for predicting mortality. There have been many related studies, including reports with no difference of predictive ability between hs-cTnT and hs-cTnI for cardiac outcomes [3]. A meta-analysis would present useful information.

Second, Hendriks et al. evaluated the effect of hs-cTnT on all-cause and cardiovascular mortality in patients with stable type 2 diabetes [4]. Adjusted HRs (95% CIs) of log hs-cTnT for all-cause and cardiovascular mortality were 1.30 (1.19–1.42) and 1.33 (1.15–1.53), respectively. The Harrell C-statistic values also supported predictive ability of hs-cTnT. Comorbidities should be adequately adjusted for the risk assessment. In addition, measurement timing of hs-TnT after STEMI should also be considered [5].

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Tomoyuki Kawada (MD) *
Department of Hygiene and Public Health, Nippon Medical School, Tokyo, Japan

*Correspondence to: Department of Hygiene and Public Health, Nippon Medical School, 1-1-5 Sendagi, Bunkyo-Ku, Tokyo 113-8602, Japan. Tel.: +81 3 3822 2131; fax: +81 3 5685 3065
E-mail address: kawada@nms.ac.jp (T. Kawada).

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We thank Dr Kawada for the interest in our study on prognostic value of high-sensitivity cardiac troponin T (hs-cTnT) in patients with ST-segment elevation myocardial infarction (STEMI) undergoing primary percutaneous coronary intervention (PCI) [1]. In the letter, the author raised two main concerns, apparently by comparing the findings of our study with other studies rather than by directly addressing them.

First, Dr Kawada cited a study by Than et al. [2] which tested the association of two high-sensitivity cardiac troponin assays (hs-cTnT and hs-cTnI) with 5-year major adverse cardiovascular events (MACE) in patients with suspected acute coronary syndromes. For the troponin assay and outcome investigated in both studies (hs-cTnT and mortality), our study and the study by Than et al. [2] are directionally concordant. The studies differ with respect to the

value of hazard ratios for the association between hs-cTnT and mortality. However, any inter-study comparison of hazard ratios needs consideration of differences in the baseline characteristics of the patients (STEMI patients with very high and markedly dynamic levels of baseline and post-PCI troponin levels versus patients with suspected acute coronary syndromes with moderate increase or troponin level within the reference range), biomarker unit used to calculate the risk estimate (extent of hs-cTnT change, expressed as a difference in crude concentration or logarithmic scale), degree of adjustment, and the length of follow-up over which the association of interest was investigated. Notably, the prognostic value of peri-PCI hs-cTnT differs across various entities of coronary artery disease [3,4]. These differences as well as inter-study differences in terms of aims and outcomes analyzed make the studies hardly comparable. A comparative analysis of troponin assays or an association between these assays and MACE were not investigated in our study. Composite endpoints are commonly used as a means to increase the number of events (and power) in clinical studies. However, they may be suboptimal for outcome assessment, for at least two reasons: first, the overall rates (or differences) may be driven by disproportional contribution of a given component of the composite endpoint; and second, when individual components of the composite endpoint go in opposite directions, the overall effect may be masked. These aspects are particularly relevant when composite endpoints are compared across various groups (or studies). Thus, whenever a composite endpoint is used as a study outcome, it should be dissected into individual components and the association with each of them should be reported. We agree with Dr Kawada that in case of discordant results in terms of association between cardiac troponins and outcomes, meta-analyses could help to clarify the controversy.

Second, Dr Kawada was concerned about the impact of comorbidities on the association of high-sensitivity troponin assays and outcome. To express this concern, the author cited the study by Hendriks et al. [5] that included exclusively stable outpatients with type 2 diabetes. Although the rationale for the study by Hendriks et al. [5] is good considering that patients with diabetes represent a high-risk group with respect to cardiovascular disease and mortality, in the absence of a comparator group without diabetes or a troponin-by-diabetes interaction testing, the confounding effect of diabetes cannot be assessed and in fact it was not intended in this study. In our study we adjusted for a wide range of potential confounders including traditional cardiovascular risk factors (including diabetes), previous cardiovascular events, extent of coronary artery disease, extent of acute damage in the setting of STEMI, impaired renal function, procedural characteristics or PCI-related complications, and peri-procedural adjunct pharmacological therapy. This clearly shows that, in our study, special attention and priority was given to adjustment for eventual confounders and comorbidities. Nevertheless, despite adjusting for such a wide range of variables, residual confounding cannot be entirely ruled out. Finally, Dr Kawada is correct in pointing out the importance of timing of troponin measurement after STEMI. Peak post-PCI hs-cTnT values are commonly used for the prognosis assessment in patients with acute coronary syndromes or STEMI. Several studies in STEMI patients undergoing primary PCI have demonstrated peak hs-TnT values approximately 11–12 h after reperfusion, a time point used for hs-cTnT measurement in our study.

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Conflicts of interest

None.

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Gjin Ndrepepa (MD)*
Department of Adult Cardiology, Deutsches Herzzentrum München, Technische Universität, Munich, Germany

Adnan Kastrati (MD)[a,b]
[a]*Department of Adult Cardiology, Deutsches Herzzentrum München, Technische Universität, Munich, Germany*
[b]*DZHK (German Centre for Cardiovascular Research), partner site Munich Heart Alliance, Munich, Germany*

*Corresponding author at: Deutsches Herzzentrum München, Lazarettstrasse 36, München 80636, Germany
E-mail address: ndrepepa@dhm.mhn.de (G. Ndrepepa).

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