Circulation

RESPONSE TO LETTER TO THE EDITOR

Response by Kaier et al to Letter Regarding Article, "Direct Comparison of Cardiac Myosin-Binding Protein C With Cardiac Troponins for the Early Diagnosis of Acute Myocardial Infarction"

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et al

In Response:

We thank Jiang et al for their interest in our article on the comparison of cardiac myosin-binding protein C (cMyC) with high-sensitivity cardiac troponin (hs-cTn) for the diagnosis of acute myocardial infarction.[1] Despite being invented >100 years ago, we believe that the ECG is the most dynamic biomarker of myocardial ischemia because diagnostic ST-elevation occurs within 30 seconds of an epicardial coronary occlusion.[2] Because this is close to the human circulation time, no circulating biomarker can beat it. However, in the absence of diagnostic ECG changes, other approaches must be pursued.

The APACE study (Advantageous Predictors of Acute Coronary Syndrome Evaluation) is designed to identify such approaches by enrolling all-comers presenting to the emergency department with chest pain regardless of initial electrocardiographic findings. However, most clinical pathways in Europe use prehospital ECG to select patients with ST-segment–elevation myocardial infarction (STEMI) for direct transfer to the nearest unit offering primary percutaneous coronary intervention.[3] This bypasses conventional emergency departments; thus, the patients "excluded" from our analysis because of STEMI are often "walk-ins" or, as Jiang et al point out, might have had a "nearly normal ECG" at first evaluation in the ambulance.

As requested, we have performed an analysis including patients with STEMI (previously excluded[1]), focusing on early presenters (≤3 hours since chest pain onset). We assessed biomarkers comparing median (interquartile range [IQR]) and discrimination power quantified by the area under the receiver-operating characteristics curve using the DeLong et al[4] findings for comparison. The area under the receiver-operating characteristics curve for STEMI was derived with a binary outcome (eg, STEMI true/false, non-STEMI excluded).

We had 659 complete data sets for cMyC, hs-cTnT, and hs-cTnI at presentation; 31 patients had a gold-standard diagnosis of STEMI, and 95 had non-STEMI. Median cMyC concentrations were 198 ng/L (IQR, 69–598 ng/L) for STEMI, 121 ng/L (IQR, 44–623 ng/L) for non-STEMI, and 11 ng/L (IQR, 7–22 ng/L) for patients without acute myocardial infarction ($P<0.001$) compared with median hs-cTnT concentrations of 29 ng/L (IQR, 16–80 ng/L), 38 ng/L (IQR, 16–91 ng/L), and 7 ng/L (IQR, 4–12 ng/L), respectively ($P<0.001$) and median hs-cTnI concentrations of 44 ng/L (IQR, 19–124 ng/L), 34 ng/L (IQR, 12–137 ng/L), and 3 ng/L (IQR, 2–6 ng/L), respectively ($P<0.001$).

Similar to the findings in the original article, in an assessment of the accuracy for the diagnosis of all acute myocardial infarction regardless of ECG findings, the area under the receiver-operating characteristics curve was higher for cMyC than hs-cTnT, 0.912 (95% confidence interval [CI], 0.884–0.940) versus 0.888 (95% CI, 0.856–0.917; $P=0.038$), and comparable to hs-cTnI, 0.914 (95% CI, 0.889–0.939; $P=0.850$). For the discrimination between STEMI and non–acute myocardial infarction, the area un-

The full author list is available on page 545.

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der the receiver-operating characteristics curve was 0.912 (95% CI, 0.840–0.983) for cMyC versus 0.889 (95% CI, 0.836–0.942, *P*=0.499) for hs-cTnT and 0.930 for hs-cTnI (95% CI, 0.894–0.966; *P*=0.555).

The advantage of cMyC over hs-cTnT but not hs-cTnI in early presenters seems to extend to patients with STEMI. However, a sample size of 31 patients is likely too small to make assumptions about the utility in patients with ST-segment changes. This does not provide a conclusive answer as to the value of cMyC in the assessment of patients with nearly normal ECGs, in patients whose ECG cannot be interpreted (eg, in the context of bundle-branch block morphology), or in patients who present even earlier. Clearly, these are aspects that require further research and a larger number of observations.

ARTICLE INFORMATION

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Disclosures

Dr Twerenbold has received a research grant from the Swiss National Science Foundation (P300PB-167803) and speaker/consulting honoraria from Roche, Abbott, and B.R.A.H.M.S. Dr Rubini has received speaker honoraria from Abbott. Dr Reichlin has received research grants from the Goldschmidt-Jacobson-Foundation, Swiss National Science Foundation (PASMP3-136995), Swiss Heart Foundation, University of Basel, Professor Max Cloetta Foundation, Uniscientia Foundation Vaduz, and Department of Internal Medicine, University Hospital Basel, as well as speaker honoraria from B.R.A.H.M.S. and Roche. Dr Mueller has received research grants from the Swiss National Science Foundation, Swiss Heart Foundation, European Union, Swiss Commission for Technology and Innovation, Cardiovascular Research Foundation Basel, University Hospital Basel, Abbott, Alere, AstraZeneca, Beckman Coulter, BG Medicine, Biomerieux, BRAHMS, Critical Diagnostics, Nanosphere, Roche, Siemens, Singulex, Sphingotec, Department of Internal Medicine (University Hospital Basel), and 8sense, as well as speaker/consulting honoraria from Abbott, Alere, AstraZeneca, Biomerieux, BMS, Boehringer Ingelheim, B.R.A.H.M.S., Cardiorentis, Duke University, Eli Lilly, Novartis, Radiometer, Roche, Sanofi, Siemens, and Singulex. MilliporeSigma was contracted to undertake the analyses of cMyC on a fee-for-service basis and holds no commercial interest. Dr Marber is named as an inventor on a patent held by King's College London for the detection of cMyC as a biomarker of myocardial injury. The other authors report no conflicts.

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