

## Carefulness is important when analyzing epidemiological data

To the Editor,

We have read the article by Keskinler et al. (1) with great interest. We would like to comment that analysis, results, and the conclusion of the study does not fulfill the authors' original hypotheses. The limitation of this study, originally stated by the author as "The number of events was not enough to establish underlying risk factors for six patients whose ECG changes were accompanied by significant changes in troponin values," is in direct contradiction with the stated hypothesis of the author. A scientific study must test its originally stated hypotheses; otherwise, it will misdirect its readers into thinking that the originally stated hypotheses are true. In Table 5, we can see that nearly all the patients have elevated troponin levels at the time of admission (0.1(0.1-0.2) IQR) cut-off value troponin 0.034. The author states the concept of troponin elevation, meaning a rise in troponin levels from the levels at the time of admission.

More than half of the patients included in the study had a hip fracture (56/101). The author claims that the surgical procedure is the cause of elevated troponin levels; however, previously published studies show that the hip fracture itself is the cause of increased troponin levels (2, 3). In Table 7, troponin values, which are analyzed as an outcome variable, should have been analyzed as a continuous variable; the baseline troponin level should also be included in the regression model. The third universal myocardial infarction (MI) definition includes the following changes in ECG as a sign of MI: PR segment, QRS complex, ST segment, and the T-wave abnormalities (4). However, the authors included some nearly normal signs of ECG, such as atrial premature contractions, as a sign of abnormal ECG.

As a result, subgroup analysis of neutral studies may increase the probability of misleading conclusions. We sincerely look forward to these issues being resolved.

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### Author's Reply

To the Editor,

We are contented with the interest shown in our work. First of all, this is not an epidemiological study. We follow the definitions used in the guidelines. As it is clearly stated in the third universal definition of MI, detection of rise and/or fall is essential in the diagnosis of MI, and assay-specific change is recommended in the European Society of Cardiology's non-ST-segment elevation MI guideline. Therefore, diagnosis solely based on the elevated baseline value is not appropriate in most of the patients. We have presented regression analysis results for ECG changes and troponin positivity separately. What we wanted to express as a limitation was that we could not assess the risk and predictors of combination of troponin positivity and ECG changes because of low number of events.

Troponin values might be assessed as a continuous outcome variable or might be used as a dichotomous variable if the same dichotomization is also used as a diagnostic criterion, as in MI. We are sure that the authors writing the letter to our manuscript are also using troponin-positive or troponin-negative definitions based on specific values or changes, as it is recommended by the guidelines. Therefore, we do not think it is an important issue for this study. We agree that the baseline troponin values might be included in the model as an independent predictor. We tested the model after including the baseline troponin values. Although some minor changes in the number occurred, the main results and the conclusion did not change.

The author(s) of the letter missed the main point in terms of ECG changes. As we have stated, our primary aim is to assess the risk of perioperative MI. Moreover, we wanted to present the perioperative ECG changes. We defined some criteria as major ECG changes; however, premature contractions were not among the major changes. We do not see any concern about presenting the frequency of any kind of arrhythmias, including the benign ones. Moreover, we did not include premature contractions among the diagnostic criteria for acute MI.

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