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**PERIOPERATIVE
MYOCARDIAL
INFARCTION AFTER
HEART VALVE SURGERY,
WHERE ARE WE GOING?
Reply to the Editor:**



We are pleased to provide a response to the letter to the Editor entitled “Cut-off for High-Sensitivity Cardiac Troponin T Not Arbitrarily but Accordingly to Usual Clinical Practice,”¹ regarding our article previously published in the *Journal*.² In this letter to the Editor, Cubero-Gallego and colleagues¹ raised several important issues related to the combination of biomarkers with electrocardiographic (ECG) or transthoracic echocardiographic criteria to diagnose perioperative myocardial infarction (MI), the mechanism of perioperative MI after heart valve surgery, and the requirement of a stable baseline of high-sensitivity cardiac troponin T (hs-cTnT) before surgery to distinguish an acute event from a recent index MI.

First, we shall add a comment about the ECG approach because new 2017 European Society of Cardiology (ESC) guidelines for the management of acute MI with ST-segment elevation have been published.³ In these new ESC guidelines,³ patients with persistent ischemic symptoms and right bundle branch block should be considered to undergo an emergency coronary angiography and percutaneous coronary intervention if indicated.³ In our article previously published in the *Journal*,² ECG criteria for diagnosing perioperative MI after heart valve surgery included (1) new pathologic Q-waves and (2) new left bundle branch block, as suggested by the Third Universal Definition of MI to diagnose MI after coronary artery bypass grafting.⁴ Therefore, the incidence of perioperative MI after heart valve surgery reported in our article might be higher on the basis of the new ESC guidelines,³ because the onset of new right bundle branch block after heart valve surgery was not considered as an ECG criterion of perioperative MI.

Cutoffs for hs-cTnT and creatine kinase isoenzyme MB for diagnosing perioperative MI after heart valve surgery were reached at our study following a rigorous

methodology according to usual clinical practice^{1,2} and the Third Universal Definition of MI.⁴ However, the elevation of biomarkers is a frequent finding in the perioperative period of uncomplicated heart valve surgery, which could be due to several factors related to direct trauma of the myocardium, inadequate cardioprotection, and reperfusion injury.¹ Another clinical scenario where high levels of hs-cTnT have been reported is in patients undergoing noncomplicated cardiac surgery with end-stage renal failure.⁵ The interference of renal function with hs-cTnT levels might be explained because troponins are large macromolecules that are small enough to be cleared by healthy kidneys, but renal impairment leads to clearance decrease.⁵

Patients undergoing cardiac surgery are usually under treatment with drugs that may remove ischemic symptoms. Therefore, criteria for diagnosing perioperative MI after cardiac surgery should be based on the elevation of biomarkers (requiring a stable baseline of hs-cTnT before surgery) and following the new cutoffs for hs-cTnT and creatine kinase isoenzyme MB provided by Cubero-Gallego and colleagues,^{1,2} with enzymatic curves suggestive of ischemia, peak values reached at similar times for spontaneous MI, and ECG or transthoracic echocardiographic criteria (the onset of new pathologic Q-waves or new bundle branch block,^{3,4} or the imaging evidence of new wall motion abnormality).^{2,4}

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**WORKING TOWARD AN
EVIDENCE-BASED
CUTOFF
RECOMMENDATION
FOR MYOCARDIAL
INFARCTION DETECTION
AFTER CARDIAC SURGERY**



Reply to the Editor:

In answer to the letter of Cubero-Gallego, Heredia, and Tamayo commenting on my editorial in the *Journal*,¹ 4 points should be highlighted:

1. A combination of electrocardiography and transthoracic echocardiography is indeed more specific, with a high negative predictive value, but it lacks sensitivity that could be compensated for by a high-sensitivity cardiac troponin T assay. Because the electrocardiography and transthoracic echocardiography were used in the study of Cubero-Gallego, Heredia, and Tamayo as the triage or screening for patients with myocardial infarction, the high-sensitivity cardiac troponin T assay was not useful to provide sensitivity to the screening used.²
2. The results obtained in the work of Cubero-Gallego, Heredia, and Tamayo are derived from a small, single-center clinical trial designed by that group and consequently are not arbitrary, as it was the cutoff recommended by the third universal definition of myocardial infarction.³ The high-sensitivity cardiac

- troponin T assay was, however, not used as it should be for a high-sensitivity assay.
3. There is some confusion regarding what constitutes “strong evidence-based medicine.” Usual clinical practices, although important in clinical situations in medical centers, in general constitute weak evidence. Clinical trials, such as the ones published by Cubero-Gallego, Heredia, and Tamayo, will constitute much better evidence toward the construction of stronger, more reliable evidence-based medicine.⁴
 4. The better time point within 3 hours after cardiac surgery, I suggested, needs to be determined, as pointed out by Cubero-Gallego, Heredia, and Tamayo. It is an interesting study that they could undertake, aiming to determine what would be the earliest and reliable myocardial infarction detection time point in patients subjected to cardiac surgeries.

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