LETTERS TO THE EDITOR

Comparison of Troponin T and Creatine Kinase-MB Fraction in Evaluating Cardiac Patients Postoperatively

Dr. Januzzi and colleagues in a recent study (1) published in the Journal suggest replacement of creatine kinase-MB fraction (CK-MB) with serum troponin testing for postoperative evaluation of the cardiac surgical patient. An important point to remember is the release pattern of these markers. Although the rise (CK-MB 4 to 8 h; CK-MB isoform 2 to 6 h; cardiac troponin I [cTnI] 4 to 6 h; cardiac troponin T [cTnT] 4 to 8 h) and peak (CK-MB 12 to 24 h; CK-MB isoform 18 h; cTnI 12 h; cTnT 12 to 28 h) are similar, the markers differ greatly in their return to normal (CK-MB 72 to 96 h; CK-MB isoform <24 h; cTnI 3 to 10 days; cTnT 7 to 10 days) (2).

Because of their prolonged elevation in the blood (up to 10 days), cardiac troponins may reflect a summation of preoperative, perioperative, and postoperative events, thereby limiting the ability to detect perioperative injury exclusively. In contrast, CK-MB and its isoforms have a more rapid clearance and return to normal more quickly, thus facilitating better timing of myocardial injury (3). The long circulating half-lives of the cardiac troponins make it difficult to distinguish new episodes of myocardial necrosis from earlier episodes (4,5). Hence, reinfarctions may be difficult to diagnose with the sole use of cardiac troponin assays, if the initial myocardial infarction (MI) occurred within a week of cardiac surgery. Subsequently, both CK-MB and cardiac troponins are concurrently useful and not mutually exclusive in the diagnosis of postoperative MI and reinfarction after coronary artery bypass graft surgery.

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REFERENCES


REPLY

We appreciate the comments of Drs. Chen-Scarabelli and Scarabelli. We agree that the distinctly different release kinetics of creatine kinase-MB (CK-MB) and troponin T (TnT) allow for complementary information in certain settings, particularly that of reinfarction. Indeed, it has been suggested that CK-MB be considered the marker of choice for the detection of reinfarction (1).

Though it was not the purpose of our study (2) to compare the prognostic role of cardiac markers among patients undergoing cardiac surgery soon after acute cardiac myonecrosis, among our cohort of 224 patients, 58 had TnT data available preoperatively. Of these, 26 had a level ≥0.10 ng/ml (at the time the conventional upper limit of normal for myocardial infarction [MI]). No clear association between elevated preoperative TnT and adverse postoperative outcomes was noted, nor did the elevation of preoperative TnT obscure the markedly powerful prognostic ramifications of marked elevations of TnT in the postoperative setting, which were independently prognostic, irrespective of preoperative TnT levels. This may be because the magnitude of TnT release identifying patients at risk for impending postoperative complications was so significant at each time point (with mean levels among complicated patients reaching nearly 9 ng/ml), compared to the generally lower levels of TnT released in the setting of most acute coronary syndromes. Given the small number of patients with elevated preoperative TnT in our study, however, it is impossible to characterize conclusively the comparative value of cardiac markers in this situation.

We agree that for the unusual circumstance of urgent cardiac surgery in the setting of a recent large acute MI, a cardiac marker with shorter serum existence such as CK-MB might be preferable for postoperative biochemical risk stratification. Finally, as we and others have demonstrated, the “expected” magnitude of TnT release following cardiac surgery varies between different procedures, and not all patients undergoing cardiac surgical procedures are expected to release large amounts of TnT (2–4). An example of this would be coronary artery bypass grafting without cardiopulmonary bypass, which is associated with significantly lower amounts of postoperative TnT release (3,4). In such patients, significant elevations of preoperative TnT might obviate the use of this marker for postoperative risk stratification. Nonetheless, for many, if not most patients undergoing cardiac surgical procedures, we believe that postoperative measurement of cardiac TnT affords superior prognostic information.

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