Management of patients with an evolving Q wave myocardial infarction or high risk unstable angina is now well defined and mandates rapid institution of therapy proven to reduce morbidity and mortality (1-3). However, optimal treatment of patients presenting to the emergency room with chest pain and low clinical risk is less clear and currently entails multiple approaches (4). These patients represent a continuing challenge of major magnitude because they comprise a majority of the 5,000,000 people presenting with chest pain to emergency departments annually in this country (5). With the development of the coronary care unit over three decades ago, it was advocated that all patients with symptoms suggestive of an acute myocardial infarction be admitted to these units (6). Inclusion of patients with compatible symptoms and no objective evidence of myocardial ischemia resulted in the admission of a population in which <30% ultimately had a diagnosis of myocardial infarction (7). It was also shown (8) that among such patients, a large group with a <5% probability of a cardiac event could be identified by clinical factors, such as type of chest pain, cardiac history and initial electrocardiogram (ECG). In a more recent report of >10,000 patients admitted for acute chest pain, those with a <1% likelihood of cardiac complications could be identified by the clinical presentation (9). The importance of the initial ECG alone as an indicator of risk is reflected by a complication rate >20-fold higher in patients presenting with chest pain associated with ECG abnormalities than in those with normal or near-normal ECGs (10).

The foregoing findings indicate that among patients presenting with chest pain, a low risk group can be identified in which intensive coronary care is neither indicated nor beneficial. Recognition of low risk is based on careful patient assessment and absence of objective evidence of clinical instability, of which a normal or near-normal ECG is a crucial element (4,7-10). These concepts have provided the basis for important alterations in the management of these patients, aimed at more rational cost-effective care, such as admission to a step-down unit (11) and observation in a short-stay unit (12). Other innovations include early triage of low risk patients by myocardial scintigraphy (13) or echocardiography (14) in the emergency department and early (15,16) or immediate (17,18) exercise testing. One of the most promising methods for identifying risk in patients with acute chest pain is the use of new serum markers of cardiac injury, of which the troponins have attracted considerable recent interest.

The cardiac-specific contractile proteins troponin I and T are highly accurate indicators of myocardial necrosis and are superior to creatine kinase-MB fraction (19,20). Both troponins have excellent sensitivity and specificity and can be measured by a simple, rapid method (21)—essential attributes of an effective diagnostic marker. The accuracy of troponins I and T has been confirmed in several large series of high risk patients with acute coronary syndromes (22-24). These results were recently extended by Hamm et al. (21) who demonstrated that negative troponin I or T values were associated with 30-day cardiac event rates of only 0.3% and 1.1% in patients with chest pain and ECGs without ST segment elevation, respectively. Hamm et al. concluded that negative values of either of the troponins, including one obtained at least 6 h after the onset of symptoms, permitted safe discharge from the emergency department. However, their results also indicated the need for greater caution in patients with ST segment depression on the initial ECG despite negative values for troponin I and T, because of short-term event rates that were not negligible (1.4% and 2.8%, respectively). Prudence is also dictated by recognition that, of 20 deaths during the 30-day study period, one (5%) occurred in a patient with negative troponin I tests, and four (20%) were in patients with normal troponin T values.

As reported in this issue of the Journal, Polanczyk et al. (25) investigated the value of troponin further in a representative, heterogeneous cohort of >1,000 patients presenting to the emergency department with acute chest pain. They confirmed the superiority of troponin I to creatine kinase-MB as a marker for myocardial injury. However, as the authors emphasize, negative troponin I values obtained during the first 24 h did not ensure a benign course. Of all patients with negative troponin I tests, 6% had a major cardiac complication, and in patients without a myocardial infarction and negative troponin results, major complications occurred in 5%. In addition, in the 94 patients with cardiac complications, only 47% had abnormal troponin I values. It was also found that the admission ECG was the strongest predictor for a major cardiac complication. Although troponin I was not an independent predictor of complications, an elevated value raised the risk of an event more than fourfold in patients with ECG ischemia. The authors conclude that their findings do not support the routine
use of cardiac troponin I for emergency department triage of patients with chest pain.

The studies of Polanczyk et al. (26) and Hamm et al. (21) demonstrate that the cardiac troponins should be applied judiciously in patients with chest pain presenting to the emergency department. In each investigation, serial measurements are fundamental, patient assessment is emphasized, and the pivotal importance of the initial ECG is confirmed. Both studies indicate that ECG ischemia increases short-term cardiac risk appreciably, irrespective of negative troponin values. It is not surprising that even a method as accurate as the troponins is imperfect in identifying patients who can be safely discharged from the emergency department. Limiting factors include failure to detect minimal myocardial injury, the need for serial measurements that include a point at least 6 h after onset of symptoms and inability to predict cardiac complications unrelated to myocardial ischemia. In this regard, Hamm et al. (21) restricted end points to myocardial infarction and death, whereas Polanczyk et al. (25) included events such as myocardial revascularization, which may be considered a management decision. Because the latter are not hard end points, they dilute the sensitivity of the test. At this time, the troponins may be regarded as an important addition to the history and ECG in the evaluation of low risk patients presenting to the emergency department with chest pain, but they should not be utilized as the sole criterion for this purpose.

References


