Identifying Patient Risk: The Basis for Rational Discharge Planning After Acute Myocardial Infarction

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Abstract. Variations in the management of patients with chest pain and acute myocardial infarction (MI) can significantly affect hospital length of stay and cost. Risk stratification of such patients, combined with data about effective therapies, provides the basis for developing rational guidelines for patient care that can improve efficiency while maintaining quality of care. Such standardized management approaches are often referred to as pathways or CareMaps. To be most effective in guiding hospital course and early discharge planning, risk stratification strategies must be applied early in a patient’s course with continuous updating. The process of identifying risk in a patient with acute chest pain occurs in two segments: assessing the risk of acute MI at presentation, and subsequently assessing the morbidity and mortality risk of patients diagnosed with acute MI. Identification of patient risk at presentation has been the subject of intense investigation. The history, physical exam, initial electrocardiogram, and cardiac enzymes are the mainstays of the process, but because of inherent weaknesses in this approach (>25% of acute MIs missed at the initial screening), several risk stratification models have been developed. To date these models have not been widely employed, however. Very sensitive early cardiac markers, such as troponin T, and the use of diagnostic echocardiography or cardiolite perfusion imaging during pain are also being investigated. Chest pain observation units are an alternate strategy and have obviated the need to admit many low- to moderate-risk chest pain patients. In these protocol-driven units, continuous physiologic monitoring and serial cardiac enzymes and electrocardiography over a 9–12 hour period refine the risk assessment. For the majority who “rule out,” the risk of subsequent MI or death is very low. Cost savings due to reduced length of stay and more efficient resource utilization are 63–76% compared with conventional ward or cardiac care unit management. For patients with acute MI, baseline characteristics, complications, and laboratory and diagnostic testing help define the risk of morbidity and mortality and guide management through the immediate post-MI phase and long term. Many models incorporating these features have been proposed for risk stratification after acute MI, and they have implications for both timing of discharge and necessary diagnostic testing. Savings by employing risk stratification to guide hospital course and discharge planning could be 30–44% in some patient groups. In conclusion, risk stratification models can facilitate early discharge planning, potentially reducing hospital stay, improving resource utilization, and reducing costs.

Key Words. risk stratification, discharge planning, care pathway, chest pain unit

Changes in the health care industry are prompting re-evaluation of the management of patients with coronary artery disease and clear or potential acute coronary syndromes. As the effort to control costs becomes increasingly important, reduction in hospital length of stay and more efficient resource utilization will be necessary. One way to meet these goals while maintaining quality of care is to uniformly apply the most efficient and effective management and treatment strategies available. The results of numerous clinical studies have documented beneficial medical and procedural interventions for acute coronary disease patients. Application of these results along with risk stratification techniques can be used to establish guidelines for the management of these patients. Continuous clinical risk assessment and the results of diagnostic testing may dictate modification of an individual patient’s course, but the presence of guidelines helps to minimize variances that can lead to increased length of stay and unnecessary costs. In this way efficiency is improved and quality is maintained, at the same time allowing flexibility in individual patient care. The discussion that follows will concentrate on strategies to optimize the care of patients with symptoms of acute ischemic heart disease through the use of risk stratification and critical pathways. Figure 1 presents an overview of how this process might be structured.

The process of risk stratification can be divided conceptually into two components: defining the risk of acute myocardial infarction in the patient presenting with acute chest pain, and estimating the risk of morbidity and mortality in the patient diagnosed with acute myocardial infarction. We will consider the strategy for initial chest pain evaluation and treatment using the protocol-driven chest pain center concept and the management of acute myocardial infarction using risk stratification to develop guidelines for efficient hospitalization and early discharge planning.

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Acute Chest Pain

Background

In the United States alone there are approximately 5.5 million visits to emergency departments each year for evaluation of acute chest pain [1]. About 60% of these patients are admitted, in many cases to cardiac care units (CCU), for “rule-out” of myocardial infarction. Only 10–15% of these patients ultimately have acute myocardial infarction [2–5] (only 30% of those admitted to an intensive care unit [6]), and as many as 19% of those admitted with a diagnosis of unstable angina have no significant coronary artery disease [7]. This diagnostic inaccuracy generates an estimated 1.6 million unnecessary hospital days and $600 million in hospital costs annually for rule-out of myocardial infarction [1]. Equally problematic, previous studies have suggested that 2–10% of chest pain patients sent home from the emergency department had acute myocardial infarction undetected on initial evaluation, up to 23% of which were fatal [2,4,5,8]. The medicolegal consequences of missed myocardial infarctions are substantial, accounting for >20% of the malpractice awards against emergency department physicians [9].

Most chest pain patients fall into a “grey area” of diagnostic uncertainty between clear ischemia or infarct and definite noncardiac chest pain. Because of the consequences of missed myocardial infarctions, physicians are under substantial pressure to admit patients with chest pain. It is this grey area population that accounts for not only the majority of missed myocardial infarctions but also the greatest proportion of unnecessary admissions. Thus, the implications for accurate risk stratification and efficient management of chest pain patients are enormous.

Risk stratification

Risk stratification of patients in the acute phase of chest pain in the emergency department is challenging. From the initial evaluation patients can be stratified as to their likelihood of underlying coronary artery disease based on the number of cardiac risk factors, baseline electrocardiogram (ECG), and description of chest pain as interpreted by the attending physician [10]. None of the variables, however, establishes the presence or absence of acute ischemia or myocardial infarction as the etiology of the chest pain. Further, the initial ECG is diagnostic of acute coronary ischemia only about 50% of the time, and initial