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Title: Chest Pain Observation Admissions and the Clinical Outcomes Throughout Hospitalization

Background:

Standard practices for patients who present to the emergency department with potentially ischemic chest pain routinely undergo initial testing with serial biomarkers as well as electrocardiogram (ECG). Low risk patients who have negative biomarkers as well as no signs of ischemia on ECG often are admitted for observation and often provocative testing. Additionally there is a known risk for preventable adverse events with hospitalization; examples include medication errors, infection and death to name a few. This study was designed to look at the incidence of clinically significant cardiac events during hospitalization in patients who were admitted initially under observation status; with the initial admitting diagnosis of chest pain. The primary end points of this study included: Myocardial Infarction, Life threatening arrhythmia, cardiac or respiratory arrest, and death. The hypothesis of the study was that the risk of major adverse cardiac events in patients who are evaluated in the emergency department (ED) for chest pain with two negative troponin biomarkers, as well as a nonischemic initial ECG is significantly lower than those who have at least one positive biomarker or sign of ischemia on initial ECG.

Methods:

A retrospective chart review analysis was done on 1243 patients who were admitted with primary admission diagnosis of chest pain at a community teaching hospital. Data was collected from June 13, 2012, through June 30, 2015. A single researcher reviewed all charts. Electrocardiogram was considered normal if there were no signs of ischemia; troponin biomarkers were considered negative below 0.04, per our laboratory reference range. Charts were reviewed for any clinically significant cardiac events during the patients' hospitalization including myocardial infarction, life threatening arrhythmia, cardiac or respiratory arrest and death as the primary endpoints. Additional secondary endpoints included non-cardiac chest pain, unstable angina, Atrial fibrillation, palpitations, malignant hypertension, congestive heart failure, and pericarditis amongst other discharge diagnoses. Descriptive statistical analysis was performed on collected data..

Results:

Of the 1243 patients reviewed, all patients were initially admitted under observation status; 17.9 percent were transitioned to inpatient during their hospitalization. Initial ECG 15.4 percent of the patients had ECG's concerning for ischemia. Cardiac biomarkers were separated into two categories, 3.5 percent of patients had a positive initial cardiac biomarker, whereas 6 percent had a positive second cardiac enzyme. Of the 1243 patients' 47 patients did not have a second set of enzymes completed during hospitalization. Patients with abnormal ECG but negative troponins, 20.1 percent of the patients had a non-cardiac cause of chest pain, while 73.3 percent with chest pain not otherwise specified; 5% of patients had pericarditis. Of the primary endpoints zero patients with abnormal ECG with negative biomarkers had myocardial infarctions, life threatening arrhythmia, or cardiac arrest but one patient died (0.1%) from respiratory failure. Data was then stratified into the category of patients with normal ECG with abnormal troponins. In this group, 24.1 percent of patients had non-cardiac cause of chest pain, 24.1 percent had myocardial infarctions, 31 percent with chest pain not otherwise specified, 3.4 percent with the diagnosis of coronary artery disease, 5.2 percent of patients with arrhythmia, and 3.4 percent of patients with atrial fibrillation specifically. Importantly, none of the patients with abnormal troponin and a normal ECG had life threatening arrhythmia, death, or cardiac arrest.

Conclusion:

Adult patients with potentially ischemic chest pain whom are admitted have an overwhelmingly low short-term risk for adverse cardiac events; when cardiac biomarkers are negative times two and no signs of ischemia is present on initial ECG. In our study, we found those with negative biomarkers in the setting of an abnormal ECG there were no patients with myocardial infarctions, life threatening arrhythmia or cardiac arrest. With positive biomarkers more patients were diagnosed with myocardial infarction, which is expected given the sensitivity of cardiac biomarkers. Of the 1243 charts reviewed the majority of patients were diagnosed with chest pain not otherwise specified, and non-cardiac chest pain. This supports the finding that admission for generally low risk patients is unnecessary. Cardiac biomarkers are key to evaluating risk for myocardial infarction and should be completed in the emergency department. This data is important to the treatment of patients who present to community hospitals where there is not a chest pain unit. The key to successfully treating patients with chest pain would allow for timely provocative testing and minimizing overall risk to patients. Data shows that risk of adverse cardiac events while hospitalized is practically nonexistent in low risk patients. The risk associated with hospital admission should be evaluated and a conversation between provider and patient should be held to plan timing of provocative testing as an outpatient.