

Critical Pathways for Chest Pain: Adding Efficiency to the Evaluation

Ng SM, Krishnaswamy P, Morrissey R, et al. Ninety-minute accelerated critical pathway for chest pain evaluation. *Am J Cardiol* 2001;88:611-7.

Study Overview

Objective. To evaluate an accelerated critical pathway for patients presenting to the emergency room with symptoms of coronary ischemia.

Design. Observational study.

Setting and participants. Consecutive patients presenting to the emergency room in a single Veterans' Affairs hospital with a possible diagnosis of coronary ischemia. Patients were excluded if they had been transferred from an outside hospital with a previously established diagnosis of myocardial infarction (MI).

Intervention. Patients were enrolled in 1 of 5 accelerated critical pathways, which triaged them to either the coronary care unit (CCU), the direct observation unit (DOU), the ward, or home. Entry into the critical pathway was based on the patient's history, electrocardiogram, and pretest probability for coronary ischemia. Serologic cardiac markers tested and incorporated in the pathway included myoglobin, cardiac troponin I, and creatine kinase-MB. These markers were drawn at 0 minutes and again at 30, 60, and 90 minutes after presentation. Results from these analyses were available within 15 minutes. Further laboratory testing was performed when deemed appropriate by the treating physician.

Main outcome measures. The main outcome measured was MI. The sensitivity, specificity, and positive and negative predictive values of the 3 cardiac markers used within 90 minutes of presentation were determined based on the number of MIs. Myocardial infarction was defined based on World Health Organization criteria, or, in cases that did not meet this definition, echocardiographic or angiographic features. A secondary outcome was CCU bed utilization. Patient records were reviewed 1 month after their initial presentation and charts were reviewed for ischemic coronary events or return visits.

Main results. 1285 patients were enrolled within the cohort, and 98% of them were men. 5.1% (66/1285) of patients were diagnosed with an MI and 10.7% (138/1285) were diagnosed with unstable angina. 4% of patients were directed to the ST-

elevation/MI pathway; 6% were directed to the ST-depression and unrelenting chest pain path; 38% were directed to the probable and possible unstable angina group; and 63% were directed to the noncardiac chest pain path. Using the 5 accelerated critical pathways and 3 cardiac markers, all 66 MIs were diagnosed within 90 minutes of presentation. For the MI patients, the 3 cardiac markers combined and used within 90 minutes of presentation had a sensitivity of 100%, a specificity of 94%, a positive predictive value of 47%, and a negative predictive value of 100%. More than 95% of patients with MIs were admitted to the CCU, and CCU utilization during the study period decreased by 40% ($P < 0.001$). 40% (508/1285) of the cohort was discharged from the emergency room with the decision to discharge being made prior to 90 minutes in 90% of these patients. 2.6% (13/508) of patients discharged from the emergency room returned to the emergency room during the following month. Only 1 patient (0.2%) presented with an MI.

Conclusion. An accelerated critical pathway for the evaluation of chest pain allows for accurate triaging of patients within 90 minutes of presentation.

Commentary

The inefficiency of the delivery system and the lack of standardization are major barriers to delivering high-quality care. Critical pathways can offer an evidence-based, standardized means of approaching medical care. However, few pathways have ventured to improve the efficiency of the delivery system. The study by Ng and colleagues seeks to implement an efficient and effective means of triaging patients presenting to the emergency room with chest pain to the appropriate level of care. Their results suggest that a 90-minute critical pathway incorporating point-of-care serologic testing is both safe and accurate in triaging chest pain patients.

However, there are many limitations to this study. The authors do not specify clear inclusion criteria, and almost all of the patients are men, which limits the generalizability of the study. The clinical criteria used within the critical pathway were not presented and can only be assumed to be subjective, which could limit the reproducibility of the study in other settings. At this particular institution, cardiac markers were avail-

able within 15 minutes; the lack of this particular technology at other hospitals could greatly influence the overall efficiency of the pathway. Furthermore, with a lack of controls it is difficult to determine whether the reduction in CCU utilization was related to the intervention or to temporal trends.

Applications for Clinical Practice

An accelerated critical pathway incorporating cardiac markers appears safe for triaging patients presenting to the emer-

gency room for chest pain. This pathway allowed all diagnosed MIs and most patients not requiring hospitalization to have triage decisions made within 90 minutes of presentation. However, further studies are necessary to determine whether this approach is cost-effective and useful in decreasing inappropriate hospital utilization.

—Review by Harvey J. Murff, MD

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