

CCU Admissions Cut by 40% With 90-minute Chest Pain Protocol

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EXECUTIVE SUMMARY

To avoid misdiagnosis of acute myocardial infarction (AMI), emergency department (ED) physicians often admit chest pain patients without MI to the coronary care units (CCU). Such unnecessary admissions cost an estimated \$10–\$13 billion annually in the United States. Dr. Alan Maisel and his researchers developed an accelerated critical pathway not only to improve patient flow in the ED and avoid misdiagnosis of Acute Myocardial Infarction (AMI), but also to reduce unnecessary CCU admissions. By incorporating Biosite’s Triage[®] Cardiac Panel, clinical history and electrocardiography into an accelerated care pathway, ED physicians reduced CCU bed admissions by 40%, detected 100 percent of AMI patients within 90 minutes of presentation and estimated the related cost savings to be nearly \$1 million annually.

SITUATION: NEED TO REDUCE UNNECESSARY CCU ADMISSIONS AND MORE RAPIDLY TRIAGE PATIENTS WITH CHEST PAIN

Twenty percent of malpractice awards against ED physicians involve the treatment of MI or myocardial ischemia.¹ As a result, ED physicians admit many non-MI patients to CCUs at an estimated U.S. cost of up to \$13 million per year.² Cardiac marker concentrations, which would improve the accuracy of triaging, have not been available soon enough to contribute to triage decisions.

“Admission of patients who are at low risk for acute coronary syndromes leads to excessive and often unnecessary hospital costs, whereas strategies that are too liberal lead to higher numbers of patients released with undiagnosed MIs.”³

— Dr. Alan Maisel and colleagues

OBJECTIVE: EVALUATE THE ACCURACY, SAFETY, AND ECONOMIC IMPACT OF AN ACCELERATED 90-MINUTE PROTOCOL

Dr. Alan Maisel and colleagues studied the performance of an “accelerated critical pathway” for evaluating patients with suspected coronary ischemia. The pathway used the patient’s clinical history, electrocardiographic (ECG) data, and results from Biosite’s Triage Cardiac Panel, a point-of-care test for myoglobin, troponin I (cTnI), and CK-MB.

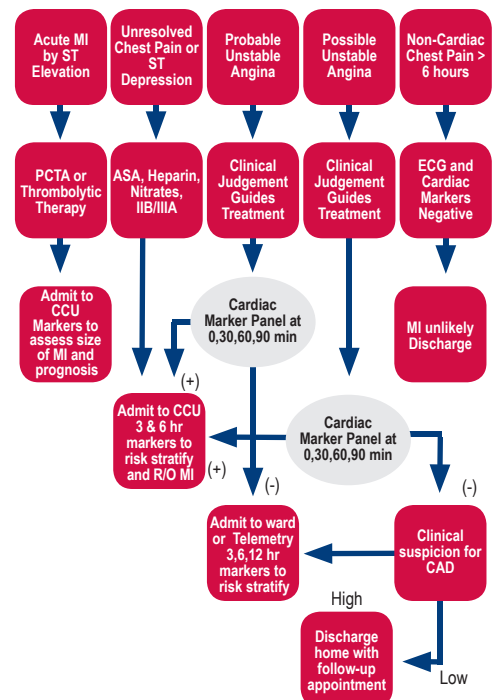
“The critical pathway in this study utilized a point-of-care measurement of three cardiac markers in addition to clinical criteria to triage patients to either the intensive care unit, the direct observation unit, the ward, or home.”³ —Dr. Alan Maisel and colleagues

PROFILE

Facility: San Diego Veterans Affairs Medical Center is a 238-bed facility affiliated with the University of California, San Diego. The VAMC and five community clinics provide medical, surgical, and rehabilitative care to more than 238,000 veterans.

- 20% of ED physician malpractice suits involve AMI
- \$10–13 billion spent annually in the United States for unnecessary CCU admissions

Accelerated critical care pathway for chest pain evaluation



METHODOLOGY: DETERMINE CCU ADMISSION RATES BEFORE AND AFTER IMPLEMENTATION OF ACCELERATED PATHWAY

To determine the impact of the accelerated critical pathway on CCU admission rates, Dr. Maisel and colleagues compared the admission rates before and after the accelerated pathway was implemented. Before implementation (the baseline period), the physicians were challenged to appropriately triage the patients to the CCU in a timely manner. Prior to the care pathway, cardiac markers were measured at 0, 2, 6, and 12 hours for 505 consecutive patients. When the 90-minute accelerated pathway was implemented, patients were admitted to the CCU according to specific clinical criteria. Cardiac markers were serially measured over a period of 90 minutes with the Triage Cardiac Panel for 1,285 consecutive patients. The number of admissions to the CCU with the 90-minute pathway were compared to the number of CCU admissions during the baseline period.

RESULTS: SIGNIFICANT REDUCTION IN LENGTH OF STAY & COST

*"The combination of all three markers, cTnl, CK-MB, and delta myoglobin, allowed 100% sensitivity at 90 minutes irrespective of electrocardiographic changes."*³ — Dr. Alan Maisel and colleagues

Using the 90-minute pathway, admissions to CCU were reduced by 40%. ED physicians diagnosed all MIs within 90 minutes of presentation. The new pathway also demonstrated 100% accuracy for the ruling out of MI, with only one patient returning with MI 12 days after the initial presentation.

*"Our estimated 6-month cost savings based on a typical 3-day stay for chest pain (one day each in CCU at \$2,160 per day, telemetry at \$1,400 per day, and the ward at \$650 per day) was \$496,000."*² — Dr. Alan Maisel and colleagues reported in an earlier study

Extrapolating this to a 12-month figure equates to \$992,000 in annual cost savings.

CONCLUSION

Using the accelerated pathway with multiple cardiac markers, ED physicians rapidly and accurately triaged 1,285 patients presenting with chest pain. The accelerated algorithm with multiple markers reduced hospitalization in costly monitored beds, allowed for better disposition to other inpatient beds, and safe discharge of appropriate patients not requiring inpatient care. Estimated cost savings were almost \$1 million annually.

REFERENCES

1. Maisel, A. Cardiac biomarkers aid in diagnosing ischemia and heart failure. *Cardiovasc Rev Rep*. 2001; 22:217-222.
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 3. Ng SM, Krishnaswamy P, Morissey R, Clopton P, Fitzgerald R, Maisel AS. Ninety-minute accelerated critical pathway for chest pain evaluation. *Am J Cardiol*. 2001; 88:611-617.
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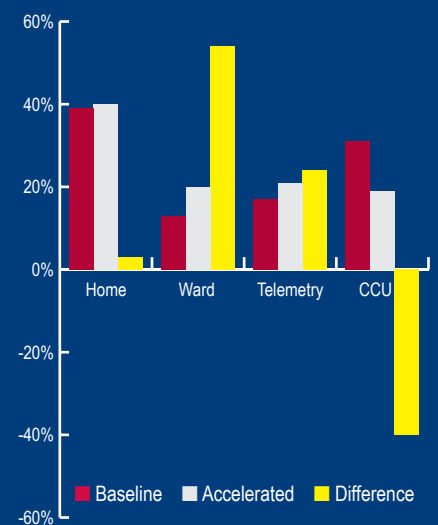
During baseline period:

- Physicians were challenged to admit patients into CCU appropriately
- Markers measured at 0, 2, 6, 12 hours

With accelerated care pathway:

- Specific criteria used for CCU admission
- Serial markers testing done over a period of 90 minutes for 1,285 patients

Impact of accelerated care pathway on CCU bed utilization



- CCU admissions cut by 40%
- 100% sensitivity and 100% negative predictive value for MI
- Multiple cardiac marker data necessary for rapid and accurate triage of chest pain patients
- Annual cost savings of \$992,000