DEM Journal Club

Article Appraisal

Article: Prospective Validation of a Clinical Decision Rule to Identify Patients Presenting to the Emergency Department with Chest Pain who can Safely be Removed from Cardiac Monitoring

Date of Journal Club: December 19th, 2017

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Background and Study Objective(s):

Chest pain is one of the most commonly encountered presentations in Canadian emergency departments. Many of these patients are placed on a continuous cardiac monitor to detect any potentially life-threatening arrhythmias. Cardiac monitors are a limited resource that need to be allocated to patients who most need them. This study aimed to validate a previously derived clinical decision rule called the Ottawa Chest Pain Cardiac Monitoring Rule to determine its safety and potential clinical impact in identifying chest pain patients who can be removed from cardiac monitoring in the emergency department.

Study Design:

This is a prospective cohort study completed at 2 tertiary care emergency departments of the Ottawa Hospital. It included adult patients > 18 years of age presenting to the emergency department with chest pain (or neck, back, shoulder, or abdominal pain that was suspicious for a cardiac cause), and who were placed on a monitor. The decision to place a patient on a cardiac monitor was made by the triage nurse with consideration of the patient's CTAS score, and ECGs were analyzed and classified by blinded investigators. The clinical rule states that patients can be safely removed from cardiac monitoring if they are chest pain free and have an ECG that is normal or has non-specific changes. The primary outcome was an arrhythmia requiring treatment within 8 hours of presenting to the emergency department, and the secondary outcomes included diagnostic characteristics of the Ottawa Chest Pain Cardiac Monitoring Rule, and 30-day morbidity and mortality.

Results:

15 (1.9%) of patients who were monitored had an arrhythmia requiring intervention, and all of these patients had abnormal ECGs as per the decision tree, and were placed on continuous cardiac monitoring. Of the 329 patients who were not triaged to cardiac monitoring, none of them had an arrhythmia detected. Since the decision rule detected all 15 arrhythmias with no patients missed, it had a sensitivity of 100% (95% CI 78.2-100%), and a specificity of 36.4% (95% CI 33.0-39.6). If the rule was applied as stated (i.e. to remove patients from monitoring who had already been triaged to a cardiac monitor), 36% of patients who were on cardiac monitoring would have been able to be safely

removed from monitoring during the initial physician assessment.

Validity of Results:

There are some questions about this study's validity, but some strengths of this study include that it is a prospective study with blinding of outcomes to investigators. During journal club, some questions were raised surrounding patient recruitment. Firstly, there was no mention of why 1069 patients of the initial 2560 patients screened did not meet inclusion criteria. Furthermore 9.7% of patients were not enrolled in the study due to physicians not completing the form. This may have resulted in selection bias. Additionally, since there is such a low incidence of arrhythmias in chest pain patients, there is a wide confidence interval around the point estimate of sensitivity (78.2%-100%). With such a low incidence of arrhythmia, a larger sample size might be necessary to conclude the rule's high sensitivity with good precision.

In addition, calling the study prospective is slightly misleading. The investigators did not apply the rule in a real world clinical situation, but applied the rule prospectively to data collected after derivation of the rule. Additionally, despite high sensitivity, the low specificity of the rule indicates that a positive rule does not discriminate well between patients who do and do not have arrhythmias: this should raise caution that the rule should not be applied more broadly than intended (to chest pain patients already triaged to a monitor). For instance, if applied generally to emergency department patients with chest pain, the result would likely be to increase the number of patients on monitors.

Generalizability of Results:

The baseline characteristics noted in Table 1 are representative of most Canadian emergency departments. However, the inclusion criteria (patients who were triaged to monitors) was based on triage nursing decisions that might be institution-specific. Completing both the derivation and validation studies at the same institutions limits external validity. External validity would be greater if the rule had been validated at multiple centers. Furthermore, while the ECG interrater reliability was high between blinded investigators, ECGs would ideally be read by emergency physicians.

The Bottom Line:

Stable patients presenting to the emergency department with chest pain who were initially triaged to a monitor, who are free of chest pain at the time of assessment, and have a normal ECG or an ECG with nonspecific changes can safely be removed from continuous cardiac monitoring. This study illustrates the low rate of serious arrhythmia in this patient population.

However, as the study did not elaborate specific criteria used by the triage nurses to triage patients to a monitored bed, it is unclear whether the practices in Ottawa are similar to those in our local emergency departments. Many patients with chest pain at BC Emergency Departments are not initially placed on monitors, and decisions to place patients on monitors may be revised based on initial troponin results or point-of-care testing available in certain BC emergency departments. Lab and point-of-care testing were not considered in the rule derivation or validation. Variabilities in local practice and limitations to the study's generalizability may impact the rule's local applicability.