Can Risk Score Alerts Improve Office Care for Chest Pain?

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Target Population: Adults, Heart Disease

Summary: Assessment of chest pain in ambulatory patients is challenging; high-risk patients may go undetected, while low-risk patients may be subjected to unnecessary evaluations. This randomized, controlled study implemented and evaluated an intervention to improve the treatment of primary care patients with acute chest pain in a large, integrated health care delivery system. The study used electronic alerts to risk-stratify outpatients with chest pain and presented the information to primary care providers (PCPs) in an electronic medical record (EMR). The intervention took place at Harvard Vanguard Medical Associates (HVMA), a multispecialty integrated group practice with 140 PCPs caring for approximately 300,000 patients at 14 centers in eastern Massachusetts. Since 1999, HVMA has integrated the Epic EMR system, a Certification Commission for Health Information Technology-certified product, into all aspects of ambulatory care within the organization, including point-of-care services, such as electronic order entry and reminders, and centralized functions, such as patient scheduling.

This study has important implications for optimizing the outpatient treatment for chest pain symptoms through the innovative use of electronic decision support, while documenting the cost implications of such a strategy. This work provides a model for how ambulatory practices across the country can use EMRs to present real-time patient risk information to clinicians with the goal of improving patient safety and quality, which has important implications for both acute and chronic care.

Specific Aims:

- Identify predictors—including race and sex—of risk-appropriate evaluation and treatment of patients presenting to primary care offices with acute chest pain. **(Achieved)**
- Determine whether rates of appropriate evaluation and treatment of patients with acute chest pain can be improved through the use of point-of-care electronic risk alerts that provide individual patient cardiac risk profiles and tailored evaluation and treatment recommendations to PCPs. **(Achieved)**
- Perform a cost analysis for the provision of electronic decision-support for patients with acute chest pain. **(Achieved)**

2010 Activities: At the start of the study, clinicians were surveyed on their risk perceptions. The survey results were analyzed and presented in a manuscript that described clinician risk thresholds and treatment strategies for patients with chest pain. This included analysis of provider demographics, size of patient

panel, and other factors to better understand their risk tolerance and corresponding approach to treatment for patients with chest pain.

The clinical trial was conducted and completed among 276 primary care clinicians across 14 ambulatory health care centers. The trial based its enrollment on complaint rather than diagnosis. As a result, a key component for the successful delivery of the intervention was training medical assistants to accurately identify patients presenting with chest pain, and enter a coded "chief complaint" of chest pain into the electronic record. This code was used as the electronic trigger for the delivery of the decision support tool, and ongoing training for new medical assistants continued through 2010.

The core of this intervention involved the delivery of electronic decision support to clinicians as they evaluated patients who presented with the problem of chest pain. The decision support is provided in the form of an electronic alert ("pop up") within the EMR. The project contracted with Epic Systems to build the decision support tool for this project. This involved creating specifications for calculating cardiac risk scores (Framingham Risk Score), and designing the interface with the electronic record. The "cardiac risk calculator" was incorporated into Epic's new standard software package for use beyond the project.

The evaluation of the impact of the intervention was completed in 2010, which included a separate assessment for high- and low-risk patients. For the former, a chart review of performance on EKG and administration of aspirin; for the latter, a review of use of exercise stress testing. The first charts were available for review in January 2009 and continued throughout the year. About 7,500 charts were reviewed and analyzed, and the team prepared a manuscript of the results for publication.

The third aim of the project was to perform a cost analysis of the provision of electronic decision support for patients with chest pain. The team estimated the costs of the intervention through collaboration and meetings with the project economist. Cost estimates were developed for individual components of the intervention, including the creation of data reports, chart reviews, electronic decision support, and treatment and evaluation costs.

Grantee's Most Recent Self-Reported Quarterly Status (as of August 2010): The project ended with all aims achieved and spending on target.

Impact and Findings: Initial qualitative findings from the project included learning how to better describe clinical care for patients in primary care with chest pain. This requires understanding the prevalence of conditions, the resources used, common mistakes, and patient demographics. The training of medical assistants yielded great improvements in coding accuracy. They achieved a 70 percent rate of correct identification of patient complaints when chest pain was the single patient complaint, and a 50 percent rate of correct identification when the patient had multiple complaints.

The average age of clinical trial participants was 50 years (± 13). Sixty-five percent were female, with 601 (20 percent) of all patients defined as high-risk and 2,402 (80 percent) of all patients defined as low-risk. Treatment strategies were somewhat more aggressive for high-risk patients than for low-risk patients, though the differences were not large, and the majority of cardiac stress tests were negative. Findings included identification of substantial variability between clinicians in evaluation strategies, including electrocardiogram performance, cardiac stress test performance, and emergency department referral. Acute myocardial infarction was uncommon (0.6 percent), but occurred more frequently among high-risk patients than to low-risk patients. Among the 16 (0.5 percent) patients diagnosed with acute myocardial

infarction, 15 (94 percent) had an electrocardiogram performed, four (25 percent) had an outpatient cardiac stress test performed, and six (38 percent) were mistakenly sent home from the primary care office. Acute myocardial infarction is uncommon among primary care patients with acute chest pain but it is commonly missed when present. Variability in current evaluation patterns suggest that better strategies are needed. The team expects to submit one paper describing the results of the clinical trial, a second paper on provider risk tolerance to patients with chest pain, and a potential third paper on the economic analysis.

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to support patient-centered care, the coordination of care across transitions in care settings, and the use of electronic exchange of health information to improve quality of care.

Business Goal: Implementation and Use