

RESEARCH LETTERS

HEALTH CARE REFORM

Physician Implicit Review to Identify Preventable Errors During In-Hospital Cardiac Arrest

The overall prevalence of preventable errors during cardiac arrests and their impact on survival are largely unknown, limiting efforts to improve quality of care during these events. To explore these issues further, we had physicians across 4 medical subspecialties—hospital medicine, emergency medicine, critical care medicine, and cardiovascular medicine—perform a structured implicit review to assess quality of care in 47 consecutive cardiac arrests due to ventricular arrhythmias among adults at our hospital between 2005 and 2007.

Methods. Complete medical records for each cardiac arrest were sequestered and randomly assigned to 2 reviewers, resulting in 94 reviews. The implicit review instrument we used was modified from a previously described instrument and is available from the authors.¹ Briefly, it consisted of a series of questions relating to specific aspects of care leading up to and during the cardiac arrest, including the reviewer's assessment that a preventable error occurred using a 5-point Likert scale (1, definitely; 2, probably; 3, uncertain; 4, probably not; and 5, definitely not). Reviewers also were asked how optimal care could have affected overall survival in patients with errors. We report rates of errors and interobserver agreement between reviewers using kappa (κ) statistics with 95% confidence intervals (CIs) generated from bootstrap resampling. Approval for this study was obtained from the University of Michigan institutional review board.

Results. The mean (SD) age of the population was 61.4 (17.3) years, and 64% were men. Comorbidities included myocardial infarction (n=16; 34%), metabolic electrolyte abnormality (n=9; 19%), renal insufficiency (n=19; 40%), and septicemia (n=5; 11%). At the time of cardiac arrest, 24 patients (51%) were on mechanical ventilation and 21 (45%) were receiving vasoactive agents. Thirty-two patients (68%) initially survived the cardiac arrest, but only 19 (40%) survived to discharge.

Reviewers believed that the cardiac arrest was definitely or probably preventable by better care in 9 patients (19%), although interobserver agreement was poor (κ statistic, -0.06; 95% CI, -0.20 to +0.13 [P=.74]). A preventable error was identified by at least 1 reviewer during cardiac arrest in 12 patients (26%). However, in none of these cases were both physician reviewers in agreement about the presence of a

Table. General Categories for Preventable Errors Identified in 94 Physician Reviews

General Categories	Reviews, No. (%)	Examples
Communication	3 (3)	No discussion of complex cases with other specialties involved
Education	20 (21)	
Delayed recognition	4 (4)	Persistent chest pain, not evaluated until patient coded
Misdiagnosis	7 (7)	Line sepsis not considered, difficulty determining fluid status
Inappropriate treatment	9 (10)	Inappropriate diuresis
Credentialing	3 (3)	Protocols not in place to recognize operative errors
Record keeping	21 (22)	
Inadequate inpatient record	8 (9)	No documentation of events leading up to inpatient cardiac arrest
Inadequate code sheet	13 (14)	No rhythm recorded until 16 minutes after code started
Implementation of ACLS	17 (18)	
Delayed defibrillation	2 (2)	Needed to defibrillate quickly
Inadequate chest compressions	3 (2)	No chest compressions documented between shocks
Inappropriate treatment	12 (13)	Patient not loaded on antiarrhythmic after multiple shocks

Abbreviation: ACLS, Advanced Cardiac Life Support.

preventable error, and interobserver agreement was again poor overall (κ statistic, 0.00; 95% CI, -0.18 to +0.19 [P=.51]). Reasons identified by the reviewers for errors before and during the cardiac arrest are listed in the **Table**. Of the 15 patients who did not survive the cardiac arrest, at least 1 reviewer believed that optimal care would have led to return of spontaneous circulation in 2 patients (13%). In both patients, however, the reviewer did not believe that optimal care would have affected long-term survival.

Comment. While physician implicit review has been used previously to assess quality of care in the inpatient setting,^{1,2} this study is the first, to our knowledge, to examine its role in evaluating cardiac arrests. Most notably, using this approach, we found that approximately 25% of cardiac arrests had preventable errors but that agreement between reviewers in identifying errors was poor overall. This is concerning since interobserver agreement with physician implicit review has been higher in other clinical settings.¹⁻⁵ Several factors may account for this finding, including the hectic and stressful nature of code situations and inability of the current inpatient medical record—particularly code sheets—for capturing important details around cardiac arrests⁶ like team dynamics, quality of chest compressions, or systems-level factors (eg, staffing). Finally, we demonstrated that even

when preventable errors are identified, reviewers believed that their occurrence had little impact on overall survival owing to the critically ill nature of these patients. Our findings have important implications for future efforts to measure and improve quality of care for cardiac arrests in hospitalized patients.

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HEALTH CARE REFORM

Perception of Drug Safety and Knowledge Influences Drug Selection

Since 1997, people have faced a constant barrage of direct-to-consumer television and print advertisements for prescription drugs, so it is conceivable that the term *drug side effect* would be understood by many Americans.¹ However, the degree to which the American public understands drug safety is unknown. We investigated the association between the level of self-perceived knowledge about drug safety and the impact of such knowledge on patient input when being prescribed a new prescription medication.

Methods. Harris Interactive's HarrisPollOnline (HPOL) was used to conduct a cross-sectional survey of adults in the United States that evaluated individuals' knowledge about drug safety, the importance they accorded drug safety knowledge, and their preference for active participation in prescribing decisions. Respondents provided free-text response to the question "What does the term drug safety mean to you?" Two authors (K.B.V. and S.L.W.) independently determined whether each category addressed a drug side effect or adverse drug events (ADEs), drug effects appropriate for the condition being treated (physiologic effects), both, or neither. To assess the respondent's level of knowledge about drug safety, we used a composite variable derived from 3 questions, each of which had a 5-level Likert response format to rate their knowledge about drug side effects, serious safety events, and drug-drug interaction. We also asked respondents to rank how important knowledge of drug side effects and drug-drug interactions was to them. By weighting respondent's knowledge of drug safety by its importance, we developed a 3-level categorical variable: low, medium, and high level of knowledge and importance (henceforth noted as weighted knowledge). Our primary outcome was whether the respondents preferred to choose the medications to be prescribed (as appropriate for their condition) or to have the physician select their medication. A secondary outcome was what occurred during the last physician-patient interaction when a medication was prescribed. We evaluated the following covariates for both confounding and effect modification: age, sex, race/ethnicity, education, previous ADEs, respondent-defined drug safety, and whether the respondent sought information on drug safety or was interested in participating in a drug safety monitoring program. We used logistic regression to estimate odds ratios for the 2 outcomes of interest.

Results. We included 1481 respondents, of which approximately one-third were aged from 18 to 39 years (one-third were aged from 40 to 54 years and the remainder were 55 years or older). There were slightly more women (n=807 [54.5%]) than men, and most were white (n=1099 [75.6%]).

Of the 1481 respondents, more than half (n=853) defined drug safety with respect to ADEs, and 611 (41%)