Tests ordered on the last day of hospital admission account for almost half of all test results that are not reviewed and for a larger proportion of abnormal test results that are not reviewed. Because patients are judged ready to go home on the day of discharge, most tests ordered that day are unlikely to change care and are probably not needed. However, if an important test result is required to guide care at discharge, providers need to figure out a process to ensure follow-up.

Deborah Grady, MD, MPH

**Use and Outcomes of Telemetry Monitoring on a Medicine Service**

Telemetry is a powerful tool for real-time monitoring of a patient’s heart rhythm and QRS pattern. Beds with telemetry monitoring are limited and expensive in most institutions; therefore, the use of this resource would ideally be evidence based. American Heart Association (AHA) guidelines provide class I, II, and III indications for the use of telemetry, but the focus is almost exclusively on cardiac diagnoses, such as admissions for rule-out acute coronary syndrome or heart block. However, there are far fewer data that describe criteria for the use of telemetry in a general medical population. In the largest study of telemetry to date, only 121 of 2240 patients (5%) who underwent telemetry were admitted with noncardiac diagnoses. We performed a study to better characterize the reasons why patients on a medicine service are placed on telemetry monitoring as well as the frequency of clinically significant telemetry events.

**Methods.** A prospective, observational study was conducted in 2010 and 2011 at the University of California, San Francisco, Medical Center, a large university-affiliated teaching hospital. The study was approved by the university’s institutional review board. We enrolled a convenience sample of consecutive adult patients who were admitted or transferred to the medicine service with telemetry monitoring on a single unit of the hospital. Each day, we asked the telemetry technician for new admissions and discharges from telemetry as well as the telemetry events for all patients whom we were tracking. For each new admission to telemetry, we administered a phone survey to the intern or the subintern who was responsible for that patient. Other clinical and demographic information was elicited from the electronic medical record system. Our primary outcomes of interest were telemetry events and management changes in response to telemetry events. A telemetry event was defined as any change in heart rhythm logged by the telemetry technician that was different from the admission heart rhythm. Management changes in response to telemetry events were identified by the primary team members when they completed the day-of-discharge surveys.

**Results.** During the study period, surveys were administered for 182 patients. The response rate was 73% for admission surveys and 74% for the discharge surveys, yielding a final sample of 100 patients for whom we had complete admission and discharge survey data. The mean patient age was 66 years; 53% of the patients were women; and 18% had do-not-resuscitate orders. The patients spent...
an average of 2.6 days on telemetry monitoring. The 3 most common admitting diagnoses were gastrointestinal bleeding (19%), renal failure (17%), and pneumonia (11%). Only 11 patients in our cohort met AHA class I indications for the use of telemetry. Most patients (57%) had no cardiac history. The initial rhythm for most patients was normal sinus rhythm or sinus tachycardia, and the most common telemetry events were sinus bradycardia, sinus tachycardia, and premature ventricular contractions. Four patients developed new atrial fibrillation or flutter. Nineteen patients had management changes in response to telemetry events. Because more than 1 intervention was possible per patient, 9 patients underwent diagnostic testing, 8 had medications changed, 7 had intravenous fluids administered, and 2 were transferred to the intensive care unit.

When asked why they chose to place their patients on telemetry, 50% of physicians responded “to detect clinical deterioration early” and 22% responded “concern for development of an arrhythmia.” Although our sample size and event rate were too small to draw meaningful statistical conclusions, neither the 2 patients who required transfer to the intensive care unit nor the 2 others who developed new atrial fibrillation or flutter met AHA class I criteria.

Comment. This study differs significantly from previous studies of telemetry in that the study population comprised patients who were admitted to a medicine service, not for a primary cardiac diagnosis. We found that very few patients had clinically meaningful telemetry events and even fewer had events that prompted a change in therapy. None of the patients who had significant events would have met AHA criteria for an indicated use of telemetry. This suggests that perhaps the AHA criteria, which were developed for cardiac patients, may not be applicable to patients with primary medical diagnoses.

Also, few studies asked physicians why they chose telemetry. We found that a concern for clinical deterioration, rather than an explicit concern for development of arrhythmia, drove most of the telemetry use. This finding is notable because telemetry does not replace more frequent vital sign checks or lower nurse to patient ratios and may lead both nurses and physicians to feel a false sense of security regarding their patient’s monitoring.

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COMMENTS AND OPINIONS

Behavioral Medicine Trial Design: Time for a Change

We read with great interest the recent editorial on the efficacy of motivational interviewing (MI) for improving medication adherence and thank the authors for drawing attention to the results of the recent Osteoporosis Telephonic Intervention to Improve Medication Adherence (OPTIMA) trial.2

The authors highlighted that “protocolizing” an MI intervention for large-scale implementation may undermine its effectiveness by moving away from its client-centered, individualized approach, and we agree. You cannot strictly protocolize an MI intervention and call it MI. Trials of MI must tailor the design of their interventions to remain faithful to the theoretical and practical underpinnings of MI.3 The fact that the OPTIMA trial included 10 sessions that each dealt with a specific (predetermined) educational topic suggests that the intervention may have been too structured, thus comprising the integrity of the MI content and the success of the trial.

The authors also acknowledged that while there may be no “magic bullet” for changing adherence behavior, they suggested that behavioral trials should focus primarily on mortality or other “hard” clinical end points and “not only on surrogates such as medication adher-