Sensitivity of Rhythm Disturbance Detection by Community Hospital Telemetry

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Telemetry is done in a variety of settings with different levels of sophistication. The American College of Cardiology has made suggestions for telemetry monitoring but these are not in place in many smaller community hospitals that do telemetry monitoring. The objective of this study was to compare prospectively telemetry without a dedicated monitor watcher or full disclosure to results obtained on full disclosure. Patients included were admitted to a single community hospital with an indication for telemetry as judged by their primary physician. Telemetry results reported by the hospital staff were compared to over-read of full disclosure traces by an academic cardiology service and the patient was used as his own control. Significant rhythm disturbances including pauses of 2 seconds or greater and short runs of ventricular and supraventricular tachycardia were frequently missed when a dedicated monitor watcher and full disclosure were not in use. When a dedicated monitor watcher and full disclosure are not in use, telemetry results should be accepted with caution and attempts should be made to improve monitoring.

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Telemetry monitoring is performed in widely different settings with significant differences in training and equipment. At an academic tertiary care hospital, a trained dedicated monitor watcher, sophisticated arrhythmia detection software, and full disclosure capability is the norm; however, a number of smaller hospitals do telemetry monitoring without the benefit of any of the above tools. We believe it is the general tendency of most physicians to accept medical data reported to them (such as results of telemetry) as correct; however, we hypothesize that there would be significant errors in telemetry reports from a hospital without dedicated monitor watchers, sophisticated arrhythmia detection software, and full disclosure capability and that some of these errors may result in changes in management if they were known.

METHODS

Telemetry performed at a small community hospital without a dedicated monitor watcher or full disclosure capability was prospectively compared to a gold standard of concurrent full disclosure monitoring and over-read by an academic cardiology service. At this hospital, telemetry is monitored by an RN (registered nurse) or an LPN (licensed practical nurse) who does not have particular training in telemetry monitoring. As in a number of other smaller hospitals, this duty is often shared by persons who have other responsibilities on the floor or in the emergency department.

Informed consent was obtained by one of the investigators from each patient who had telemetry ordered by their attending physician. The intent of the comparison was briefly explained and the patient was told that any results garnered from the

Table 1. Telemetry Reports

Patient Data	Hospital's Telemetry Report	Concurrent Full Disclosure Result
85-year-old male, heart failure, pacemaker	Paced rhythm, PVCs	AV sequential pacemaker, PVCs, PACs
80-year-old female; known A-fib, CAD, CHF	A-fib, <i>ST depression</i>	A-fib, <u>5 pause of 2 seconds</u> , rare PVCs <i>rare couplets of PVC'S</i>
83-year-old male, prior valve surgery, TIA symptoms, pacemaker	Paced rhythm, PVCs	AV sequential paced rhythm, PVCs, PACs
78-year-old female, non-Q wave MI diabetes, renal insufficiency, CHF	Sinus rhythm, occasional ventricular bigeminy	Sinus rhythm, PVCs bigeminal cycles, <i>couplets of PACs</i>
68-year-old male, severe COPD, <i>PACs and couplets</i> , severe dilated cardiomyopathy	Sinus tachycardia, <i>ST depression</i>	Sinus tachycardia, <i>occasional PVCs and rare 2 episodes of non-sustained VT</i>
54-year-old male, chest pain	Normal sinus rhythm	Normal sinus rhythm
84-year-old female, hyperkalemia	Pacemaker, some PVCs, some couplets	Pacemaker, <i>occasional PACs and PVCs both rarely in couplets, episodes of nonsustained VT and SVT</i>
80-year-old female, known pauses, known A-fib, TIA symptoms, known CAD	Irregular rhythm, some bradycardia, A-fib, <i>no pauses noted</i>	PVCS, <u>6 pauses up to 2.5 seconds</u>
79-year-old female, renal insufficiency hyperkalemia, diabetes	Sinus rhythm, some PVCs	Sinus rhythm, <u>7 beat run polymorphic VT</u> , rare PACs and PVC with rare couplets
70-year-old female, diabetes, hypoxia, pneumonia, CHF	Sinus rhythm	Sinus rhythm, rare PACs and PVCs

Telemetry reports from 10 patients at a community hospital without full disclosure, sophisticated arrhythmia detection, or a dedicated monitor watcher are shown along with gold standard results from concurrent monitoring with a full disclosure system that was over-read by an academic cardiology service. Differences in the reports are italicized—those considered to be serious are underlined. PVC = premature ventricular contraction; AV = atrial ventricular; PAC = premature atrial contraction; A-fib = atrial fibrillation; CAD = coronary artery disease; CHF = congestive heart failure; TIA = transient ischemic attack; MI = myocardial infarction; COPD = chronic obstructive pulmonary disease.

full disclosure monitor that were not noted on the hospital's routine telemetry monitoring system would be reported to the patient's physician in a preliminary fashion the following day. The patient's age, admitting diagnosis, and sex were recorded. Patients were intended to have 24 hours of concurrent monitoring, though they were disconnected if they were discharged sooner or if the attending doctor discontinued telemetry.

The telemetry results were obtained after the 24-hour monitoring period by asking the charge nurse on duty and copying any representative traces that were recorded over the day. The concurrent full disclosure results were read by an academic cardiology service that was blinded to the results of the hospital's telemetry report. Preliminary full disclosure results were conveyed to each patient's attending physician the following day.

RESULTS

179 hours and 53 minutes of telemetry recording were obtained. Results of telemetry as reported by the hospital and those determined by over-read of the concurrent full disclosure traces are reported in Table 1. At the hospital studied, telemetry reports frequently did not include significant events that occurred, including pauses of greater than 2 seconds, non-sustained ventricular tachycardia, and supraventricular tachycardia.

We believe on retrospective review that 5 of the 10 sets of recordings had rhythm disturbances not detected by routine monitoring without full disclosure that should have resulted in changes in management such as amendments to medications or referral for consultation with a cardiologist.

DISCUSSION

A problem with this report is that the data were generated at a single hospital; however, it is our belief that the results are not likely to be significantly different at other hospitals without dedicated monitor watchers, sophisticated arrhythmia detection software, or full-disclosure capability. Another problem with this study is that the number of patients enrolled and the total recorded telemetry time is not large; however, our intent is to simply highlight a potential problem with telemetry monitoring as it is done at the hospital we studied and at other similar small community hospitals.

We believe this article supplies useful information. Even though good models of quality telemetry are available, they are not always followed. We believe that many physicians practicing in community hospitals believe that telemetry results they receive are reliable, as they are accustomed to getting when they trained at academic centers. However this may simply not be true.

We believe that there are relatively simple solutions to the difficulties brought up by this comparison. They include: (1) use of a trained dedicated monitor watcher as previously suggested by the American College of Cardiology's Committee on

Emergency Cardiac Care,¹ (2) upgrading monitoring systems to include quality arrhythmia detection capability, and (3) smaller hospitals possibly using contracted telemetry monitoring services from larger hospitals that have dedicated monitor watchers. The American College of Cardiology's Committee on Emergency Cardiac Care has previously stated in regard to telemetry monitoring, that "there must be adequate human surveillance of the monitors 24 hours a day by medical, nursing, or paramedical personnel (monitor watchers) trained and qualified in the ECG recognition of clinically significant cardiac rhythm disturbances."¹ We are aware of a workable example of cooperation between a small hospital in Utah and a larger hospital's telemetry monitoring floor. In this case real-time telemetry is electronically transmitted to a dedicated monitor watcher's station at a tertiary care hospital. Any rhythm disturbances noted by the larger hospital's telemetry station are quickly called to the smaller hospitals nurses station to be certain that they are aware of the rhythm disturbance in question.

REFERENCE

1. Jaffe AS, Atkins JM, Field JM, et al. Recommended guidelines for in-hospital cardiac monitoring of adults for detection of arrhythmia. *J Am Coll Cardiol* 1991;18:1431-1433.