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The Use of Telemetry Monitoring Among General Medicine Patients

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BACKGROUND

Telemetry was introduced in hospitals during the 1960s to provide continuous cardiac monitoring in cardiac intensive care units (ICU). Over the last five decades, the use of telemetry has expanded beyond the ICU setting to non-critical care settings.[1] Concurrent with the broad application of cardiac monitoring, the American Heart Association (AHA) and American College of Cardiology (ACC) have published guidelines for appropriate use of non-ICU electrocardiographic (ECG) monitoring based on consensus opinion.[1,2] Despite the existence of these guidelines, numerous studies have shown that a significant number of non-ICU patients on cardiac monitoring do not meet appropriate indications, with a resultant low incidence of arrhythmias detected.

Inappropriate use of telemetry monitoring negatively affect patients, providers, and the hospital organization as a whole. Continuous ECG monitoring is expensive given the cost of equipment, maintenance, and supplies including batteries, paper, and monitor leads. It is also labor intensive - nurses spend an average of about 20 minutes per patient per day on telemetry-related tasks.[3] Telemetry monitoring is sometimes associated with unnecessary testing and intervention. The overutilization of non-indicated continuous ECG monitoring contributes to a system of waste in the hospital.

OBJECTIVE

To determine why and when general medicine non-ICU patients are upgraded from a non-telemetry level of care to telemetry monitoring at Thomas Jefferson University Hospital (TJUH). Comparison of the reasons for initiation of continuous ECG monitoring with the AHA and ACC guidelines would provide a greater understanding of the applicability of these recommendations to non-ICU general medicine patients. This information can provide guidance to identify areas of intervention to decrease inappropriate and/or overutilization of telemetry. The ultimate goal is to identify general medicine patients who are likely to benefit from continuous ECG monitoring, without negatively affecting clinical outcomes for those who do not receive cardiac monitoring.

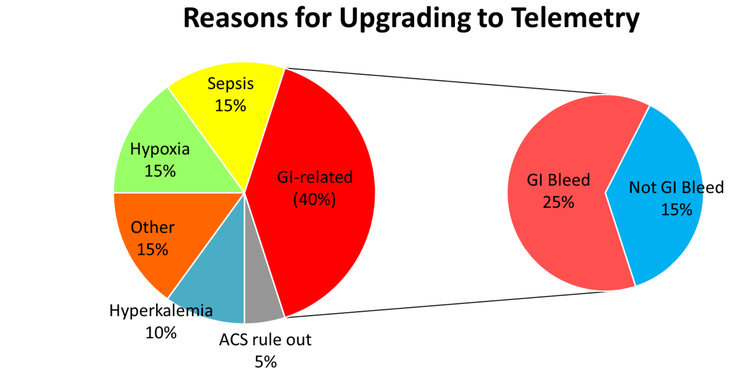
METHODS

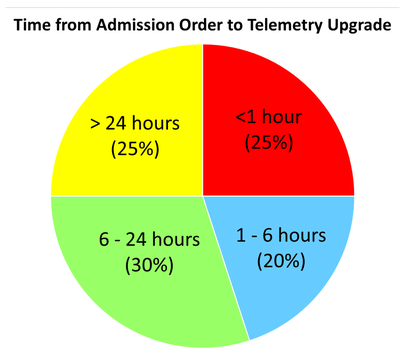
A prospective observational study was performed on patient who were admitted to TJUH from April 1, 2017 to May 12, 2017. We identified 20 patients who were initially admitted under "General floors" to one of the 7 general medicine teams, and subsequently had their level of care changed to "Telemetry". Data was collected on patients' demographics and past medical history; time and reason for changes in level of care; and clinical outcomes.

SIGNIFICANCE

The AHA and ACC guidelines for telemetry utilization focuses almost exclusively on cardiac diagnoses, thus limiting its application to a general medical population. In the current literature, no studies exist that examine the reasons for upgrading general medicine patients from the initial admission status of non-telemetry to continuous ECG monitoring during their hospital course. Such studies are relevant and important to better understand which general medicine patient populations benefit from telemetry, a tool that is designed to aid in the management of cardiac conditions, and to identify methods in which to decrease overutilization of a limited resource.

RESULTS





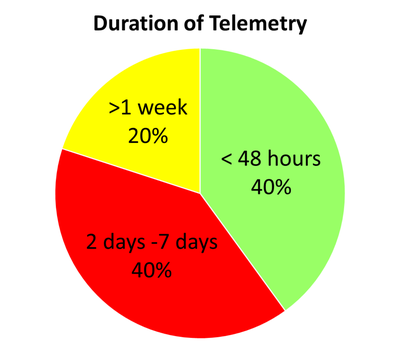


Figure 1 (Top). Reasons why patients' level of care was upgraded to Telemetry. Among the 20 patients identified, the majority of patients were upgraded for reasons related to the gastrointestinal system (40%, n = 8) – in 63% of these patients, there was concern for a gastrointestinal bleed. Only 5% (n = 1) of the patients was placed on telemetry given concern for acute coronary syndrome. The "other" category (n = 3) includes patients who were post-op from a pleurodesis with an arterial-line in place; in alcohol withdrawal; and found to have an acute deep vein thrombosis.

Figure 2 (Middle). Time from admission order (to General floors without telemetry) to order entry for Telemetry as the level of care. 75% of the changes occurred within 24 hours of admission. For the remaining 25% of patients whose level of care was changed after the first 24 hours, the time ranged from 49.5 hours to 245.3 hours.

Figure 3 (Bottom). Duration for which these 20 patients were on continuous ECG monitoring prior to a change in their level of care back to "General Floors" or discharge from the hospital. For the majority of patients (n = 16), telemetry was discontinued within 7 days from onset. For the remaining 20% of patients (n = 4) that had continuous ECG monitoring for greater than 1 week, the duration ranged from 7.7 days to 10.5 days, with an average of 9.6 days.

DISCUSSION

Most changes in patients' level of care to telemetry occurred within 24 hours of admission (75%, n = 15); and between the hours of 7PM and 7AM (40%, n = 8) when patients are cared for by the night float residents. An astounding 25% occurred within 1 hour of the admission order being placed. The least number of upgrades to telemetry occurred between 7AM and 12 noon when most teams are rounding on patients and/or engaged in patient-centered rounds. This suggests that to minimize multiple handoffs among providers within the first 24 hours of (e.g. when patients need to move to a new room with telemetry-capabilities), it is necessary for the admitting and accepting clinicians to more thoroughly discuss and agree upon the appropriate level of care.

Only 5% (n = 1) of the reasons to upgrade patients to telemetry met any indications per ACC/AHA guidelines. Interestingly, 15% (n = 3) were for hypoxia. Thus, it may be an economical investment to make non-telemetry beds capable of continuously monitoring patients' pulse oximetry. 15% (n = 3) of upgrades to telemetry were the result of a rapid response (RRT), but 1 was transferred to the intensive care unit (ICU) due to lack of telemetry-capable beds. The 3 RRTs were called for hypoxia; hypoxia with encephalopathy; and hypoxia with concern for acute bleed status-post recent thoracentesis. 10% (n = 2) of patients were transferred to the ICU for hemoptysis; and for worsening alcohol withdrawal.

50% of patients' telemetry strips were read as normal sinus rhythm (NSR). There was no comment about telemetry results on any of the progress notes or discharge summaries for 30% (n = 6) of patients. The remaining patients' telemetry (n = 3) was read as NSR with premature atrial complexes; sinus tachycardia; and v-paced with premature ventricular complexes.

CONCLUSIONS

Most patients in this small prospective chart review were upgraded from general floors to telemetry for reasons that do not meet an ACC or AHA guideline-supported indication. Among the 20 patients and cumulative total of greater than 1,565 hours of continuous ECG monitoring, no clinically significant arrhythmias were identified. Although a larger sample size is needed to yield a more accurate representation of why and when general medicine patients are upgraded to telemetry, this study has identified potential areas of intervention (investment in continuous pulse oximetry monitoring on non-telemetry units; greater discussion about level of care between admitting and accepting physicians) to decrease the overutilization of a limited resource.

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