Letters

low-dose techniques, and published recommendations alone are not leading to optimized doses. Our results highlight the urgent need for increased oversight of CT.

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LESS IS MORE

Potential of Missing Life-Threatening Arrhythmias After Limiting the Use of Cardiac Telemetry

We previously revised our telemetry protocol by using the American Heart Association guidelines, producing a 43% decrease in telemetry initiation.1-2 After determining that there was no increase in mortality, cardiac arrest, or activation of the rapid response team, we sought to ascertain the risk of missing life-threatening arrhythmias (LTAs) with reduced telemetry use. Life-threatening arrhythmias, such as ventricular tachyarrhythmias, are the primary rationale for using telemetry, and fear of missing them likely contributes to overuse. We studied the nature and clinical outcome of our telemetry alarms. We hypothesized that alarms representing LTAs are uncommon and that few alarms affect patient management.

Methods | In March 2013, we instituted a revision of non-intensive care unit telemetry that integrated the current American Heart Association guidelines3 into our electronic ordering system. Predefined criteria (developed internally at our institution and in use for many years before our telemetry protocol revision) categorized telemetry alarms as emergency or nonemergency. Alarm events were communicated from a central monitoring department to patient care units via telephone, and a detailed log of alarms was maintained.

We selected 2 periods—before (October 19, 2012, to November 19, 2012) and after (May 22, 2013, to June 19, 2013) revision—to retrospectively review alarm logs. We tabulated the total number of alarms and studied, in detail, a random selection of alarm logs. All alarms designated as emergency in these subgroups were then evaluated with a detailed medical record review, arrhythmia analysis, and determination of whether any change in clinical management followed.

Emergency alarms were divided into 3 classes: potential LTAs, clinically important alarms, and alarms of questionable importance. Management changes included transferring to an intensive care unit, beginning use of a new medication, ordering a diagnostic study, or activating a rapid response or
cardiac arrest team. The study was approved by the institutional review board at Christiana Care Health System. Informed consent was not required.

Statistical analysis was performed using the t test and χ² test.

Results | Emergency alarms were infrequent (Table 1). All alarm logs for 1323 and 1322 randomly selected patients from the periods before and after revision, respectively, were examined in detail. The total number of alarms, examined in detail, was 4106 and 3094, respectively. There was only 1 potentially LTA alarm (0.01%) of the 7200 total alarms in these subgroups (Table 2). This patient had a self-terminated ventricular tachycardia that lasted 32 seconds. Thus, there was not a single LTA for which telemetry led to an immediate treatment during the study period. Of the 78 emergency alarms, 29 (37.2%) were classified as clinically important. However, only 14 (48.3%) of these 29 alarms led to a change in clinical management within 1 hour. Most of these alarms were for rapid atrial tachyarrhythmia. Telemetry length declined after the revision due to prespecified durations.

Discussion | Even among the alarms designated as emergency, we found episodes of clinically important arrhythmias to be very infrequent, rarely leading to a change in patient management. Life-threatening arrhythmias were

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Table 1. Alarms Before and After Revision of the Continuous Cardiac Telemetry Protocol

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Total No. of monitored patients during study periods</td>
<td>2658</td>
<td>2036</td>
<td>NA</td>
</tr>
<tr>
<td>Total No. of alarms from monitoring department during study periods</td>
<td>8273</td>
<td>4647</td>
<td>NA</td>
</tr>
<tr>
<td>Total No. (%) of emergency alarms from monitoring department during study periods*</td>
<td>70 (0.8)</td>
<td>46 (1.0)</td>
<td>.47</td>
</tr>
<tr>
<td>No. (%) of monitored patients examined in detail</td>
<td>1323 (49.8)</td>
<td>1322 (64.9)</td>
<td>NA</td>
</tr>
<tr>
<td>No. (%) of alarms examined in detail</td>
<td>4106 (49.6)</td>
<td>3094 (66.6)</td>
<td>NA</td>
</tr>
<tr>
<td>No. (%) of emergency alarms examined in detail[95% CI]</td>
<td>42 (1.02) [0.99-1.05]</td>
<td>36 (1.16) [1.12-1.20]</td>
<td>.57</td>
</tr>
<tr>
<td>Mean (SD) length of monitoring per patient, d*</td>
<td>2.58 (8.64)</td>
<td>1.55 (1.45)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mean (SD) No. of alarms per patient*</td>
<td>3.1 (3.0)</td>
<td>2.3 (2.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>No. (%) of patients examined with no alarms*</td>
<td>341 (26)</td>
<td>397 (30)</td>
<td>.01</td>
</tr>
</tbody>
</table>

Abbreviation: NA, not applicable.

* P value obtained by χ² test.

b P value obtained by t test.

Table 2. Classification of Emergency Alarms

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Alarms</th>
<th>Before Revision (October 19, 2012, to November 19, 2012) (n = 42)</th>
<th>After Revision (May 22, 2013, to June 19, 2013) (n = 36)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potentially LTA, sustained VT, VF, and pause &gt;10 s*</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Telemetry alarm led to immediate treatment</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Telemetry alarm followed immediate treatment, problem detected by hospital staff before telemetry called</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Clinically important arrhythmia, rapid SVT and AF &gt;180/min, symptomatic heart rate &lt;35/min, pause &gt;5 s, second- or third-degree AVB, and recurrent NSVT</td>
<td>18</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Recurrent NSVT</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SVT, including AF with RVR</td>
<td>10</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Pause &gt;5 s, sinus, or AF</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Symptomatic heart rate &lt;35/min</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Transient second- or third-degree AVB</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Changes in patient management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telemetry alarm led to management change in 1 hour, SVT &gt;180/min</td>
<td>10</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Telemetry alarm influenced ultimate treatment decision, recurrent pause &gt;3 s, and recurrent NSVT</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Telemetry alarm did not lead to treatment or influence ultimate management decision</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Arrhythmias of questionable importance (eg, asymptomatic heart rate &lt;35/min with or without AF, or sinus pause of 3–5 s occurring during sleep or at rest, or details of alarms not available)</td>
<td>23</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: AF, atrial fibrillation; AVB, atrioventricular block; LTA, life-threatening arrhythmia; NSVT, nonsustained ventricular tachycardia; RVR, rapid ventricular response; SVT, supraventricular tachycardia; VF, ventricular fibrillation; VT, ventricular tachycardia.

* One episode of VT of 32 seconds was detected. It was self-terminated, asymptomatic, and without any need for treatment.
Physicians, faculty, and medical students should consider the benefits of an aggressive approach to diagnosing Parkinson disease (PD) with the dopamine transporter (DaT) scan. The DaT scan is a nuclear medicine imaging tool that reveals the distribution of the dopamine transporter in the basal ganglia and substantia nigra to assess the extent of neuronal damage due to PD. The scan is increasingly important in the context of disease progression, diagnostic challenges, and management decisions.

While the DaT scan is a valuable tool for diagnosing and staging PD, it is crucial to approach the use of this imaging modality with caution. The scan should be ordered and interpreted by a dedicated neurologist or a patient’s primary care physician with expertise in PD.

**Nonneurologists and the Dopamine Transporter Scan**

**To the Editor**

The clinical vignette described in “All My Husband Needed Was a Good Physical Examination” provokes the following observations:

1. The patient’s primary care physician should not have ordered a dopamine transporter (DaT) scan, which is only needed when a neurologist cannot distinguish essential tremor from a Parkinson disease (PD) tremor by history and examination.

2. The DaT scan concentrates over 42 mGy (4.2 rad) of ionizing radiation in the basal ganglia, which is precisely where a patient with PD can least afford to experience radiation damage. While healthy neurons are considered fairly resistant to the toxic effects of radiation, substantia nigra neurons in PD are already sick from the toxic effects of misfolded α-synuclein, which is likely to increase their radiosensitivity.

3. Nuclear medicine departments should require DaT scans to be ordered by neurologists, who can provide the most accurate estimate of pretest probability of disease and the best assessment of the necessity of the DaT scan.

4. The nuclear medicine industry should cease efforts to “educate” primary care physicians to obtain a DaT scan prior to sending the patient for a neurological consultation. No neurologist expects a primary care physician to order a DaT scan, which is inappropriate as ordering a myocardial perfusion study prior to obtaining a cardiology consultation.

5. Finally, a DaT scan should only be ordered in those rare cases where the outcome of the scan might lead to a significant change in therapy. The DaT scan should never be performed merely to provide documentation for a disability claim, which should be based instead on the clinical evaluation by a neurologist (preferably a movement disorders subspecialist).

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