

AACVPR Case Study: Henry Ford Hospital

Title: Electrocardiography Monitoring Based on Clinical Need

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Motivation and Operations

1. What was your motivation for implementing these changes in your program?

Research has shown that continuous electrocardiography (ECG) monitoring during supervised cardiac rehabilitation (CR) is of little value in low and moderate risk patients, and potentially only of moderate value in high risk patients. Matching the level of clinical monitoring to the patient's need allows a program to potentially enroll more patients per class, independent of ECG transmitters, thus improving access to care and reducing supply cost.

2. How long did it take to implement these changes?

After deciding to implement a policy of only ECG those monitoring patients during supervised CR who have a need for a higher level of surveillance, it only took a few weeks to get the staff to help develop an algorithm for deciding which patients would receive continuous ECG monitoring.

3. What staffing changes did you have to make in or to achieve these changes?

None. We continue to staff the CR program based on the number of patients per class with a goal patient/staff ratio of approximately 5:1 based on the individual needs of the patients.

Reflection on Process

4. What worked well?

We developed the following algorithm to assist staff in determining which patients should be continuously ECG monitored during supervised CR. We also inform patients when they begin the program that use of ECG telemetry will likely be discontinued within a few (e.g., 1-3) weeks, if their treatment is proceeding as expected. For some (not all) of the patients that are transitioned off of full-time ECG telemetry, a stress test is completed for the purpose of developing a target heart rate range (THRR).

Henry Ford Hospital ECG Monitoring Algorithm

1. All patients are continuously ECG monitored during their first six sessions of CR. Characteristics of patients who will be continuously ECG monitored throughout are listed in Table 1 of the supplemental materials.
2. Following six sessions of CR, patients without indicators for continued use of telemetry are transitioned to either monitoring exercise intensity using a heart rate watch, or guided by rated perceived exertion (RPE) only. Indications for continued

use of ECG telemetry are listed in Table 2 of the supplemental materials. Indicators for using RPE only to monitor exercise intensity are listed in Table 3 of the supplemental materials.

3. ECG telemetry may resume at any time during CR depending on the needs of the patient, and for as long as that need persists. Staff are encouraged to use their clinical judgement when making the determination of whether a patient would benefit from the use of ECG telemetry during any given session.

5. What were the opportunities for improvement?

To improve compliance to any scheduled stress test, we schedule the stress test for a day and time that the patient would normally be attending CR. This is also less burdensome for the patient.

6. How long have you been implementing these changes?

Since June 2016.

Future/Next Steps

7. Do you anticipate making any changes in the future to your current process?

The current process is working well, though there are always opportunities for incremental improvement. Increasing access to care is a major goal of the department and we continue to look for ways to streamline getting patients scheduled in to CR as soon as practically possible.

8. Do you have any supplemental materials you would be willing to share?

Table 1. Indications for CR patients to remain on ECG telemetry

1. Higher Risk Patients
 - a) Heart failure (HF) patients on positive inotropic agents
 - b) Patients with a left ventricular assistive device (LVAD)
 - c) Patients currently undergoing hemodialysis
2. Patients who have insurance providers that do not reimburse for non-monitored CR
3. Request from a physician to maintain ECC telemetry monitoring for a patient

Table 2: Possible indications to consider when deciding if continuing or resumption of ECG telemetry monitoring is needed for an additional 3-6 sessions or more

1. Observed or documented arrhythmias of the following
 - a) Sustained ventricular tachycardia (VT) (8+ beats)
 - b) Supraventricular tachycardia (SVT), relative based on symptoms and extent of SVT
 - c) Heart block or bradyarrhythmias
 - d) Non-sustained ventricular tachycardia (VT) (≤ 7 beats, relative based on symptoms and frequency of non-sustained VT)
 - e) Medically managed (no percutaneous intervention) myocardial infarction (MI)?
2. ST or QRS changes, such as ST depression > 1.0 mm during exercise (or additional ST depression of 1.5 mm if baseline abnormality is present)
3. Addition of an anti-arrhythmic drug (e.g. amiodarone, sotalol)
4. Signs or symptoms of new or worsening angina
5. CR patient with recent cardiac related admission to hospital who subsequently returns to CR

Table 3. Indications for CR patients to move to RPE only

1. Patients with claudication, orthopedic, or other non-cardiovascular conditions that are unable to perform moderate to vigorous exercise
2. Patients who are stable and demonstrate an exercise heart rate response < 15 beats above rest
3. Patients who, after given sufficient education and training, are unable to demonstrate an understanding regarding the ability to use a heart rate monitor
4. Patients who are stable and do not wish to use or will not benefit from the use of a heart rate monitor