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Review Article

Appropriate Usage of Continuous Cardiac Monitoring in the Inpatient Setting: A Literature Review

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Electrocardiographic monitoring (telemetry) in the inpatient setting has significant utility, but is constrained by rising healthcare costs, rare detection of significant events and potential for great alert fatigue [1, 2]. In 2017, the American Heart Association (AHA) published updated practice standards for telemetry monitoring that addressed overuse, appropriate use, alarm management and documentation in electronic medical records [3, 4]. Here, we review their recommendations for indication for telemetry utilization on the hospital floor. The rationale for arrhythmia monitoring is for diagnosis and management of arrhythmias, assessing for etiology of syncope, immediate recognition of sudden cardiac arrest to improve time to defibrillation, and catching sustained, life-threatening arrhythmias [5, 6].

In patients presenting with chest pain and indications for acute coronary syndrome (ACS), telemetry is warranted in the early phases (<24 hours) for intermediate- or high-risk non-ST elevated-ACS or ST-segment-elevation of myocardial infarction (STEMI), until ruled out [3]. Cardiac arrest is the leading cause of death among adults in the United States, and most common cause of death after MI [7]. In patients with myocardial infarction (MI), after cardiac arrest, during temperature management, vasospastic angina, apical ballooning syndrome or stress cardiomyopathy, telemetry is always appropriate [3, 4]. For patients who have had nonurgent PCI, it can be indicated if there were complications [3, 4]. Patients do not need telemetry if they had nonurgent

PCI without complications or have low-risk noncardiac chest pains (i.e. normal ECG and negative biomarkers) [3]. Multiple studies showed no benefit in detecting or predicting any lethal arrhythmias or sudden death, and greater than 99% false alarms in low-risk patients with chest pain [8, 9]. Any patient who is admitted for acute decompensated heart failure will need arrhythmia monitoring until the precipitating event is resolved (eg, volume overload, ischemia, anemia, progressive ventricular, respiratory or renal failure, hypertension, exacerbation of comorbidities, or infection) [3, 4].

For patients with new onset arrhythmias, telemetry is suggested for patients with ventricular tachycardias (VTs) post-resuscitation or hemodynamically unstable until ICD implanted, but only considered in non-sustained VT [3, 4]. New or recurrent atrial fibrillation (AF), hemodynamically unstable or symptomatic AF, those in ongoing rate control management, and those initiating new antiarrhythmic agents will all require continuous telemetry [3]. Hemodynamically unstable patients with congenital or genetic arrythmia patients and Wolf-Parkinson-White syndrome patients with RR intervals > 250 milliseconds risk developing ventricular fibrillation and should be closely monitored with telemetry [3, 4]. Telemetry is not indicated in patients with chronic AF unless if they were admitted for arrhythmias, clinically unstable or unable to take their medications [3, 4]. Telemetry is required for symptomatic sinus bradycardia, asymptomatic but receiving negatively chronotropic medications initiated and worsening sinus bradycardia [3, 4]. If they are asymptomatic and stable, admitted for other reasons, telemetry offers no benefit.

In patients presenting with heart block, it is important consider if they are symptomatic or asymptomatic, transient or permanent, and also the etiology of the block. Basically, any degree AV block requires telemetry [3, 4]. However, telemetry offers no benefit in those with benign conditions such as asymptomatic Wenckebach or vagal tone-induced AV block of any degree [10]. For surgeries, telemetry is appropriate in any patient needing and following open heart surgery, requiring mechanical circulatory support, major cardiac interventions such as valvuloplasty, complicated ablations, and recent transdermal pacing and implantation of permanent device [3, 4]. Telemetry is no longer required if patients are admitted to a rehabilitation facility or if they have an intracardiac device but are admitted for non-cardiac reasons.

In noncardiac surgeries, routine use of arrhythmia monitoring is not indicated for asymptomatic patients, unless major thoracic surgery through postoperative day three or with multiple risk factors for AF [3, 4]. Syncopal patients with suspected cardiac cause are vulnerable to arrhythmias, and stroke patients require telemetry to assess for intermittent AF or asymptomatic rapid ventricular response [4]. In one study on telemetry use, it was found that telemetry monitoring influenced the management decisions for syncope [11]. Severe to moderate magnesium or potassium imbalances warrant telemetry, as they can lead to AV blocks or ventricular arrhythmias [3, 4]. Concerning levels include moderate hypokalemia includes levels <3mEq/L or symptomatic with ECG changes, hyperkalemia ranging <6.5 mEq/L with symptoms or ECG changes, and magnesium deficiencies less than 1.3 mEq/L and severe elevations up to 6 to 10 mEq/L [3, 4]. Patients who have undergone drug overdoses that might affect the heart, be it psychotropic drugs, opiates, inhalants, cocaine, or other stimulants, telemetry is required until the patient is free of the influence of the drug and clinically stable [3, 4].

Telemetry may be ordered for patients with Do Not Resuscitate/Do Not Intubate, chronic obstructive

pulmonary disease (COPD) exacerbation and pulmonary embolism [3, 4]. For DNR/DNI, telemetry was harmful unless being used to trigger interventions consistent with patient wishes. While COPD exacerbation and stable pulmonary embolism patients were not mentioned in the guidelines, studies have shown that they were both found not to benefit from telemetry [12, 13]. No ventricular arrythmias were detected and no deaths were attributed to cardiovascular events [14, 15]. In summary, indications for inpatient telemetry monitoring vary in terms of severity of arrhythmia, clinical stability, adherence to medications and symptomatic presentation. However, the indications listed above for appropriate use are not absolute. Therefore, it is imperative to use clinical judgement to support your decisions regarding initiating and discontinuing telemetry.

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