

## ACC POLICY STATEMENT

# Recommended Guidelines for In-Hospital Cardiac Monitoring of Adults for Detection of Arrhythmia

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### Introduction

Cardiac monitoring was initially employed in coronary care units during the 1950s and 1960s. Today, it is more broadly applied in a variety of critical and noncritical care hospital settings. Although cardiac monitoring is required by the Joint Commission on Hospital Accreditation (1) in all critical care areas, it now is being used more frequently in noncritical care settings to improve patient care, reduce medicolegal risk and serve as a laborsaving device.

Despite nearly 30 years of in-hospital use of cardiac monitoring, only a few studies (2-9) have attempted to define its value and limitations. Most of those reports are of little relevance today, as newer, more specific and accurate arrhythmia recognition and alarm technology replaces earlier systems that were based on heart rate. In light of the expanding use of this technology, this document was developed for the American College of Cardiology by the Emergency Cardiac Care (ACC/ECC) Committee to provide guidelines for the application of in-hospital cardiac monitoring. Although such monitoring is often used to reduce medicolegal risk or as a laborsaving device, or both, the criteria proposed herein reflect medical rather than economic or personnel considerations.

### Process Used for Development of Guidelines

The method used to develop these guidelines was similar to that of a combined American College of Cardiology and American Heart Association Task Force that recently devel-

oped guidelines for ambulatory electrocardiography (10). A draft document was prepared by the ACC/ECC Committee with consultation from the ACC Committee on Electrophysiology and the ACC Committee on Technology. The committee membership at large reviewed, modified and approved the document. Officers and other responsible individuals in the American College of Cardiology reviewed, modified and approved the final document.

Because many different recording and analysis systems are in clinical use throughout the United States today, this document assumes that any cardiac monitoring system to which these guidelines apply accurately records, retrieves and displays cardiac electrical signals. These guidelines are intended to cover the use of in-hospital hard-wire and telemetry cardiac rhythm monitoring systems. They do not pertain to other forms of cardiac monitoring such as ambulatory electrocardiographic (ECG) (Holter) or ST segment monitoring devices used to detect myocardial ischemia.

The role of cardiac monitoring has changed dramatically in the last several years, and will continue to change. Future advances in technology and socioeconomic factors (e.g., shortages of nurses, hospital budgetary constraints, health care reimbursement procedures) will continue to influence the availability of cardiac monitoring and its subsequent use by the clinician. The American College of Cardiology recognizes that no set of guidelines can anticipate all possible clinical situations. Accordingly, the ultimate judgment regarding the use of any specific procedures or diagnostic tests remains the responsibility of the patient's physician or physicians.

### General Guidelines

The following guidelines apply to the use of cardiac monitoring in all clinical settings:

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1. 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. In general, the degree of human surveillance required is inversely related to the sophistication and reliability of the cardiac monitoring equipment used.

2. Appropriately trained physicians and nurses must be responsible for decisions regarding the use of cardiac monitoring in each hospital clinical area with these devices in use. These individuals must determine: a) the specific degree of monitoring surveillance that is appropriate for each clinical area; b) the minimal qualification and training standards of personnel assigned to monitor surveillance duties; c) the protocols and procedures for responding to common arrhythmias; d) the unit-specific indications for initiation and discontinuation of cardiac monitoring.

3. Adequate numbers of trained medical personnel (physicians or nurses, or both) must be present or immediately available to treat important, life-threatening arrhythmias detected by the system. The lack of available personnel to promptly detect or treat arrhythmias expeditiously should raise questions concerning the indications for surveillance.

### Clinical Indications for Cardiac Monitoring

No published clinical studies have established firm criteria for in-hospital cardiac monitoring. Accordingly, the following rating system was devised by the ACC-ECC Committee to classify the more common clinical conditions for which such monitoring is currently being applied. Assignment of common clinical situations to each of the categories in this document reflects the opinions of the ACC-ECC members.

**Class I.** Cardiac monitoring is indicated in most if not all such patients.

**Class II.** Cardiac monitoring may be of benefit in some patients but is not considered essential for all.

**Class III.** Cardiac monitoring is not indicated because the patient's risk of a serious arrhythmia is so low that monitoring is not of therapeutic benefit.

The ACC recognizes that, given the diversity of uses for cardiac monitoring, a comprehensive listing of the precise usefulness of monitoring in every clinical situation is impossible. There may be situations in which a patient in a class I category may not desire or require monitoring and other circumstances in which a patient in class III may be appropriate for cardiac monitoring because of the complexity of managing his or her medical problems. The period of time that cardiac monitoring serves a clinically useful purpose is highly variable and must be individualized by the clinician to meet each specific patient's needs. The guidelines are intended to begin to define the medical indications for in-hospital cardiac monitoring. They were not developed for use as guidelines for reimbursement, medicolegal considerations, quality assurance or the definition of when monitor-

ing can or should be used to substitute for medical or nursing personnel, or both. Such considerations are important but are beyond the scope of this document.

Guidelines classifying the use of cardiac monitoring for a variety of common clinical situations follow:

#### Class I

Cardiac monitoring is indicated in most if not all patient in this group. This category includes all patients who are a significant risk of an immediate, life-threatening arrhythmia.

1. Early hospital phase (from arrival in the emergency department through the 1st 3 days) of patients with initially suspected and subsequently proved acute myocardial infarction. This period will be longer for patients with clinically important complications (e.g., significant arrhythmias, conduction defects, silent ischemia, pump failure, shock). In general, patients with such complications need to be monitored for  $\geq 2$  days after the complication has been corrected or controlled (see class II).

2. Patients suspected of having acute myocardial infarction on the basis of clinical or ECG criteria, or both. Monitoring is continued until infarction can be excluded.

3. During surgery and early convalescence (postoperative care unit period and for the 1st 3 days) of all patients who have undergone cardiac surgery, including those who receive an automated internal cardioverter defibrillation (ICD) system. This period will be longer for patients with clinically important complications (e.g., significant arrhythmias, serious conduction defects, pump failure, shock). In general patients with such complications need to be monitored for  $\geq 2$  days after the problem has been corrected or controlled.

4. Patients who have been resuscitated recently from cardiac arrest or those documented directly or indirectly to be at risk for cardiac arrest (e.g., patients with Mobitz type II heart block or greater, new onset high degree heart block runs of sustained ventricular tachycardia or new onset intraventricular conduction defects).

5. Most critically ill medical or surgical patients requiring care in intensive care units. This group includes, but is not limited to, those patients who are in hemodynamically unstable condition or who are undergoing mechanical ventilation.

6. During the acute phase of management of patients who have been poisoned with drugs or chemicals at doses known or suspected to have cardiac arrhythmic toxicity (e.g. tricyclic antidepressants, phenothiazines, digitalis, antiarrhythmic drugs).

7. During the acute phase of myocarditis.

8. During initiation and loading of type I or type II antiarrhythmic drugs for potentially life-threatening arrhythmias in patients clinically prone to proarrhythmic effects.

9. Immediately after percutaneous transluminal coronary angioplasty for patients with complications of the procedure (e.g., coronary artery dissection or thrombosis). Monitorin

should continue until the patient's condition has been stable for at least 24 h.

10. Patients with unstable angina; monitoring is continued until the patients is in stable condition (not necessarily pain free).

11. Patients with high risk coronary artery lesions (e.g., high grade left main coronary artery disease or its equivalent) who are candidates for, and who will undergo, urgent mechanical revascularization.

12. Patients treated for arrhythmias by catheter ablation.

### Class II

Cardiac monitoring may be of benefit in some patients but is not essential for all.

1. Patients with acute myocardial infarction after day 3, especially those suspected to be at higher risk for ventricular fibrillation such as those with anterior wall Q wave infarction, conduction defects or the complications of infarction indicated in class I-1. Patients with no complications, non-transmural events or nonanterior wall infarction are at lower risk.

2. Patients with potentially lethal arrhythmias several days after initial control of the arrhythmia.

3. Patients who, because of their underlying disease state, are deemed by the physician to be at significant risk for cardiac arrest, respiratory arrest or the development of hypotension.

4. Patients with clinically significant nonlife-threatening arrhythmias (e.g., atrial fibrillation) who, because of severe underlying cardiac dysfunction, are considered to be at increased risk for proarrhythmic effects during initial treatment with a Type I or a Type III antiarrhythmic agent.

5. Patients with suspected or proved hemodynamically significant paroxysmal tachyarrhythmias or bradyarrhythmias.

6. During the acute phase of pericarditis when myocarditis is not clinically evident.

7. Patients who are being evaluated for unexplained syncope or other transient neurologic signs or symptoms that might be due to a cardiac arrhythmia.

8. Immediately after percutaneous transluminal coronary angioplasty.

9. During the 1st 48 to 72 h, patients in whom a permanent pacemaker and lead system has been implanted.

10. Patients in stable condition after cardiac surgery.

### Class III

Cardiac monitoring is not indicated because the patient's risk of a serious arrhythmia or the likelihood of therapeutic benefit is low.

1. Postoperative patients who are at low risk, such as young patients after relatively simple uncomplicated operations that do not involve cardiopulmonary bypass.

2. Obstetric patients, except for those with significant medical (especially cardiovascular) conditions or those who develop the cardiovascular difficulties defined in class I or II.

3. Patients who have a terminal illness and who are not candidates for the treatment of arrhythmias that may be detected. Many, but not necessarily all patients with a "do not resuscitate" designation may fit into this category.

4. Patients who have undergone routine, uncomplicated coronary angiography.

5. Patients with chronic, stable atrial fibrillation.

6. Patients with stable asymptomatic premature ventricular contractions or nonsustained ventricular tachycardia who are hospitalized for reasons other than cardiac or hemodynamic compromise.

7. Patients whose underlying cardiac disease has been stabilized and who have had no arrhythmias on 3 consecutive days of monitoring.

### References

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