

**Medical Emergency (or Rapid
Response) Teams to Prevent
In-Hospital Cardiac Arrest**

Introduction

Mortality from in-hospital cardiac arrest remains high. The average survival rate is approximately 17% despite significant advances in treatments. Survival rates are particularly poor for arrest associated with rhythms other than ventricular fibrillation (VF)/ventricular tachycardia (VT) rhythms. Non-VF/VT rhythms are present in more than 75% of arrests in the hospital.

Many in-hospital arrests are preceded by easily recognizable physiologic changes, many of which are evident with routine monitoring of vital signs. In recent studies nearly 80% of hospitalized patients with cardiorespiratory arrest had abnormal vital signs documented for up to 8 hours before the actual arrest. This finding suggests that there is a period of increasing instability before the arrest.

Of the small percentage of in-hospital cardiac arrest patients who experience return of spontaneous circulation and are admitted to the intensive care unit, 80% ultimately die before discharge. In comparison, only 44% of nonarrest patients admitted to intensive care urgently from the floor (ie, before an arrest occurs) die before discharge.

Cardiac Arrest Teams (In Hospital)

Cardiac arrest teams are unlikely to prevent arrests because their focus has traditionally been to respond only after the arrest has occurred. Once the arrest occurs, the mortality rate is greater than 80%.

There has been a major shift in focus for in-hospital cardiac arrest over the past few years, with patient safety and prevention of arrest now the focus. The best way to improve a patient's chance of survival from a cardiorespiratory arrest is to prevent it from happening. For this reason recognizing clinical deterioration and intervening at once to prevent arrest are now being stressed. Rapid assessment and intervention for a number of abnormal physiologic variables can decrease the number of arrests occurring in the hospital. The majority of cardiorespiratory arrests in the hospital should be classified as a "failure to rescue" rather than an isolated, unexpected, random occurrence. This new thinking requires a significant cultural shift within institutions. Actions and interventions need to be proactive with the goal of improving rates of morbidity and mortality rather than reacting to a catastrophic event.

Rapid Response Systems

◆ **Rapid Response Team (RRT)**

Over the past decade hospitals in several countries have designed systems to identify and treat early clinical deterioration in patients. The purpose of these rapid response systems is to improve patient outcomes by bringing critical care expertise to ward patients. There are several names for these systems, such as medical emergency team (MET), rapid response team (RRT), and rapid assessment team.

◆ **Medical Emergency Team (MET)**

There are common basic components to all rapid response systems. Success depends on many factors. Initially success depends on activation of the MET by the floor or ward nurse or physician, who uses specific physiologic criteria to decide when to call the team. The following list gives examples of such “calling criteria” for adult patients:

- Threatened airway
- Respiratory rate <6 or >30 breaths per minute
- Heart rate <40 per minute or >140 per minute
- Systolic blood pressure <90 mm Hg
- Symptomatic hypertension
- Sudden decrease in level of consciousness
- Unexplained agitation
- Seizure
- Significant fall in urine output
- Nurse or provider concerned about patient
- Subjective criteria also may be used

The system is critically dependent on the primary nurse’s identifying and acting on the specified criteria to immediately summon the MET to the patient’s bedside. The MET typically consists of healthcare providers with critical care or emergency care experience and skills that support immediate intervention for critical care situations. The MET is responsible for performing a rapid patient assessment and beginning appropriate treatment to reverse physiologic deterioration and prevent a poor outcome.

Published Studies

The majority of published “before and after” studies of METs or rapid response systems have reported a 17% to 65% drop in the rate of cardiac arrests after the intervention. Other documented benefits of these systems are a decrease in unplanned emergency transfers to the intensive care unit (ICU), decreased ICU and total hospital length of stay, reductions in postoperative morbidity and mortality rates, and improved rates of survival from cardiac arrest.

The recently published MERIT trial is the only randomized controlled trial comparing hospitals with a MET and those without one. The study did not show a difference in the composite primary outcome (cardiac arrest, unexpected death, unplanned ICU admission) between the 12 hospitals in which a MET system was

introduced and 11 hospitals that had no MET system in place. Further research is needed about the critical details of implementation and the potential effectiveness of METs in preventing cardiac arrest or improving other important patient outcomes.

**Implementation
of a Rapid
Response
System**

Implementing any type of rapid response system will require a significant cultural change in most hospitals. Those who design and manage the system must pay particular attention to issues that may prevent the system from being used effectively. Examples of such issues are insufficient resources, poor education, fear of calling the team, fear of losing control over patient care, and resistance from team members.

Implementation of a rapid response system or MET requires ongoing education, impeccable data collection and review, and feedback. Development and maintenance of these programs requires a long-term cultural and financial commitment from the hospital administration, which must understand that the potential benefits from the system (decreased resource use and improved survival rates) may have independent positive financial ramifications. Hospital administrators and healthcare professionals need to reorient their approach to emergency medical events and develop a culture of patient safety with a primary goal of decreasing morbidity and mortality.
