

Rapid response systems: have we MET the need?

Chris Joyce and Colin McArthur

Preventable deaths are common in hospitals, both internationally and in Australia and New Zealand. The 1995 Quality in Australian Health Care Study showed that adverse events result in the death of 0.79% of patients admitted to hospital.¹ Over half of these deaths are preventable. In New Zealand, a similar study found that a preventable adverse event leading to permanent disability or death occurred in 0.87% of hospital admissions.² Extrapolating these event rates to all Australian and New Zealand hospitals implies over 10 000 preventable deaths each year. This is a major public health problem.

Cardiac or respiratory arrests in hospital are usually preceded by a period of significant physiological disturbance. It follows that, if systems were put in place to detect this physiological deterioration, and timely appropriate medical intervention occurred, some deaths might be prevented. This is the paradigm underlying the development of rapid response systems, exemplified by the medical emergency team (MET). METs have been instituted with great enthusiasm in many hospitals in Australia and New Zealand, despite limited evidence that they actually improve patient outcome.

A MET system involves both an afferent limb (triggering mechanism), and an efferent limb (rapid response by a physician-led team capable of advanced resuscitation). Triggering is usually by a nurse, who activates the MET when one or more of a standard set of calling criteria are met. The calling criteria relate primarily to the level of physiological disturbance in the patient. In this issue of the Journal (*page 205*), the MERIT study investigators show that, in hospitals where nursing staff have been well educated about the MET system and have a positive attitude to it, they are more likely to activate it.³ No matter how good the response, a system cannot work if it is not triggered appropriately. Where rapid response systems of any sort are used, effective education of those in a position to identify changes in a patient's condition is important.

What is the evidence about the effect of METs on patient outcome? Two study designs have been used. The first design measures an index of patient outcome (eg, rate of death per hospital admission), implements a MET system, then re-measures the index.⁴ Most — but not all — of the studies using this design suggest that METs may improve outcome. The problem is that this simple study design using historical controls may irretrievably weight the outcome in favour of new therapies.⁵ Perhaps the best demonstration of the need to be cautious in using the results of trials with historical controls is contained within the MERIT (Medical

Early Response, Intervention and Therapy) study.⁶ If one looks at the control hospitals only, and compares the baseline (historical controls) to the study period, then one sees a fall in the incidence of cardiac arrest and unexpected death; on face value, doing nothing improves outcome. Studies using historical controls cannot answer the question of whether METs improve outcome.

The second study design is the prospective cluster-randomised trial, with each hospital constituting a cluster. As METs are a hospital-level intervention, this is the most appropriate study design for assessing their effect, and was used by the MERIT study.⁶ This study did not find any effect of METs on the composite primary outcome of cardiac arrest, unplanned ICU admission or unexpected death. The study was significantly under-powered, so that a moderate treatment effect could not be excluded, and was confounded by the fact that nearly half the calls to the cardiac arrest teams of control hospitals were for events other than cardiac or respiratory arrest. It is unlikely that the MERIT study could be repeated with a sample of more than 100 hospitals — as the authors believe would be necessary to provide adequate power.

It is possible that METs could have beneficial effects that were not measured in the MERIT study. In this issue of the Journal (*page 151*), Jones and colleagues have shown that METs may have a significant role in the earlier identification of patients for whom a switch to comfort care is appropriate.⁷ Although changes in overall hospital mortality are hard to demonstrate, better provision of end-of-life care could be an important outcome of a rapid response approach to physiological deterioration.

What then for patients with physiological compromise for whom rescue is appropriate and likely to be effective? We are left with no good evidence about whether METs work, and no real prospect of such evidence being forthcoming. What should we do? It has been proposed that there is a case for implementing interventions that are low cost, low risk and easy to implement sooner rather than later, without waiting for the strongest level of evidence to emerge. However, this may not be the case with MET systems. Potential problems include inappropriate management because the MET is unfamiliar with the patient; diversion of attention away from underlying problems, such as inadequate staff levels on wards; diversion of MET doctors from their usual duties; conflict with the primary medical team; and diversion of resources for improving patient safety from other effective interventions.

The evidence supporting METs is weak. The search must continue for effective, evidence-based changes that we can make to our hospital systems to identify treatable sick patients early and to deliver effective therapy in a timely manner. We need to make “failure to rescue” a rare, historic disease.

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