Should hospitals have a medical emergency team?

The outcome of cardiac arrest on hospital wards is poor. Patient deterioration may be predictable since physiological derangements often precede cardiac arrest. Changes in basic observations may be evident in the hours prior; these may be amenable to scoring systems. It may be intuitive that early intervention may prevent undesirable outcomes such as cardiac arrest, death or critical care admission. Medical emergency teams (METs) respond to deteriorating patients as identified by such scoring systems. METs were first introduced into the Liverpool Hospital in Australia. The concept empowers ward nurses, and others, to summon critical care expertise rather than the traditional system of referral to the junior doctor of the patient's admitting team. This should enable the early application of critical care interventions, intensive care admission or follow up.

The case for medical emergency teams

Nine studies have looked at the introduction of METs. One of the earlier studies compared the first hospital with a MET to two hospitals with conventional cardiac arrest teams (Bristow et al, 2000). Although the incidences of death and cardiac arrest were unaltered, unanticipated critical care admissions were reduced. This led to several other studies. These were mostly in single centres, with before-and-after methodology. Some of these had significant flaws and not all demonstrated outcome benefits. However, two studies of the same MET appeared robust within the limits of this study design and suggested an outcome benefit.

Bellomo et al (2003) reported that the incidence of cardiac arrest was reduced following the introduction of a MET to the hospital-wide population. In the 4 months before introduction of the MET, there were 63 cardiac arrests and 37 deaths; in the 4 months afterwards, there were 22 cardiac arrests and 16 deaths. Both time periods had similar admission populations of around 2000. Total inpatient deaths were also reduced. Interventions performed were quite straightforward, and this has been the finding of others.

In their sister study, Bellomo et al (2004) looked at the MET applied specifically to postoperative major surgical patients. Following the introduction of the MET there was a significant reduction in the occurrence of pre-defined adverse events from 301 per 1000 patients to 127 per 1000 patients. There were relative risk reductions of around 80% for each of respiratory failure, need for renal replacement and severe sepsis. The reduction in postoperative deaths equated to a saving of around 23 lives per 1000 surgical admissions.

The case against medical emergency teams

While two single centre studies have found that METs did not improve outcomes, the large MERIT study (Merit Study Investigators, 2005) is methodologically the most sound. Twenty-three Australian hospitals were involved in the study where METs were introduced in a prospective randomized fashion to 12 hospitals. Data were collected for the 6 months before and after introduction. In hospitals where a MET was introduced, there was no improvement in the composite outcome of unexpected death, cardiac arrest and unplanned critical care admission: 5.3 per 1000 patients *vs* 5.9 per 1000 patients in the control hospitals. It also demonstrated that MET calling systems failed to identify sick patients. There were 611 unplanned critical care admissions from the wards in the MET hospitals, yet a MET call was only made for 209 (34%) of these patients. Only 313 (51%) had MET criteria documented more than 15 minutes before the event. For all events, within the preceding 15 minutes, a record of blood pressure, pulse and respiratory rate was only complete in 19%.

The study has been criticized and may have been underpowered. It was powered to detect a 30% reduction in the composite outcome from 3% to 2.1%, but the baseline incidence of the composite outcome was only 0.68%. There was also an unexpected reduction in events in control hospitals. However, even if statistical significance were reached, the magnitude of the difference is such that it is unlikely to have led to a clinically significant result.

Conclusions

Overall, there appears to be evidence of an absence of benefit of METs. There are a number of possible reasons for the apparent lack of efficacy:

1. The illness scoring criteria may not be appropriately sensitive and specific.
2. When the criteria are met, a call is not made. This lack of appropriate use has been commented on by several authors and was a finding of the MERIT study.
3. These systems summon a team but they may not be the appropriate personnel and they may not instigate appropriate treatments.
4. Any beneficial effects appear to be greater than the activity of the MET, suggesting that other factors are relevant. Bellomo et al (2003, 2004) discussed that introduction of their system involved a prolonged education package which may have accounted for the benefit seen. Might the answer be in the education of ward doctors to recognize critical illness and respond in a timely manner? **BJHM**

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