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Research papers

Early warning scores for emergency admissions

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ABSTRACT

Recent Department of Health reports and the increasing number of emergency admissions mean that our systems need to change so that patients who are seriously ill get the care they need. Collaboration between primary and secondary care trusts is needed to improve systems for the care of the sick patient at the time of admission.

Keyword: early warning scores

Introduction

A busy hospital is a dangerous place. Patients who apparently look well may be harbouring deteriorating vital signs. They may be in the wrong department for their condition, or waiting at home, due to lack of beds. They are probably being observed by a member of staff who has not been trained to recognise critical illness.

In April 1999, the Department of Health established a review of adult critical care services and invited an expert group to develop a framework for the future organisation and delivery of critical care. Its report was called *Comprehensive Critical Care*[1] and followed an influential Audit Commission report which emphasised the concept of 'patients at risk' – patients at risk of their condition deteriorating and even requiring critical care.[2] Better training of medical and nursing staff, early warning scores and the concept of 'outreach critical care' were advocated in these reports, which were published amid a wave of publicity about the lack of critical care facilities in the NHS. The Government ploughed millions of pounds into expanding critical care beds over the next few years.

We now have a new way of defining severity of illness. Patients are no longer classified by where they are, but by how ill they are.[3] The idea is that patients should receive the care they need, regardless of location, and the necessary resources mobilised. It surprises many people that the vast majority of cardiac arrests in hospital are predictable, and less than 10% of patients survive attempts at cardiopulmonary resuscitation (CPR). Schein *et al*'s paper described how 84% of patients had new complaints or documented deteriorating physiology (hypoxaemia, increased respiratory rate, hypotension, oliguria, new confusion) in the 8 hours before cardiac arrest.[4] Only 8% of patients survived CPR in this study. Other studies have reported similar findings and the lack of intervention in response to documented deteriorating physiology.[5] A well known paper by McQuillan *et al* showed that of 100 emergency admissions to the intensive care unit (ICU), only 20 were considered to have been well managed beforehand.[6] This and other studies have shown that patients who receive suboptimal care in the hours before admission to ICU have up to twice the subsequent mortality.[7]

The difference between suboptimal care and good care is actually very simple: giving the right oxygen, the right fluid and getting the right help at the right time. These basic skills, based on the A, B, C, D, E system of assessment and management are not taught at medical or nursing schools, and, surprisingly, there is little training along these lines for staff who deal with emergency patients.

Many patients would be horrified to know that if they were admitted to hospital with a life-threatening illness, they would be cared for in a system that fails to recognise and intervene if they deteriorate. This not only has implications for quality of care, but for resources too. In McQuillan *et al*'s paper, admission to ICU could have been avoided altogether in 41% of the patients who received suboptimal care.[6] UK

institutions which have developed early warning systems have demonstrated a reduction in ICU admissions, ICU and hospital mortality. David Goldhill, at the Royal London Hospital, reported a significant reduction in cardiac arrest calls and ICU mortality after the introduction of a 'patient at risk team' based in ICU.[8] Alison Pittard, at Leeds General Infirmary, demonstrated a reduction in emergency admissions to ICU, shorter ICU lengths of stay, reduced mortality, reduced re-admission rate and a reduction in cancellation of elective surgery, following the use of an early warning score, protocol and outreach team on selected surgical wards.[9] Trusts cannot ignore the need for systems, facilities and training which can reduce hospital mortality and utilise critical care beds more effectively.

Although there are many different variations of early warning scores in use it is probably the recognition of seriously abnormal physiology, however measured, and a protocol that requires inexperienced staff to call for help early that makes a difference, rather than the score itself. Previous research using a commonly used score showed that an early warning score of 5 or more was associated with an increased risk of death or ICU admission. Patients are more likely to score highly during the first 48 hours after admission to hospital.[10] Early warning scores are being introduced throughout UK admission units, and are useful both in terms of triage and communication between professionals. There is no reason why they cannot be adapted for use in community hospitals, nurse-led units, out-of-hours primary care centres and Emergency departments. The establishment of critical care networks means that the same score is used by several trusts within a particular area. The use of early warning scores at the interface between primary and secondary care is an area for research.

An example of an early warning score system is shown in Table 1. Each observation has a score and normal vital signs score zero. If the total score is 3 or more, a nurse has to observe the patient more closely; if the total score is 5 or more, a junior doctor is called to assess the patient; if the total score is 7 or more, a senior doctor is called to assess the patient. A senior doctor is also called if the junior doctor fails to attend within a specified time, or the patient fails to improve.

Currently, primary and secondary care trusts invest time and resources in basic and advanced life support training in case of cardiac arrest. Little is invested in training for a more common scenario – a sick patient. We need to create a culture in which seriously abnormal vital signs, rather than cardiac arrest (when it is too late) are considered an emergency.[11]

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Table 1 Example of an early warning score

Score	3	2	1	0	1	2	3
Heart rate (per minute)		<40	41–50	51–100	101–110	111–130	>130
Systolic BP (mmHg)	<70	71–80	81–100	101–179	180–199	200–220	>220
Respiratory rate (per minute)		<8	8–11	12–20	21–25	26–30	>30
Consciousness level			New confusion	A	V	P	U
Urine (ml/4 h)[a]	<80	80–120	120–200		>800		
O_2 saturations (%)	<85	86–89	90–94	>95			
O_2 therapy	NIV or CPAP	>10 l RB or >60%	Any O_2 therapy				

[a]Urine output is usually not included when patients first present
NIV = non-invasive ventilation; CPAP = non-invasive continuous positive airway pressure; 10 l RB = 10 l via reservoir bag mask; A = alert; V = responds to verbal commands; P = responds to painful stimuli; U = unresponsive

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CONFLICTS OF INTEREST

None.

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