Criteria for intensive care unit admission and the assessment of illness severity

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Abstract

Critical care expansion in the UK has increased in recent years, reflecting increased demand, yet bed occupancy remains high and there are significant difficulties in matching supply and demand. Expansion of ICU services outside the walls of critical care has involved the development of complex multidisciplinary outreach services who exist to support ward teams in caring for individuals who are critically unwell or have recently been stepped down from higher levels of care; there is increased evidence of their effectiveness in reducing mortality and preventing unexpected deterioration. Discharge of patients from critical care is also an area of controversy with conflicting evidence of increased mortality rates for those discharged prematurely or out-of-hours. Careful planning is involved with appropriate post-ICU care is critical to avoiding poor outcomes. ICU scoring systems allow comparison of outcomes between individual units and facilitate research but are unhelpful in predicting outcome for individual patients. Deciding which patients not to admit to ICU are frequently the most difficult decisions facing critical care staff. Many patients previously considered inappropriate for organ support may now be admitted pre-determined limits of treatment or to facilitate complex palliative care needs.

Keywords APACHE; critical care ethics; critical care scoring systems; early warning scores; ICNARC; intensive care society; levels of critical care; outreach; standardized mortality ratio

Introduction

The demand for critical care services has increased steadily over the past decade. Figures from March 2017 reveal a total of 4066 adult critical care beds across England, up from 3747 in January 2011.[1] Despite this increase in capacity, the same data also reveals a consistently high rate of bed occupancy of 85–90% as well as an increasing rate of cancellation for urgent surgery. In practice the lack of a critical care bed is a relatively common reason for postponing major urgent or elective procedures in many centres.

Admission to the intensive care unit (ICU) depends upon patient, disease and institutional factors. For example, the post-operative needs of two patients undergoing traumatic ankle fixation, one with severe chronic obstructive pulmonary disease on home non-invasive ventilation and another of a similar age without such comorbidity clearly differ despite a comparable surgical insult. Similarly, it is unfeasible to expect a patient undergoing major open thoracic aortic surgery to be cared on a ward immediately postoperatively. There are also significant differences in the ability of non-critical areas to provide care depending on institutional set-up; what may be adequately provided for in one hospital (e.g. monitoring for diabetic ketoacidosis in a medical admissions unit) may be beyond the capabilities of another due to equipment, staffing or capacity reasons. Admission should also consider the degree of reversibility of any precipitating illness and likely trajectory of patient care; inappropriate admissions are costly in terms of finance, emotional stress on patients and families and just allocation of resource.

Organization of care

The report 'Comprehensive Critical Care' recommends that classification focuses upon the level of dependency an individual patient needed, regardless of location.[2] This classification is reproduced in Table 1. Whilst this system is not universally employed nor nationally validated, it is referred to by a number of authorities as a useful way of defining the varying needs of the critically ill. A supplementary classification reflecting the most significant disorder has been proposed to identify patients requiring specialist investigation and treatment usually provided by tertiary centres; this is shown in Table 2. It is important to recognize that the level of care is not governed by the location of the patient, nor does it necessarily determine staff to patient ratios or equipment availability outside invasive mechanical ventilation. Guidance is, however, offered on these topics: consultant work patterns must deliver continuity of care, the consultant/patient ratio must not exceed the range between 1:8–1:15 and resident/patient ratio should not exceed 1:8.[3] Twice daily, consultant intensivist-led ward rounds are required by UK national guidance, including weekends and national holidays. The evidence would suggest that a 'closed' model of care, one where therapy is directed by a consultant intensivist who's responsibilities are dedicated to the unit provides the best outcomes for patients.[4]

Critical care exists within the continuum of primary, secondary and tertiary care as patients who become severely ill will be found in a variety of settings. Patients who are deteriorating or at risk of deterioration may be identified by ward-based teams and the appropriate referral pathways initiated. Those identified as levels two or three should be moved to a critical care area, as should those who are level one but at significant risk of deterioration to level three such as those with threatened airway compromise.

- Critical care is described using levels of levels of care depending upon the degree of support and observation requires.
- These levels range from zero to three, the lowest being standard ward care and observation with the highest what is traditionally thought of as intensive care.

Admission criteria

The report 'Comprehensive Critical Care' recommended that classification focus upon the level of dependency individual

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Definitions of organ support levels

Level	Description	Examples
0	Patients whose needs may be safely delivered on a ward within an acute hospital	• Fluid and antibiotic therapy • 2–4 hourly observations
1	Patients at risk of deterioration or who have recently been discharged from higher levels of care who may be safely cared for on an acute ward with additional input from critical care	• Risk of clinical deterioration • Epidural or regional anaesthesia techniques which require specific monitoring • Tracheostomy in situ without respiratory support • Continuous ECG monitoring with central telemetry and recording
2	Patients requiring closer monitoring or intervention including support for a single failing organ system, or enhanced post-operative care, or those 'stepping down' from higher levels of care	• Basic respiratory support, e.g. continuous positive airway pressure, non-invasive ventilation • High flow (> 30L/min) facial or nasal oxygen • Invasive arterial or central venous pressure monitoring • Need for repeated and frequent blood gas monitoring • Single/low dose vasoactive infusions
3	Patients requiring advanced respiratory support alone (i.e. mechanical ventilation) or basic respiratory support with support of at least two organ systems	• Combinations of the treatments above • Frequently, the requirement for continuous renal replacement therapy may only be performed in level three areas due to more favourable staffing ratios • Need for deep sedation (usually by drug infusion) to facilitate procedures, mechanical ventilation or control of epilepsy

Table 1

patients needed, regardless of location.[2] Whilst largely speaking, patients admitted with the ICU should have a reversible condition, the concept of futility is a difficult one to objectively quantify and those who may not previously have been considered suitable candidates for ICU care are now increasingly being admitted in certain circumstances. Examples include patients with multiple co-morbidities where specific limits of treatment are set, those with complex palliative care or pain management needs who cannot be managed satisfactorily on the ward and irretrievably ill individuals to facilitate organ harvest after cardiac or brain death. As such, 'hard and fast' rules about admission are extremely variable and depend upon institutional values and capabilities. Predicting death may be easy when it is imminent; similarly, predicting those who are unlikely to decline is often not difficult. The grey area between is where the intensivist frequently operates.

Early warning scores

Early detection, timeliness and competency of clinical response are major determinants of outcome in those with acute illness. Patients do not simply die unheralded; in the vast majority there is a period of increasingly physiological abnormality such as tachypnoea, hypotension and declining renal function that can be detected and treatment initiated. Over the past 20 years there has been an increasing recognition that care prior to ICU admission may often neglect simple management of airway, breathing and circulatory problems, oxygen administration and institution of monitoring. The term 'failure to rescue' refers to the inability of a healthcare system to recognize and reverse such deterioration. This may be due to a lack of taking observations, recording them, recognizing early signs of deterioration or communication of these concerns. They may also relate to inability to institute timely or correct treatment.

Denominators for specialist intensive care services

Suffix	Requirement
N	Neurosurgical care
C	Cardiac surgical care
T	Thoracic surgical care
B	Burns and plastics surgical care
S	Spinal unit care
R	Renal care
L	Liver care
A	All other specialist care pathways

Table 2

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