Correspondence Section

Contemporary definition of sepsis and the role of the Acute Medicine trainee in the management

Dear Editor,

We read with interest the review of shock by Rowe and Fletcher in the Acute Medicine Journal,[1] and would like to make some comments regarding the contemporary definition of sepsis and the role of the Acute Medicine trainee in the management of severe sepsis and septic shock.

The systemic inflammatory response syndrome (SIRS) was defined in 1992 as a means to aid a universal definition of sepsis[2] as quoted by Rowe and Fletcher in their review. There is an error in their criteria and the respiratory rate should be > 20 min-1 (as opposed to "> 24 min-1"quoted in the paper).

In 2001, the definition of sepsis was refined, and the SIRS component replaced with "general" and "inflammatory" variables[3] listed below:

General variables

Fever (Core temperature > 38.3˚C)
Hypothermia (Core temperature < 36˚C)
Tachycardia (heart rate > 90 min-1)
Tachypnoea
Altered mental state
Hyperglycaemia (plasma glucose > 7.7 mmol/l) in the absence of diabetes
Significant oedema or positive fluid balance (> 20 ml kg-1 over 24 hrs)

Inflammatory variables

Leukocytosis (white cell count [WCC] > 12 x 109/l)
Leukopaenia (WCC < 4 x 109/l)
Normal WCC with > 10% band forms
Plasma C-reactive protein > 2 standard deviations (SD) above the normal value
Plasma procalcitonin > 2 SD above the normal value

These variables are incorporated into the 2008 Surviving Sepsis Campaign guidelines[4] referenced by Rowe and Fletcher; this same document redefines sepsis as documented or suspected infection with "some" of these variables. The need to modify the definition for sepsis was based on the almost universal consensus that the existing SIRS criteria were exceedingly nonspecific, as well as the widespread clinical use of biomarkers of systemic inflammation (C-reactive protein and procalcitonin) to aid the diagnosis of sepsis.

Although initially seemingly more complex, this revised definition of sepsis incorporates many of the variables that modern clinicians use in the early evaluation of septic patients. We agree with the Surviving Sepsis Campaign that the classical SIRS criteria, although of historical interest, are not fit for purpose in either the current diagnosis or definition of sepsis.

Rowe and Fletcher also state in their review that in managing patients with septic shock, the competencies expected by acute medicine trainees are limited to adequate volume resuscitation, antibiotic therapy, and source control followed by referral to critical care. The current 2009 Acute Internal Medicine specialty training curriculum[5] states that trainees should possess the skills to implement Surviving Sepsis guidelines appropriately. The Surviving Sepsis Campaign 2008 guidelines[4] recommend that the initial 6 hour resuscitation should aim for endpoints that include measurement of urine output, mean arterial pressure, central venous pressure and central venous oxygenation saturations.

To achieve these endpoints within 6 hours, a combination of fluid therapy, vasopressor and inotropic support, and packed red cell transfusion is recommended.[6] This requires the skills of central venous access, arterial line insertion, invasive monitoring, and safe use of vasoactive medication. We believe that acute medicine trainees, in accordance with the Acute Internal Medicine curriculum, should be competent in these skills. While we agree ongoing management of patients with severe sepsis and septic shock should be in a high dependency environment, early goal-directed therapy should not be delayed pending intensive care unit admission and should ideally be started in the emergency department or acute medicine unit.

Yours faithfully,

Shiva Sreenivasan
Consultant acute physician, Gloucestershire Royal Hospital
Great Western Road, Gloucester GL1 3NN

Maria-Belén Espina
Consultant acute physician, Gloucestershire Royal Hospital
Great Western Road, Gloucester GL1 3NN

Louise Powter
Specialty registrar in acute and general internal medicine
Gloucestershire Royal Hospital, Great Western Road, Gloucester GL1 3NN

References

1. Rowe K, Fletcher SJ. The emergency management of the patient presenting with shock. *Acute Med* 2011; **10(2)**: 103–105.
2. Members of the American College of Chest Physicians/Society of Crit Care Med Consensus Conference Committee: American College of Chest Physicians/Society of Crit Care Med Consensus Conference: Definitions for sepsis and organ failure and guidelines for the use of innovative therapies in sepsis. *Crit Care Med* 1992; **20**: 864–874.
3. Levy MM, Fink MP, Marshall JC, *et al.* 2001 SCCM/ESICM/ACCP/ATS/SIS International Sepsis Definitions Conference. *Crit Care Med* 2003; **31**: 1250–1256.
4. Dellinger RP, Levy MM, Carlet JM, *et al.* Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2008 [published correction appears in *Crit Care Med* 2008; **36**: 1394 –1396]. *Crit Care Med* 2008; **36**: 296–327.
5. Specialty training curriculum for Acute Internal Medicine: Joint Royal Colleges of Physicians Training Board, London 2009. Accessed at http://www.jrcptb.org.uk/specialties/ST3-SpR/Docume nts/2009%20Ac ute%20Internal%20Medic ine%20(AIM)%20Curriculum.pdf on 30 June 2011.
6. Townsend S, Dellinger RP, Levy MM, *et al.*, editors. Implementing the Surviving Sepsis Campaign. Des Plaines, Brussels, and Land O Lakes: Society of Critical Care Medicine, European Society of Intensive Care, and International Sepsis Forum; 2005.

Correspondence Section

Authors' response

Drs Shreenivasan, Espina and Powter raise some important issues in the assessment and management of septic patients. We appreciate the correction of the respiratory rate component; the correct figure is 20/min as they suggest.

I do not think, however, we were suggesting that the SIRS criteria are particularly useful when assessing a patient with potential sepsis. They are, I agree, non specific and were principally created to introduce some consistency in definition when discussing sepsis and mainly for research purposes. They are still principally used here. The 'revised' clinical and laboratory indices are also non specific and were suggested as criteria to aid bed side diagnosis in the quoted (ref 3) 2001 conference. Interestingly the last paragraph of this report specifically states that no new definitions of sepsis were introduced. I do not think any of these 'criteria' substitute for clinical acumen and common sense. I will not discuss those purported to aid bed side diagnosis in detail but I think it reasonable to observe that septic patients presenting at the front door almost never 'report' a positive fluid balance of 20ml/kg or are oedematous. Similarly the laboratory indices of sepsis listed are mostly also non specific. I have never seen a laboratory WCC indicating % banded forms, CRP is a general indicator of inflammation but is not often immediately available and procalcitonin is not universally available.

The Surviving Sepsis campaign is vitally important but not without criticism. One particular point of note is the recommendation of blood transfusion to an Hb of 10g/dl. There is hard evidence that this is not best practice.

I fully agree with the need for acute medical trainees to have the skills to manage septic patients beyond the initial period. The introduction of Level 2 areas into AMU should facilitate this. The specific skills listed however will generally be acquired within a critical care placement and I would caution against the use of central venous monitoring and inotrope support in an environment with neither the staff competencies (including nursing) nor facilities to support this.

Simon Fletcher
Consultant in Intensive Care Medicine
Norfolk and Norwich University Hospitals NHS Trust