Pitfalls in the Treatment of Sepsis

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KEYWORDS

• Sepsis • SIRS • qSOFA • Medical errors • Emergency medicine • Critical care

KEY POINTS

- There have been recent changes in the diagnostic criteria for sepsis due to criticism of prior definitions.
- The diagnosis of sepsis is challenging in special patient populations (eg, the elderly, children, patients taking medications that alter typical physiologic responses).
- There is significant controversy in "bundled" care for septic patients because it is unclear which aspects are most helpful and which aspects may pose the potential for harm.
- The disposition of a septic patient out of the emergency department may be one of the most consequential decisions the treating clinician can make. It should be approached considering not only the patient's condition in the emergency department but also their likely trajectory following admission.
- Strong consideration for transfer to a higher level of care should be made if it is not clear the resources required for the severity of illness can be met at their present institution.

INTRODUCTION

Emergency departments (ED) and emergency providers (EPs) have a vital role to play in the treatment and management of septic patients. Indeed, presentation and admission via the ED have been associated with more favorable outcomes.[1,2] However, sepsis care in the ED has also been shown to have quality concerns, which include incorrect antimicrobial choice, delay to diagnosis, and failure to implement evidence-based treatments.[3–5] In this article, the authors describe potential pitfalls in ED sepsis diagnosis and treatment and how to avoid or mitigate them. It should be noted that to avoid redundant content, this is not exhaustive.

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DIFFICULTY IN DIAGNOSIS

Systemic Inflammatory Response Syndrome

The original definition of sepsis relied on the presence of 2 or more criteria outlined in the systemic inflammatory response syndrome (SIRS). In fact, the SIRS criteria acted as the building blocks for identifying and diagnosing sepsis, severe sepsis, and septic shock. SIRS incorporated changes in heart rate, body temperature, respiratory rate, and white blood cell count. If there was a known or suspected infection in a patient with 2 or more SIRS criteria, the patient was diagnosed with sepsis (**Box 1**).

It is known that systemic inflammation can occur in several different noninfectious conditions, decreasing the specificity of SIRS. **Fig. 1** illustrates the presences of SIRS in some of the more common noninfectious conditions, including trauma and pancreatitis.

A diagnostic error may occur when the clinician prematurely excludes the diagnosis of sepsis in a patient where one of these other noninfectious systemic inflammatory states is present. This premature closure may result in delayed identification and treatment of a concurrent infection. The converse is also true; not all patients with systemic inflammation are infected and, in these patients, antibiotics are not indicated. In the ED, the undifferentiated nature of the patient and lack of initial clinical data compound these issues.

In addition, a recent study showed that SIRS criteria also lacked sensitivity for defining sepsis. Diseases like sepsis that are associated with significant morbidity and mortality demand a highly sensitive screening tool for diagnosis. Kaukonen and colleagues[6] showed that 1 in 8 patients in the intensive care unit (ICU) with infection and organ dysfunction did not have 2 or more SIRS criteria. These SIRS-negative patients had a lower, but substantial, mortality associated with severe sepsis. Because of the shortcomings of the SIRS criteria as well as a better understanding of the pathophysiology of sepsis, the Sepsis 3.0 definition was developed.

Quick Sequential Organ Failure Assessment

It remains to be seen if the new sepsis definition will result in a more accurate and rapid diagnosis of sepsis. The authors of the new definition propose stepping away from using the SIRS criteria because they were considered to be unhelpful and confused both the adaptive and the maladaptive physiologic response to infection. They introduced the Quick Sequential Organ Failure Assessment (qSOFA) score

Box 1
Systemic inflammatory response syndrome

Two or more of the following:

- Temperature greater than 38°C or less than 36°C
- Heart rate greater than 90 beats per minute
- Respiratory rate greater than 20 breaths per minute or $Paco_2$ less than 32 mm Hg
- White blood cell count greater than 12,000/mm^3 or less than 4000/mm^3 or greater than 10% immature bands

Data from Bone RC, Balk RA, Cerra FB, et al. Definitions for sepsis and organ failure and guidelines for the use of innovative therapies in sepsis. The ACCP/SCCM Consensus Conference Committee. American College of Chest Physicians/Society of Critical Care Medicine. Chest 1992;101:1644–55.