Given all the changes in sepsis definitions, what is the best way to know if a patient is at risk for sepsis?

This is an important question, as the early recognition and treatment of patients with sepsis and septic shock are associated with improved outcomes. Unfortunately, there is no clear answer to this question.

In 2016, the Third International Consensus Definition for Sepsis and Septic Shock (Sepsis-3) was published. As part of Sepsis-3, the definition of sepsis was revised from an inflammatory process in response to an infection to “life-threatening organ dysfunction due to a dysregulated host response to infection.” One outcome of this revision was that systemic inflammatory response syndrome, as an indicator of sepsis in combination with concern for infection, was replaced with the quick Sequential (Sepsis-Related) Organ Failure Assessment (qSOFA; Table 1) or the SOFA score (Table 2) as an indicator of organ dysfunction. The Sepsis-3 committee recommended that qSOFA be used in settings other than the intensive care unit (ICU) to identify patients at risk for sepsis and the SOFA score be used in the ICU as part of the diagnostic criteria for sepsis.

The key clinical point is the need for ongoing monitoring of patients for indications of organ dysfunction. If a patient has indications of organ dysfunction (regardless of the cause or which screening tool is used), further assessment is required.

The challenge is that there is no consensus on how to screen for or diagnose sepsis. The 2016 Surviving Sepsis guidelines, which were based on evidence using the old sepsis definitions, did not include the Sepsis-3 criteria. Rather, those guidelines recommend ongoing screening, without specifying the criteria. Because the debate about the appropriate screening criteria for sepsis is ongoing, it is important to know what each score does and does not tell you (Table 3).

An important consideration is that a normal qSOFA or SOFA score does not rule out sepsis, because no screening tool is “perfect” (i.e., has 100% diagnostic accuracy). Additionally, the accuracy of each score varies depending on whether the patient is in the emergency department, the ICU, or a non-ICU setting. Several excellent review papers address this challenging question, including the use of
manual versus automated screening. A recent review paper, which summarized the literature on the identification of patients with sepsis on hospital wards, noted that although automated screening decreases time to diagnosis and intervention for sepsis, the mortality benefit has been mixed and the most accurate screening tools (single time or automated) remain to be identified.

**Case Study**

A 48-year-old woman was transferred to the acute care surgical unit after gastric conduit surgery on postoperative day 2. She experienced multiple minor regurgitation events and aspiration of gastric contents. Assessment on postoperative day 5 showed disorientation, anxiety, pulling at catheters, heart rate 110/min, respiratory rate 30/min, blood pressure 86/60 mm Hg (mean 65 mm Hg via noninvasive blood pressure measurement), and normal body temperature. The cause for these symptoms was thought to be delirium from receiving a combination of benzodiazepines and opioids. Yellow fluid draining from the jejunostomy site was attributed to biliary drainage. Blood and surgical site samples were cultured; no other laboratory samples were collected and antibiotics were not administered. The patient’s condition deteriorated and the rapid response team was called, after which the patient was transferred to the ICU. Sepsis was then recognized, and the bundle elements were initiated. Unfortunately, these actions had been delayed, and the patient could not be resuscitated from septic shock.

**Discussion**

The case study illustrates the challenge in differentiating sepsis from other disorders, resulting in a delay in implementing potentially lifesaving interventions. Examine the data gathered on postoperative day 5—did the patient have indications of end-organ dysfunction? Yes (mental status change, tachypnea, hypotension: qSOFA score = 3). Did the patient have indications (or risk) for infection? Yes, aspiration and possible wound infection or leakage. At this point (positive qSOFA with risk of infection), further assessment of the patient for sepsis...

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**Table 1** Quick Sequential Organ Failure Assessment (qSOFA) score

- Systolic blood pressure ≤ 100 mm Hg
- Respiratory rate ≥ 22/min
- Any change in mental status

Each parameter is scored as 1 point, for a total of 0-3. For patients outside the intensive care unit with a suspected infection, a score of ≥ 2 indicates an increased risk for a prolonged stay in the intensive care unit or death.

**Table 2** Sequential Organ Failure Assessment (SOFA) score

- Respiration: PaO₂/FIO₂ (P/F)
- Coagulation: Platelet count, ×10³/μL
- Liver: Bilirubin, mg/dL
- Cardiovascular: Blood pressure and vasopressor use
- Central nervous system: Score on Glasgow Coma Scale
- Renal: Creatinine, mg/dL, or urine output <500 mL/d

Points are assigned based on abnormality of each parameter. For example, a P/F ratio of 400 is scored as a 0, <300 as a 2, and <100 as a 4. An online SOFA score calculator is available at www.mdcalc.com/sequential-organ-failure-assessment-sofa-score.

**Table 3** General considerations for SIRS, qSOFA, and SOFA scores

- **SIRS**
  - Indication of inflammation
  - Not a specific indicator of sepsis—other causes of inflammation
  - 47% of non-ICU patients were SIRS positive during hospitalization
  - Sole dependence on SIRS criteria may miss 1 in 8 patients with sepsis
  - The presence of SIRS should alert the clinician to the need for additional assessment, as these signs may precede clinical deterioration.

- **qSOFA**
  - Recommended for use in non-ICU patients as indicator of risk for prolonged ICU stay and mortality
  - Not a diagnostic tool to rule out sepsis
  - Positive qSOFA suggests the presence of organ dysfunction that requires additional evaluation

- **SOFA**
  - Used in ICU to evaluate end-organ dysfunction
  - Accurate predictor of in-hospital mortality in ICU patients
  - In the presence of infection, an increase in SOFA score by ≥ 2 points (indicating worsening end-organ function) is diagnostic of sepsis

**Abbreviations:** ICU, intensive care unit; SIRS, systemic inflammatory response syndrome; qSOFA, Quick Sequential Organ Failure Assessment; SOFA, Sequential Organ Failure Assessment.
should have been undertaken, including evaluating for other causes of end-organ dysfunction.

This case demonstrates the need to maintain constant vigilance for sepsis and the potentially beneficial use of a systematic process to identify patients at risk for sepsis. In the absence of a single test or tool to detect sepsis definitively, patients at risk depend on the astute assessment of the bedside nurse to recognize the significance of a change in their condition. For further information, access the AACN website\(^\text{19}\) for Resources for Sepsis. CCN

Financial Disclosures
None reported.

References