

Sepsis Screening Tools

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CASE

Mr. H is a 67-year-old man status post hemicolectomy four days ago. He was transferred from the ICU to a medical-surgical floor at 1700 last night. Overnight the nurse called the house officer regarding urine output less than 0.5ml/kg/hr and tachycardia of 105 beats per minute. The house officer ordered a one liter NS bolus. This morning the patient is exhibiting signs and symptoms of severe sepsis, including temperature 103.5°F, HR 117 beats per minute, mean arterial pressure 58 mmHg, decreased level of consciousness, and decreased urine output. His WBC is 21,000/μL. The patient is now critically ill and is being transferred to a critical care unit. Could there have been a better way to identify the problem the night before and intervene before this change in status became severe?

DISCUSSION

Scenarios like the one above occur commonly in hospitals. A study of septic patients in a surgical intensive care unit (SICU) showed that 47% of the patients admitted with sepsis, severe sepsis, or septic shock came from a surgical floor¹. Patients who develop sepsis as inpatients present different challenges from patients who present to the hospital with sepsis.

According to the Institute for Healthcare Improvement (IHI), the incidence of sepsis has increased to 750,000 new cases per year with at least 210,000 fatalities². Seventeen percent of hospitalizations with

the diagnosis of septicemia or sepsis result in death compared with only 2% of other types of hospital admissions². Besides having a high mortality rate, sepsis can cause long periods of debilitation. Thirty-six percent of patients hospitalized with sepsis are transferred to other facilities, such as long term care, compared to 14% of other types of inpatients. Implementation of Early Goal Directed Therapy (EGDT) improves sepsis survival³. However, early recognition of sepsis in the inpatient setting can be a challenge.

Early recognition of sepsis is imperative in improving mortality rates. A 2001 study showed improvement in mortality rates only if EGDT is initiated within six hours⁴. The challenge is the complexity of sepsis which prevents early recognition from occurring consistently, particularly on medical-surgical units. However, clinical knowledge alone does not guarantee sepsis will be recognized. The clinician must have time to review patient data and determine whether the patient has signs of sepsis. This is challenging in today's fast-paced clinical environment. The complexities of sepsis recognition can be overcome by implementing a systematic recognition program for sepsis. Screening tools are widely available and are effective in the recognition of sepsis⁴⁻⁶.

It is important for each healthcare facility to choose a method for screening which is congruent with the workflow of the facility. A few of the considerations include:

1. Who should do the screening?
2. How often should the screening be done?
3. Should the screening be done on paper or electronically?

Although physicians and other healthcare providers have the ultimate responsibility in determining if a patient is septic, their contact with the patient is

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limited compared to the contact the nursing staff has with the patient. The requirement for early recognition makes it necessary for the nursing staff to be able to recognize potential sepsis in the patients and report findings to healthcare providers. Many institutions utilize the primary nurse for completing screening tools while others use charge nurses or rapid response teams^{7,8}. The frequency of screening is also a difficult question because some of the SIRS criteria, such as lab values, would have data points only once a day, while others, such vital signs, have more continuous assessments. Studies have examined screening tools used at a wide range of frequencies. Some screening tools are completed only on admission and with any sign of patient deterioration; others are done every time a new set of vital signs is entered into the medical record. Hospitals still using paper charting will implement a paper sepsis screening tool. Hospitals with electronic medical records may consider partially automating the screening tool using data already entered by nursing and ancillary staff. A multidisciplinary team should be formed in each institution to determine the best method for sepsis screening for the facility⁷.

The University Medical Center Health System Critical Care Collaborative is a multidisciplinary team formed to improve the quality of critical care delivered in the facility. The Collaborative determined the need for a sepsis screening tool and developed one individualized for the facility based mostly on the screening tools available on the IHI website (Figure 1). The screening tool was completed by the primary care nurse on admission to the intensive care unit to determine its potential utility. After a one month trial it was determined the tool was adequate for identifying sepsis. However, use of the tool was not consistent because the tool was on paper and our hospital utilizes an electronic medical record. The Critical Care Collaborative worked with information technology professionals to develop an electronic sepsis screening tool. This tool works by “firing a rule” every time a nurse completes a head to toe assessment on the patient. The rule prompts the computer system to look for criteria identifying sepsis as the paper sepsis screening tool does. If the patient is identified as potentially having sepsis according to the computer,

a task is “fired” for the primary nurse to complete a sepsis screening tool. Figure 2 is a screen shot of the electronic sepsis screening tool. Only time will tell if the electronic sepsis screening tool will be effective for the UMC Health System. Adjustments may be needed to create the most efficient and accurate sepsis screening tool. Continuous evaluation of the tool’s effectiveness by the multidisciplinary Critical Care Collaborative will insure a method for improving the recognition of sepsis in our healthcare facility.

KEY POINTS

1. Sepsis has a high morbidity and mortality.
2. Inpatients who develop sepsis may have delays in evaluation, testing, and treatment.
3. Sepsis screening tools based on SIRS criteria can provide a rapid method to help identify sepsis.
4. These tools are potentially useful for all health care providers but need to be used consistently.

KEY WORDS- sepsis, screening, electronic record, surviving sepsis guidelines

Figure 1. Paper Sepsis Screening Tool

Place Patient Label Here

**University Medical Center Adult ICU
Sepsis Screening Tool**

Step 1:

Is the patient already being treated for sepsis? _____ Yes _____ No

If answer is yes, STOP.

If answer is no, CONTINUE to step 2

Step 2: (Two or more of the following)**A) Sepsis Criteria**

- _____ Temp > 100.9 or < 96.8 (in the last 24 hours)
 _____ HR > 90 (in the last 24 hours)
 _____ Respiratory Rate >20 or PaCO₂ < 32 (in the last 24 hours)
 _____ WBC >12000, < 4000, or > 10% Bands

B) Other possible indicators

- _____ Acute change in Level of Consciousness
 _____ Glucose > 120 in non-diabetic

If less than two items checked, STOP.

Step 3: Infection (Suspected or Confirmed)

Does this patient have a suspected or confirmed source of infection? _____ Yes _____ No

(Such as: Pneumonia, Invasive Catheter, UTI, Decubitus Ulcer, Acute Abdomen, Colitis, Meningitis, Pancreatitis, Cellulitis, Bone/Joint, or Wound)

If answer is NO, STOP.

If answer is YES, continue to step 4 and contact physician if necessary. The patient may have SEPSIS.

Step 4: Organ Dysfunction

- _____ Acutely altered mental status
 _____ SBP <90 or MAP <65
 _____ SPO₂ < 90%
 _____ Creatinine > 2 mg/dl or urine output < 0.5 mg/kg/hr
 _____ Platelet count < 100,000
 _____ Bilirubin >2mg/dl, AST>90, ALT >90
 _____ Lactate > 2mmol/L

If one or more items are checked the patient may have SEVERE SEPSIS.

Step 5. If patient screens positive for SEPSIS or SEVERE SEPSIS, CALL PHYSICIAN NOW (if not already aware).

- _____ Early Goal Directed Therapy for Adult Sepsis orders were implemented
 _____ Early Goal Directed Therapy for Adult Sepsis orders were NOT implemented

WHY _____

Date _____

Time _____

Not Part of the Medical Record

Figure 2. Electronic Sepsis Screening Tool
Sepsis Screening Tool (Complete form)

Sepsis Screening Tool

Complete sepsis screening
 Patient already identified as Septic

9

Date/Time of Last Blood Culture and Lactate

Last Blood Culture: 04/01/2013 14:01 Status: InProcess

Last Lactate: 04/02/13 15:37

Vital Signs that meet or exceed SIRS/Sepsis criteria within the previous 24 hours.

9

Out of Range Vital Signs in the past 24 hours

*** No Out of Range Temps Found ***

Heart Rate

Date/Time: 04/04 18:00 Heart Rate: 103 bpm
 Date/Time: 04/04 17:00 Heart Rate: 116 bpm
 Date/Time: 04/04 16:00 Heart Rate: 98 bpm
 Date/Time: 04/04 15:00 Heart Rate: 101 bpm

Respiratory Rate

Lab values that meet or exceed SIRS/Sepsis criteria within previous 24 hours.

9

Out of Range Labs in the past 24 hours

*** No Out of Range PaCO2 Results Found ***

White Blood Cells

Date/Time: 04/05 05:28 WBC: 16.7 K/uL

*** No Out of Range Bands Results Found ***

*** No Out of Range Glucose Results Found ***

Does the patient meet any of the following SIRS criteria?

Patient does NOT meet any of the listed criteria
 Temp greater than 100.9 or less than 96.8
 Heart rate greater than 90
 Respiratory rate greater than 20 or PaCO2 less than 32
 WBC > 12000, < 4000 or >10% bands
 Acute change in level of consciousness
 Glucose greater than 120 and pt non-diabetic

Does the patient have a suspected or confirmed infection?

Patient does NOT have a suspected or confirmed infection
 Acute abdomen
 Bone/Joint
 Cellulitis
 Colitis
 Decubitus Ulcer
 Invasive catheter
 Meningitis
 Pancreatitis
 Pneumonia
 UTI
 Wound
 Other

Other Suspected or Confirmed Infection:

Vital Signs that meet or exceed Organ Dysfunction criteria within the previous 24 hours.

9

Out of Range Vital Signs in the past 24 hours

*** No Out of Range SBPs Found ***

Mean Arterial Pressure

Date/Time: 04/04 15:00 MAP: 64 mmHg

*** No Out of Range Oxygen Sats Found ***

Lab values that meet or exceed Organ Dysfunction criteria within the previous 24 hours.

9

Out of Range Labs in the past 24 hours

*** No Out of Range Creatinine Results Found ***

Platelets

Date/Time: 04/05 05:28 Platelets: 63 K/uL

Bilirubin

Date/Time: 04/05 05:10 Bilirubin: 5.2 mg/dL

*** No Out of Range AST Results Found ***

Does the patient meet any of the following Organ Dysfunction signs/symptoms criteria?

Patient does NOT meet any of the listed criteria
 Acutely altered mental status
 SpO2 less than 90%
 Platelet count less than 100,000
 Lactate greater than 2mmol/L
 SBP less than 90 or MAP less than 65
 Creatinine > 2mg/dL or urine output < 0.5mg/kg/hr
 Bilirubin > 2mg/dL, AST > 90, ALT > 90

If the patient meets any of the Organ Dysfunction signs/symptoms criteria, then please notify the primary team. A task will follow where the notification can be documented.

Rapid Response Team Notified

Yes
 No
 N/A

Sepsis Screening Tool (In Sections)

Sepsis Screening Tool

Complete sepsis screening
 Patient already identified as Septic

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 UTI
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 Other

Other Suspected or Confirmed Infection:

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Rapid Response Team Notified

Yes
 No
 N/A

Sepsis Screening Tool (In Sections)

Performed on: 04/05/2013 1437

Sepsis Screening Intervention

The patient has screened positive for severe sepsis.

Physician Contacted? Yes No Reason Physician NOT Contacted

Intervention Sepsis orderset / rapid response orders implemented Sepsis orderset / rapid response orders NOT implemented

Reason Sepsis Orders NOT Implemented

Physician Notification - Initiation

Physician Notified Physician Service Notified Notification Method

Notification Reason

Physician at bedside Other: Physician Office/Clinic Pager Phone

Physician Response

Responding Physician Physician Notified Of

Physician Response

Telephone orders received, written and read back No orders received New orders noted Other:

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