Sepsis Protocol Compliance Up

Guidelines *from page 1*

Medicine, the International Sepsis Forum, and the Society of Critical Care Medicine to standardize and improve the diagnosis, treatment, and management of sepsis. The global initiative's two protocols, called "bundles," offer stepwise evidence-based guidelines to achieve goals for resuscitation and sepsis management. (See box.)

So far, the ongoing campaign has been adopted by 166 facilities in North America, Europe, and Latin America, Dr. Levy said. For the first time, he released the program's 2-year data on mortality and compliance with objectives. Thus far, 15,000 patients have been treated according to the protocol.

At baseline, the average mortality was 37%. This varied significantly based on the patient's location in the hospital when entered into the study. Baseline mortality was lowest among patients recruited from emergency departments (28%), and higher among those in ICUs (41%) and wards (47%). The high mortality rate among ward patients "is no surprise for those of us who see these patients languish in the wards for a long time before their sepsis is identified, especially in facilities without a rapid-response team," Dr. Levy said. Baseline mortality was 26% in patients without shock and 30% in those with shock. Mortality was higher in patients with both elevated lactate levels and hypotension (46%).

Mortality and compliance were assessed quarterly for 2 years. At baseline, only 11% of participating facilities were achieving all the elements of the resuscitation bundle. By the end of the second year, however, 30% were achieving all the goals. The significant 20% increase followed a linear improvement, with significant changes beginning in the second quarter. Significant improvements were seen in each of the bundle's elements.

The decrease in mortality is a 'welcome change' from the poor outcomes often associated with sepsis.

DR. LEVY

The management bundle showed similar improvements. At baseline, only 18% of facilities were consistently achieving all the bundle's goals. By the end of the study, this had improved significantly, to 36%. "It took us a little longer to achieve significant changes with this bundle, but by the end of year 1, we were seeing that," Dr. Levy said.

Because the campaign did not collect detailed data about baseline severity of illness, the investigators created a crude severity scale by using data that were available on each patient, including the presence or absence of shock, source of admission (ED or ICU), site of infection, number of organs with dysfunction at baseline, and the presence of ventilation.

"After adjusting the mortality rates for these factors, the decline was still 5.4%, a significant reduction," Dr. Levy said. ■

What the Sepsis Bundles Entail

The Surviving Sepsis Campaign was published last year in Critical Care Medicine (2008;36:296-327). A description of the program and access to the manual and database are available at www.survivingsepsis.org.

The campaign consists of two implementation bundles, one for resuscitation and one for management.

Sepsis Resuscitation Bundle

Evidence-based goals must be completed within 6 hours for patients with severe sepsis, septic shock, and/or lactate greater than 4 mmol/L (36 mg/dL). The goal is to perform all indicated tasks 100% of the time within the first 6 hours of identification of severe sepsis.

- ▶ Element 1—Measure serum lactate level.
- ▶ Element 2—Obtain blood cultures prior to antibiotic administration.
- ▶ Element 3—Administer broad-spectrum antibiotic within 3 hours of emergency department admission and within 1 hour of non-ED admission.
- ▶ Element 4—In the event of hypotension and/or serum lactate greater than 4 mmol/L:

a. Deliver an initial minimum of 20 mL/kg of crystalloid or an equivalent.

b. Apply vasopressors for hypotension not responding to initial fluid resuscitation to maintain mean arterial pressure greater than 65 mm Hg.

- ▶ Element 5—In the event of persistent hypotension despite fluid resuscitation (septic shock) and/or lactate greater than 4 mmol/L:

a. Achieve a central venous pressure of greater than 8 mm Hg.

b. Achieve a central venous oxygen saturation greater than 70% or mixed venous oxygen saturation greater than 65%.

Sepsis Management Bundle

Evidence-based goals must be completed within 24 hours for patients with severe sepsis, septic shock, and/or lactate greater than 4 mmol/L (36 mg/dL). The goal is to perform all indicated tasks 100% of the time within the first 24 hours from presentation.

- ▶ Element 1—Administer low-dose steroids for septic shock in accordance with a standardized ICU policy.
- ▶ Element 2—Administer recombinant human activated protein C in accordance with a standardized ICU policy.
- ▶ Element 3—Maintain glucose control greater than 70 mg/dL, but less than 150 mg/dL.
- ▶ Element 4—Maintain a median inspiratory plateau pressure less than 30 cm H_20 for mechanically ventilated patients.

For information on implementing the program, visit www.sccm.org and click on "Professional Development," followed by "Quality Initiatives."

Protein C May Distinguish Sepsis From Pneumonia

BY PATRICE WENDLING

CHICAGO — Protein C levels may be useful as an early biomarker to distinguish patients with sepsis from those with pneumonia.

In a retrospective chart review of 1,047 protein C tests performed in 980 patients, average protein C activity levels were significantly less in sepsis patients at 59.2% than in pneumonia patients at 108.9%, principal investigator Scott Gutovitz and his colleagues at Orlando (Fla.) Health reported in a poster presentation at the annual meeting of the American College of Emergency Physicians.

The researchers conducted the retrospective review over a 14-month period at an eight-hospital health care system. They identified 32 samples from patients with sepsis and 34 samples from patients with pneumonia and no clinical evidence of sepsis. Charts were excluded if the measurement was obtained before the sepsis/pneumonia event or more than 10 days after the event.

Protein C levels were significantly lower in the sepsis group (mean age 38 years) than in the pneumonia group (mean age 51.5 years) in the 0- to 12-hour interval after diagnosis (49% vs. 91%), 12- to 24-hour interval (61% vs. 109.3%), 24- to 48-hour interval (64% vs. 117.2%), and 48- to 240-hour interval (61.5% vs. 115%).

Although the number of patients in each subgroup was small and thus resulted in fairly large confidence intervals, the finding is fairly consistent over time, Dr. Gutovitz said in an interview.

Complicating a correct pneumonia diagnosis is the fact that pneumonia is a clinical and radiologic diagnosis, whereas sepsis is defined as the presence or presumed presence of an infection plus at least two systemic inflammatory response syndrome (SIRS) criteria.

Protein C is known to be lower in patients with sepsis, but its levels in nonseptic patients with pneumonia have not previously been quantified, he said. In a previous study, SIRS criteria were not useful predictors for progression to severe sepsis in community-acquired pneumonia (Chest 2006;129:968-78). ■

Diabetes Linked to Lower Risk of Acute Respiratory Failure in Sepsis

BY HEIDI SPLETE

Sepsis patients with diabetes are significantly less likely to experience acute respiratory failure than are patients without diabetes, according to data from a review of 930 million hospitalizations over 25 years.

Previous studies have shown that sepsis is common in people with diabetes, and that those patients are less likely to develop acute lung injuries as a result of sepsis. But those studies did not compare organ dysfunction in sepsis patients with and without diabetes.

Dr. Annette Esper of Emory University in Atlanta and her colleagues reviewed National Hospital Discharge Survey data from 1979-2003. The researchers identified 12.5 million cases of sepsis, and 17% of the patients had diabetes. Among those with diabetes and sepsis, 57% were women and 64% were white. The average age was 68 years.

Overall, patients with diabetes and sepsis were significantly more likely to develop acute renal failure than were patients without diabetes (13% vs. 7%), but were significantly less likely (9% vs. 14%) to develop acute respiratory failure (Crit. Care 2009 Feb. 12 [doi:10.1186/cc7717]).

The difference in acute respiratory failure persisted regardless of the infection source. Among patients with a respiratory source of sepsis, those with diabetes were significantly less likely to develop acute respiratory failure than were those without diabetes (16% vs. 23%). The difference in acute respiratory failure rates was also significant for patients with and without diabetes (6% vs. 10%) who had nonpulmonary sources of infection.

Although the overall fatality rate for sepsis patients with diabetes was significantly lower than for those without diabetes (19% vs. 21%), the fatality rates between patients with and without diabetes who developed acute respiratory failure were not significantly different (52% vs. 48%).

Theories as to why respiratory failure rates differ between patients with and without diabetes include blunted inflammatory response to organ dysfunction in people with diabetes, and the possibility that diabetes patients may be hospitalized for sepsis sooner because they are more alert to signs of infection. Diabetes medications may play a role, too. "Many medications administered to patients with [diabetes], including insulin and thiazolidinediones, are known to have anti-inflammatory effects in addition to lowering blood glucose," they noted.

The researchers had no financial conflicts to disclose. ■