Postoperative Sepsis Rates and Severity Increased

The rates of postoperative sepsis, and especially severe sepsis, rose significantly over a 17-year period.

BY ELIZABETH MECHCATIE
Senior Writer

The rate of postoperative sepsis among adult patients increased significantly over a 17-year period, as did the proportion of cases that were considered severe, according to an analysis of a state inpatient database.

Although hospital mortality from postoperative sepsis dropped in patients undergoing nonelective surgery, the proportion of patients who developed severe sepsis after elective surgery increased significantly, and mortality from sepsis after elective surgery did not improve, Dr. Todd Vogel said. He presented results of the study at the annual meeting of the Surgical Infection Society.

"What's concerning from the data is that elective cases did not show a significant decreased trend at all; in fact, we have not made any headway in mortality secondary to sepsis" after elective surgery, said Dr. Vogel, of the University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, New Brunswick.

Dr. Vogel and his associates analyzed data from the State Inpatient Database for New Jersey from 1990 to 2006 for patients aged 18 and older who developed sepsis after elective or nonelective surgery, using diagnosis codes defined by the Agency for Healthcare Research and Quality. There were 1,276,451 surgery discharges during that time, of which 42% were elective and 58% were nonelective. Sepsis was a complication in 3% of all surgical procedures.

Of the patients undergoing elective surgery, about 1% developed postoperative sepsis and 0.5% developed severe sepsis (defined as sepsis complicated by organ dysfunction). The rate of sepsis after elective surgery increased from 0.67% to 1.74%, and the rate of severe sepsis increased from 0.22% to 1.12%. Both were highly statistically significant increases. The proportion of sepsis cases that were severe after elective surgery nearly doubled from 33% to 65%, also a highly significant increase.

The rates of postoperative sepsis and severe sepsis were significantly higher among the patients who had nonelective surgery (about 4% for sepsis and about 2% for severe sepsis). The rate of sepsis after nonelective surgical procedures increased from 3.7% to 4.5%, and the rate of severe sepsis increased from 1.8% to about 3%. The proportion of sepsis cases after nonelective surgery that were severe increased significantly from almost 48% to nearly 70%. However, in-hospital mortality among these patients dropped from 38% to 30% for sepsis and from 55% to 38% for severe sepsis, a highly significant decrease.

The pattern of pathogens also changed during the period studied, with a significant drop in rates of septicemia caused by staphylococci, anaerobes, pseudomonas, and *Escherichia coli* among the nonelective surgery cohort. There was also a significant increase in the rates of streptococcal septicemia and staphylococcal septicemia in a subgroup of patients undergoing elective surgery, but the rates of septicemia caused by *E. coli*, pseudomonas, and anaerobes remained unchanged in this cohort.

The findings may be explained by changes in the types of patients who are admitted to the hospital for elective surgery, Dr. Vogel said in an interview. The trend toward minimally invasive procedures may mean that elderly patients or those who are sicker are more likely to be admitted to the hospital for elective surgery, he speculated. The improved mortality among nonelective cases could be attributable to advances in critical care and antibiotics, and greater awareness of sepsis, he added, noting that this was not clear from the data and will be the focus of a future study.

The investigators also found a significant disparity based on ethnicity, gender, and age of patients, which Dr. Vogel said needs to be studied further. The rates of postoperative sepsis and mortality after nonelective and elective surgery were highest among black patients, compared with white patients (who had the lowest rates) and Hispanic patients. Men were more likely to have postoperative sepsis than were women, and there was a significant increase in the rates of postoperative sepsis with age. ■

Recent Negative Trials in Sepsis Contain Some Guidance

BY MARY JO M. DALES
Editorial Director

San Diego — Recent trial results have quelled much of the excitement about the promise of interventions designed to reduce the risk of death resulting from sepsis. Yet within the mostly negative results of those studies, there are some findings that help to define appropriate treatment approaches, according to Dr. David A. Schulman, chief of pulmonary and critical care medicine at Emory University Hospital, Atlanta.

The findings of VASST (Vasopressin and Septic Shock Trial) found no difference in 28-day mortality among 778 patients randomized to norepinephrine or to norepinephrine plus vasopressin. Although the difference was not statistically significant, those who had less severe shock and were started on less than 15 mcg/min of norepinephrine had a lower mortality rate with the addition of vasopressin (26.5%), compared with the rate seen in those given norepinephrine alone (35.7%). The result persisted at 90 days (N. Engl. J. Med. 2008;358:877-87).

Thus, vasopressin can be used as a second agent in the hypotensive, septic patient who is on a moderate dose of another pressor, Dr. Schulman said in a presentation at the annual meeting of the Society of Hospital Medicine. Vasopressin, dosed at 0.03 U/min, may be added to norepinephrine with an anticipated effect equivalent to that of norepinephrine alone. Vasopressin should not be titrated, and it should be used only as a second agent. Vasopressin should be used with caution in patients with significant myocardial dysfunction (cardiac index less than 2.1 L/min per m^2).

The recent CORTICUS (Corticosteroid Therapy of Septic Shock) trial concluded that steroids are no better than placebo for reducing mortality, yet the role of steroid therapy in the treatment of septic shock is "more unclear than ever," Dr. Schulman said. Current data do not provide sufficient evidence that low doses of corticosteroids are harmful in septic patients without relative adrenal insufficiency. The current advisory is to "implement a combination of hydrocortisone and fludrocortisone if a patient remains hypotensive with presumed septic shock for [more than 1 hour] after administration of appropriate fluids and pressors."

CORTICUS, a randomized controlled trial of 500 septic shock patients, found that 28-day mortality was comparable whether subjects were given placebo or hydrocortisone at 50 mg every 6 hours for 5 days followed by a 6-day taper. Furthermore, the trial discerned no difference in response to steroids among patients with relative adrenal insufficiency. Shock resolved faster in the steroid-treated subjects, but they didn't live any longer than patients who were not given steroids. Also, steroids were associated with an increased risk of hyperglycemia, recurrent sepsis, and recurrent shock (N. Engl. J. Med. 2008;358:111-24).

The findings countered those of the practice-changing study that held that adrenal insufficiency predicted which vasopressor-refractory sepsis patients would respond to steroids (JAMA 2002;288:862-71). In that trial, 300 patients were tested for response to ACTH, and all were treated with glucocorticoid and mineralocorticoid supplementation. At 28 days, survival was higher in those patients who had tested positive for adrenal insufficiency; no benefit was seen in the other patients.

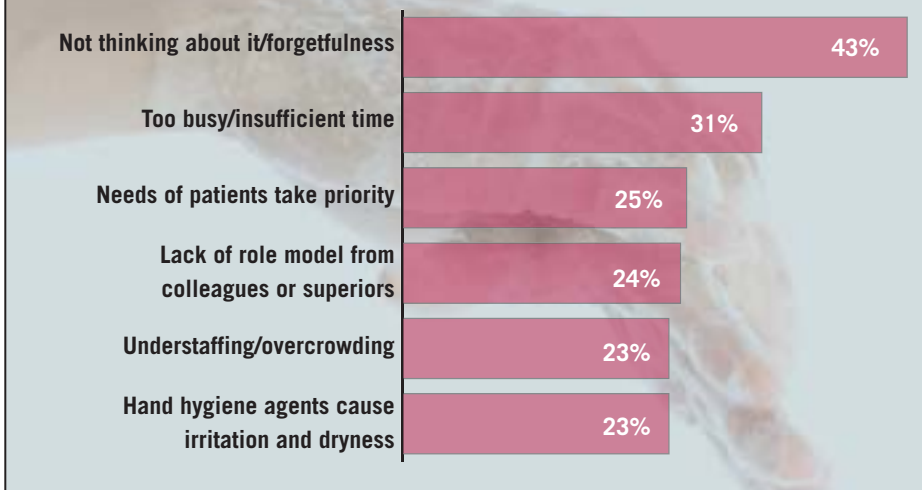
A closer examination of that study indicated that 24% of the patients were given etomidate, which is an adrenal suppressant and is no longer the standard of care. Also, subjects had a higher average dose of pressors at enrollment, an indication that they were sicker than the patients in the CORTICUS trial, and they received fludrocortisone rather than hydrocortisone, Dr. Schulman said.

The results of three trials have called into question the role of drotrecogin alfa (recombinant human activated protein C) in the management of sepsis. Both the RESOLVE (Resolution of Organ Failure in Pediatric Patients With Severe Sepsis) trial in children and the ADDRESS (Administration of Drotrecogin Alfa in Early Severe Sepsis) trial in low-risk patients randomized to recombinant human activated protein C or placebo were stopped early in light of their small chance of benefit and an increased risk of serious bleeding in the ADDRESS trial.

In the third ongoing trial, called PROWESS (Recombinant Human Activated Protein C Worldwide Evaluation in Severe Sepsis), patients with septic shock or severe sepsis were randomized to a continuous infusion of 24 mcg/kg per hour of recombinant human activated protein C for 96 hours. During the course of the trial, however, the protocol was changed to severe sepsis only, the manufacturing process of the product was changed, and the placebo was changed from normal saline to 0.1% albumin. Before the protocol change, no difference was noted in 28-day mortality. After the change, a 0.71 relative risk was noted in the treatment group, Dr. Schulman said. ■

DATA WATCH

Major Challenges to Hand Hygiene Compliance in Hospitals



Note: Based on a 2008 survey of 539 members of the Association for Healthcare Resource and Materials Management.
Source: Perception Solutions Inc.

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