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On Alert

Treating shock patients at Good Samaritan Hospital, San Jose

By Susan Scollan-Boring, BSN, CCRN

It is the beginning of your shift and you have just entered Mr. Jones' room to do your initial assessment. Mr. Jones was admitted yesterday with cellulitis of his foot. This evening he seems slightly confused and his color is pale. His blood pressure is 100/50 (the last one was 129/65), his temperature is 96.0, heart rate is 110, respiratory rate is 26 and his O2 sat is 93 percent on 2L of oxygen. His condition seems to have changed since report. What do you do?

If you are a staff nurse at Good Samaritan Hospital (GSH) in San Jose, CA, you pick up the phone, dial the emergency number and have a "shock alert" paged over the overhead system. Within minutes the shock team assembles at the bedside and the patient is being treated with the most up-to-date, evidence-based treatment available.

The Need for a Shock Team

Severe sepsis is a national health problem. Approximately 750,000 patients will suffer from severe sepsis this year in the United States; of these patients, 250,000 will die. The care of these patients is estimated to cost almost $17 billion. Unfortunately, the mortality rate of severe sepsis has changed very little in the past 25 years. However, recent studies have begun to change how we treat septic patients. The Society of Critical Care Medicine[1] and the Volunteer Hospital Association[2] have recently published similar guidelines for their care.

To review how GSH patients were treated for different types of shock, a shock committee was formed last February. The committee, which consists of the ICU director, ICU medical director, two critical care educators, an emergency room physician, the medical director for infectious diseases and the vice president of clinical patient services, found that there was no consistent strategy to treat patients in shock. Thus, it was decided that the "Shock Team" approach was the best way to deliver early and aggressive treatment.

The shock program was originally developed by Frank Sebat, MD, and colleagues, in conjunction with Shasta Regional Medical Center, formally known as Redding (CA) Medical Center, Redding, who provided recommendations to the GSH shock committee on how best to implement a shock program. Dr. Sebat and colleagues developed inclusion criteria, shock protocols, a "shock" order set, shock cart and a shock education program. Using the shock program and the study "Early Goal Directed Therapy in the Treatment of Sepsis and Septic Shock,"[3] the shock committee modified and implemented the shock program at GSH.

The goals of the program are to identify patients who are in shock (septic, hypovolemic, non-acute MI cardiogenic or anaphylactic) early, before organ damage from hypoperfusion occurs. Once the patient is identified, that patient is treated aggressively with the most current evidence-based treatment for shock.

It became clear early on that the most important part of the implementation process for this program was education for both the nursing and physician staff. Dr. Sebat, director of Kritikus Foundation and intensive care at Redding Medical Center, Emmanual Rivers MD, chief of emergency medicine at Henry Ford Hospital in Detroit and David Spain, MD, chief of trauma services at Stanford University, did a lecture series at GSH on the treatment of sepsis. The nursing staff was required to attend an hour-long presentation on the treatment of shock. The classes included the physiology of cellular hypoperfusion as well as the shock alert process and GSH shock protocols. The class was offered approximately 20 times during the 2 months prior to the "go live" date.

Classes also were offered to physicians by S.J. Salfen, MD, medical director of the med/surg ICU and Robert Armstrong, MD, medical director of infectious disease, at GSH.

Shock Criteria

On Jan. 5, 2004, the GSH shock program went live. Patients who manifest the following criteria of sustained inadequate tissue perfusion will, by hospital policy, have a shock alert called:

1. Patients who are hypotensive with a mean arterial pressure of less than 60 and one or more of the following:

Temperature of < 36ºC or > 38ºC

Respiratory rate > 20

Altered mental status

Oliguria (i.e., < 30mL/hr)

Lactic acidosis (lactic acid = 2.5 or base excess = -5.0)

2. Patients with normal blood pressure who exhibit three or more of the above; (Patients in the ED, PACD, ICU or labor and delivery (L&D) will be given 1,000 mL of crystalloid and reassessed prior to calling the shock alert.)

3. Any patient identified as being in shock by the registered nurse or physician

Those patients who manifest the following criteria will be excluded from the shock criteria:

1. Patients with an acute MI — a "Code Heart" will be called instead.

2. Patients with "do not resuscitate" orders; Patients with "modified" code orders can be treated with the shock protocols up to the point of their modified status.

Shock Alert Process

When a patient is identified to have met the shock criteria, the shock alert is paged overhead. Two nurses from critical care, the ED physician, respiratory therapy, two phlebotomists and the nursing supervisor respond to wherever that patient is. The "on-call" critical care intensivist arrives within 20 minutes to assume care. Additionally, the shock cart arrives, carrying all of the IV fluids, tubings, central lines, arterial lines, etc. that are needed to manage these patients.

When appropriate, a triple lumen CVP line with ScVO2 monitoring capability is placed to allow the patient's cellular oxygen consumption to be evaluated. One lab phlebotomist draws the initial shock labs (lactic acid, electrolytes, CBC, coags, etc.) and takes it back to the lab immediately. The second phlebotomist stays and draws the blood cultures and any other labs that are not needed immediately. The initial lab results are back within 10-15 minutes, which allows the treatment to be focused in the right direction.

The appropriate shock orders (septic, hypovolemic, etc.) are implemented and the patient is moved as soon as possible to the appropriate critical care bed where the protocols are continued. By hospital policy, once a shock alert is called, it is not to be called off until the patient has been assessed by the shock team and had the shock labs drawn.

Program Benefits

The shock program has been well-accepted by the nursing staff. Nurses on the med/surg floors know that they have a back-up system if they think their patient is deteriorating. If they have questions about whether a patient meets the shock criteria, they are encouraged to call the ICU and ask for help. There have been several shock alerts called on patients who had very subtle symptoms of shock, but elevated lactic acid levels. These patients may have had poor outcomes if the nurses had not recognized the early signs of shock.

Nurses in the ED benefit from this program because the shock team helps the primary ED nurse care for the patient and enables the rest of the ED staff to care for the other patients in the department. The shock team is available to

help with the "high-risk" L&D patients as well. This allows the L&D nurses to care for the mother and baby while the shock team manages the critical care needs of the mother.

Continued Improvement Efforts

Since January, 37 shock alerts have been called. Of those, only three have been patients who did not meet the shock criteria. Each shock alert is evaluated by the shock committee for patient outcome and compliance to the hospital shock policy. The committee also looks at the time it takes to get labs drawn and the results back, the time to first contact with an intensivist, how long it takes to get the first two liters of resuscitation fluid in, how long it takes to get the patient to the ICU, etc.

Data has been collected on shock patients prior to the implementation of the program and will be compared to post-protocol data once the numbers are adequate, hopefully by September. While there are no official comparisons available, the feeling is that the shock program has made a difference in patient outcome. Treating patients before they have a cardiac or respiratory arrest provides a much better chance for a positive outcome.

Although the program is still new and being evaluated continuously for ways to improve the service for the staff and ultimately the patients, nurses have the autonomy, education and assessment skills to obtain appropriate treatment for their patients. Most importantly, the patients at GSH have access to the most up-to-date, evidence-based shock treatments.

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Additional Resources

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Susan Scollan-Boring is program manager, critical care education, and Shock Program coordinator at Good Samaritan Hospital, San Jose, CA.

For additional information, please contact susan.scollanboring@hcahealthcare.com or Kritikus Foundation at 530-244-7149 or kritikus@sbcglobal.net.

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