Surviving Sepsis Campaign

Statement from the Surviving Sepsis Campaign Leadership on CVP, $ScvO_2$, and Lactate Measurements

Until data are available that can provide evidence-based recommendations for the use of alternate methods of obtaining clinical measurements that guide appropriate therapy during initial resuscitation for severe sepsis, the Surviving Sepsis Campaign leadership recommends targeting central venous pressure (CVP) of 8-12 mm Hg, superior vena cava oxygen saturation ($SCVO_2$) of 70% (or mixed venous oxygen saturation [SVO_2] of 65%) and lactate normalization (1,2). Although the original sepsis bundles included targets, the decision about how this goal would best be achieved was left to the treating clinician (3,4). The current guidelines continue to recommend these target measures, while the performance indicators for bundle compliance now call for *measuring* CVP and $SCVO_2$, and re-measuring lactate if the initial lactate was elevated. The rationale for the indicators' being *measurement* and not target achievement is that the decision to give more fluid or add inotropes to the resuscitation should be based on the entire clinical picture. In some patients, reaching higher or lower values than these targets may be associated with better hemodynamics, but deviation from these should be justified. Institutions that can bring more advanced technologies to the bedside may do so and use those measurements as part of the total clinical picture for decision making.

While some institutions may be able to utilize inferior vena cava (IVC) ultrasound at the bedside to assess IVC size and respiratory variation or use echocardiography to assess left ventricular diastolic size or contractility for decision making during the early hours of resuscitation, they represent the minority. Likewise, the use of esophageal Doppler or any of the devices that estimate changes in stroke volume from the arterial pressure waveform is to be encouraged. However, during the early hours of resuscitation, access to these technologies — even at institutions that regularly use them—can be challenging. The Campaign recognizes some limitations with CVP and $ScvO_2$ although it would be the rare physician who does not find knowledge of a low CVP in a hypoperfused patient useful. The same applies to a high CVP that goes higher with fluid boluses. The SSC, of course, realizes that a high $ScvO_2$ is a sign of very poor prognosis, but a low $ScvO_2$ is a useful piece of information to integrate into the clinical picture. Because the majority of patients will have a central line or long peripherally inserted cardiac catheter (PICC) in place, measurement of these two parameters can be done relatively easily. And who argues with a resuscitation plan that normalizes lactate? These measurements along with clinical acumen, experience, and whatever tools are available will contribute to the total clinical profile to provide beneficial therapy for the patient. This interpretation should be made in the context of patient comorbidities and, in the case of early sepsis resuscitation, $ScvO_2$ (5).

In the new performance improvement effort based on the 2012 guidelines, the actual indicator is a marker of process, rather than a target indicator. If an institution is just beginning to implement the Surviving Sepsis Campaign, they may start with collecting data for the 3-hour bundle (which does not include measurement of CVP, $ScvO_2$ or repeat lactate); they may then progress to the 6-hour bundle that now includes measurement of CVP, $ScvO_2$, and repeat lactate(process indicators). As an institution's performance improvement initiative matures over time, they may progress to the full 6-hour bundle including the guideline-recommended targets for the three process indicators. The new software for data collection for the 2012 guidelines will allow all of these options with generation of relevant performance reports.

Recent conversations among Campaign leaders and regulatory agencies have resulted in the acknowledgment that achievement of target quality indicators will rarely reach 100%. Some facilities that have been doing improvement work for a long time have recognized that they have reached the maximum level for meeting target indicators because individual patient characteristics may prevent reaching targets. Institutions will not be penalized for not reaching 100%, hence the emphasis on process. Decisions on what the target percentage should be for maximal and acceptable achievement have yet to be made.

The Surviving Sepsis Campaign is carefully watching current trials and options that will improve care of patients with severe sepsis. When evidence to recommend new guidelines or revision of existing guidelines is available, the Campaign will evaluate and put forth appropriate statements on its website. These may lead to changes in the bundle quality indicators.

References

1. Dellinger RP, Levy MM, Rhodes A. Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2012. *Crit Care Med* 2013; 41:580-637 **2.** Dellinger RP, Levy MM, Rhodes A. Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2012. *Intensive Care Med* 2013; 39: 165–228 **3.** Levy MM, Pronovost PJ , Dellinger RP, et al . Sepsis change bundles: converting guidelines into meaningful change in behavior and clinical outcome *Crit Care Med* 2004; 32:S595 - S597 **4.** Dellinger RP, Townsend SR. Point/Counterpoint editorial rebuttal. *Chest* 2013; 144(2):379-380 **5.** Osborn TM, Levy MM, Dellinger RP, Annane D: [Response to letter to the editor]: Surviving Sepsis. *Crit Care Med* 2013; in press