Committee News

4 Things Every General Anesthesiologist Should Know About Critical Care Medicine

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Lessons learned from the ICU translate directly into anesthetic care of critically ill patients in the OR and NORA locations. Critically ill patients presenting to the OR are at high risk and present with issues that require adaptation in how we administer anesthesia. Vigilance and optimization of care during the perioperative period can prevent further insult to the physiological processes and result in better outcomes.

AKI

Acute kidney injury (AKI) is defined as a rise in serum creatinine 1.5-1.9 times the baseline, or greater than .3 mg/dl. It is a clinical diagnosis. AKI causes can be cardiorenal, nephrotoxic, sepsis-associated, hepatorenal, and obstructive. The multinational AKI-EPI study revealed the incidence in the first week post-ICU admission was 52% after scheduled surgery and increased to 56% after emergency surgery. AKI causes may be multifactorial, requiring different types of treatment modalities. For example, if nephrotoxic injury has occurred, the use of diuretics and I.V. fluids may be damaging and counterproductive, whereas a patient with decompensated heart failure may benefit from the use of diuretics. Fluid resuscitation in septic shock, when provided in a timely manner, may be beneficial. Maintaining hemodynamic stability throughout the perioperative period and identification of factors that may lead to AKI can reduce its occurrence (*Intensive Care Med* 2015;41:1411-23).

Lung-protective ventilation

The concept of lung-protective ventilation has long been a hot issue in critical care. The concept is that we as physicians have the potential to exacerbate injury to already damaged lungs through improper and injurious ventilator settings. The ARDSNet trial in 2000 demonstrated that use of tidal volumes of 6 mL/kg predicted body weight and a plateau pressure under 30 cmH_20 versus 12 mL/kg resulted in significantly lower mortality and fewer days on a ventilator in patients with ARDS (*N Engl J Med* 2000;342:1301-8). There has been much enthusiasm about translating these results into routine anesthetic practice in the OR. However, the results of a recent systematic review do not demonstrate a clear effect of tidal volume, higher versus lower PEEP, or recruitment maneuvers on postoperative pulmonary complications, mortality, or length of stay (*Anesth Analg* 2022;135:971-85). The benefits of these strategies seem to be relegated to those patients who clearly meet the criteria for ARDS.

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Sepsis and septic shock

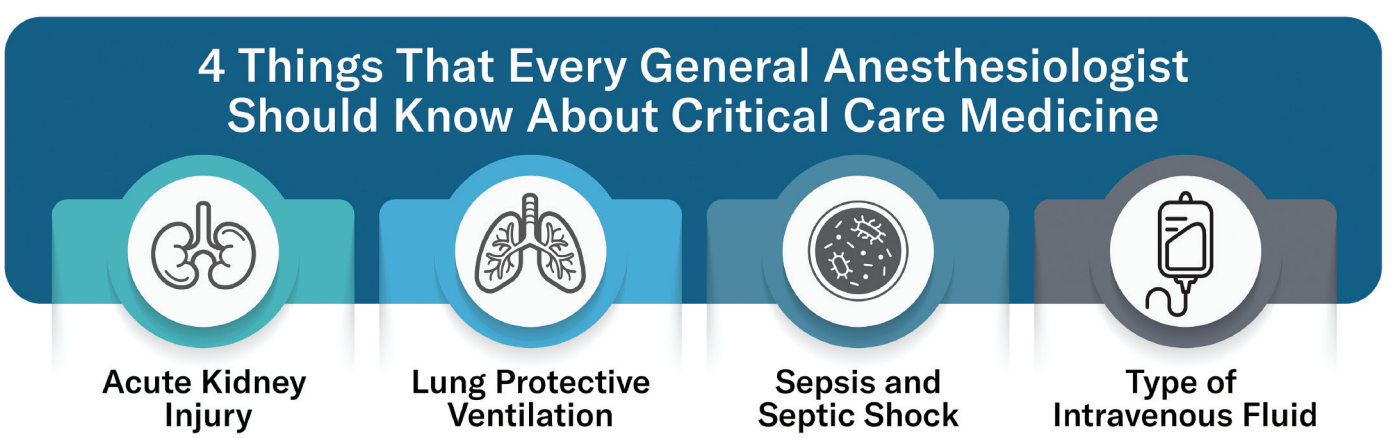
Treatment of sepsis and septic shock may need to begin in the OR. Surgeries are often performed for source control of sepsis, putting the anesthesiologist in the position of immediately taking care of these critically ill patients. The Surviving Sepsis Campaign provides a guideline for dealing with the management of such patients (*Crit Care Med* 2021;49:e1063-e1143). The guidelines advocate for giving 30 mL/kg of balanced crystalloid over the first three hours of resuscitation, prompt initiation of intravenous norepinephrine, even without a central line, and prompt administration of antibiotics. Use of I.V. vitamin C is discouraged, and use of corticosteroids is only suggested when there is an ongoing need for vasopressors.

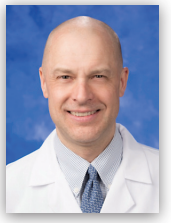
There is a growing appreciation of the dangers of overaggressive fluid resuscitation as well as an appreciation of the types of fluids we give. Historically, septic shock has been treated with aggressive fluid resuscitation. Potential risks include worsening of kidney injury, respiratory failure, and tissue edema. Meyhoff et al. demonstrated that restriction of I.V. fluids did not result in any fewer deaths or serious adverse events at 90 days compared to standard high-volume fluid resuscitation. This calls into question the aggressive early fluid resuscitation indicated by the Surviving Sepsis Guidelines and places a premium on careful assessment of intravascular volume status (*N Engl J Med* 2022;386:2459-70).

Type of I.V. fluid

The type of intravenous fluid we administer may impact outcomes. In a heterogenous sampling of critically ill patients, albumin has been shown to offer no benefit over crystalloids. Hydroxyethyl starch has been shown to increase the risk of acute kidney injury, and possibly death. A 0.9% saline can induce hyperchloremic metabolic acidosis in large volumes and may increase the risk of acute kidney injury. Balanced salt solutions, with a chloride concentration closer to that of plasma, have seen increased usage as a result. While the data is not definitive, it seems that balanced crystalloids may potentially reduce mortality in the critically ill (*NEJM Evid* 2022;1).

Attention to these lessons learned from our ICUs can clearly help us take better care of our critically ill patients when they require anesthetic care. ■





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