The Flood and Ebb of Septic Shock

To the Editor:

In a recent issue of CHEST (June 2009), Murphy and colleagues reported that patients who receive greater attention to achieve adequate filling during early sepsis with acute lung injury, and whose fluid balance is negative during recovery, fare better than those who do not. Alsous and colleagues reported in these pages nearly a decade ago the association of negative fluid balance and the survival of patients with septic shock. The observation of Murphy et al is additional confirmation in a growing body of literature suggesting that fluid balance is associated with outcomes. It remains to be determined whether this is cause or effect. Insofar as the cardiovascular lesion of septic shock includes capillary leak and nitric oxide-mediated vasodilation, resulting in increased vascular capacitance, refilling is required to maintain venous return and systemic pressure. For patients with high-output shock and coincident lung injury, it is not unreasonable to increase venous tone by administering a pressor to permit less fluid administration. If source control (ie, appropriate antibiotic therapy and mechanical drainage when required) is timely, the storm flood abates, vascular tone and permeability return more quickly, and the amount of exogenously administered fluid required to fill the system slowly decreases.

In survivors, at some point no more fluid is required (ie, inputs equal outputs), after which the typical patient may be left with a >10-L cumulative net positive fluid balance (much less for those with lung injury if pressors are used to reduce fluid needs); it is the cost of success. That fluid MUST return to the vessels and central circulation as a prerequisite and a sign of recovery. Diastolic dysfunction and hypoalbuminemia commonly coincide; so, as venous return increases, the propensity to pulmonary edema increases. The transition to unassisted breathing (the cessation of sedative administration and a drop in mean thoracic pressure during spontaneous breathing trials) further aggravates this “venous return problem.” If the clinician does not keep up with diuresis, the patient’s lungs flood with each spontaneous breathing trial (or even before each trial), and the patient remains unnecessarily bound to the ventilator. While this model awaits confirmation in a prospective randomized study, basic physiology and common sense, like so many recent seminal findings in critical care, are sure to prevail.

Constantine A. Manthous, MD, FCCP
Bridgeport, CT

Affiliations: Dr. Manthous is Associate Clinical Professor of Medicine at Bridgeport Hospital and Yale University School of Medicine.

Financial/nonfinancial disclosures: The authors have reported to the ACCP that no significant conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article.

Correspondence to: Constantine A. Manthous, MD, FCCP, Associate Clinical Professor of Medicine Bridgeport Hospital and Yale University School of Medicine, 267 Grant St, Bridgeport, CT 06610; e-mail: Pmouth@bghosp.org

© 2009 American College of Chest Physicians. Reproduction of this article is prohibited without written permission from the American College of Chest Physicians (www.chestjournal.org/site/misc/reprints.xhtml).

DOI: 10.1378/chest.09-1723

References


Response

To the Editor:

I would like to thank Dr. Manthous for his comments regarding our article and also to acknowledge his group’s contributions to this area of investigation. We agree that optimal fluid management in patients with septic shock and ARDS can improve patient outcomes. Further clinical studies are needed to determine whether variances exist in the fluid management of such patients across many hospitals and how these variances are related to clinical outcomes. Such outcome studies, focusing on routine management issues and the supportive care of critically ill patients, have the potential to not only improve patient care, but also to reduce health-care costs.

Marin H. Kollef, MD, FCCP
St. Louis, MO

Affiliations: Dr. Kollef is Professor of Medicine, Washington University School of Medicine.

Financial/nonfinancial disclosures: The author has reported to the ACCP that no significant conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article.

www.chestjournal.org

CHEST / 136 / 6 / DECEMBER, 2009

1705

References