

A positive cumulative fluid balance in critically ill patients: is it really harm for everybody?

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by Trejnowska et al, see p. 1147

Fluid therapy in the intensive care unit (ICU) remains controversial and creates a difficult dilemma. The rationale for fluid administration in sepsis and trauma is based on the presence of primary or secondary hypovolemia due to volume loss, severe vasodilation, capillary leak, and third-space losses.^{1,2} The main aim of early fluid treatment is to achieve an acceptable volemic state (central venous pressure, 8–10 mm Hg for non-ventilated persons). Thus, early aggressive fluid resuscitation has resulted in a significant improvement in clinical outcome of critically ill patients with sepsis and trauma.^{1,2} Therefore, it is not surprising that a very large positive fluid balance (FB) is a common finding in this population.

However, this statement is not true for everyone. Even slight cumulative positive FB may in itself be harmful and can worsen respiratory function,^{3,4} associated with increased mortality in patients with acute renal failure⁴⁻⁷ and cardiac in critically ill subpopulations.⁷⁻¹⁰

On the same topic, in the current issue of *Kardiologia Polska* (*Kardiologia Pol*, *Polish Heart Journal*), Trejnowska et al¹¹ published a retrospective, observational survey of the importance of positive FB in critically ill patients. The study was conducted between January 2012 to December 2016 in 2 ICUs of Silesian Center for Heart Disease in Poland, including a total of 495 patients admitted to both ICUs. The overwhelming majority of them were patients with cardiovascular and respiratory compromise. The authors found a strong correlation between cumulative positive FB and increased mortality in cardiac critically ill patients.¹¹ The predominance of critically ill patients with cardiovascular disorders in the present study is very important in that the significance of fluid management is different for cardiac and noncardiac

critically ill subpopulations.⁷⁻¹⁰ The adequacy and appropriateness of fluid therapy (crystalloids and colloids) for cardiac patients is highly debatable, and it is suggested that more vasopressors, inotropes, and mechanical support should be used instead.¹² From this point of view, the significance of positive FB in critically ill patients could not be judged by this highly selected population in which most patients suffered from cardiovascular disease as a cause of the ICU treatment. It is also worth mentioning that the authors did not present data on catecholamine administration, acute renal and respiratory dysfunction, and other types of shock.

Trejnowska et al¹¹ highlighted in their study that even a minor quantity of positive FB might be associated with an increased risk of death in cardiac critically ill patients. Those findings are in line with a previous paper by Boyd et al,¹³ who also demonstrated that a more positive FB (more than 3 liters at 12 hours), both early in resuscitation and cumulatively over 4 days, was associated with an increased risk of mortality in septic shock. Trejnowska et al¹¹ reported that the main difference in cumulative positive daily FB between survivors and nonsurvivors was about 1 liter of fluids during the first 72 hours of the ICU stay (see Figure 1 in the original paper). This is a small positive FB that might be considered negligible and might not require resuscitation in patients with trauma and sepsis but might be detrimental for those with significant cardiovascular and respiratory compromise.

ARTICLE INFORMATION

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