

# Septic Shock Resuscitation: Continuous Fluids or Early Vasopressors?

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## ABSTRACT

Whether to fill up the pipes fully with fluids before starting vasopressors or whether to start vasopressors early, even with half-filled pipes during septic shock resuscitation, has been intensely debated in recent times. There are concerns about both approaches.

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Whether to fill up the pipes fully with fluids before starting vasopressors or whether to start vasopressors early, even with half-filled pipes during septic shock resuscitation, has been intensely debated in recent times. There are concerns about both approaches.

First, the aim of filling up the pipes to the full can have a deleterious effect on organ function which has been noticed in many studies.<sup>1–3</sup> This is because of the harmful effects of cumulative fluid overload. Since these patients have widespread inflammation and leaky capillaries, the administered fluid escapes the vascular compartment and produces edema, hypertension, heart failure, etc. But it is important to understand that the evidence for fluid overload is often subjective and erroneous. One needs to be cautious to avoid overestimation or underestimation. The formula to calculate fluid overload is—% fluid overload = [(total fluid intake – total fluid output)/admission body weight × 100].<sup>4</sup>

A cut-off of 10% is found to have higher mortality. Since calculations based on a simple formula can often be misleading, it is important to look into multiple variables and take repeated measurements to determine the trajectory of the shock state. It is also important to rely upon the dynamic indices over static indices considering heart-lung interaction. But cumulative fluid overload needs prevention by all means.

Second, although vasopressors are the cornerstone therapy in septic shock, their correct timing is extremely important to accrue their beneficial effects. There is no doubt that early use of vasopressors can correct hypotension faster and prevent prolonged periods of hypotension, but there is also some evidence that a high dose of norepinephrine may compromise the host immune system and produce deleterious effects.<sup>5</sup> Therefore, preventing excessive effects of norepinephrine load (systemic decatecholaminization) by adding second vasopressors, steroids, etc., and de-escalation after achieving desired mean arterial pressure (MAP) is also important. It has been found that increasing vasopressor dosing intensity during the first 24 hours after septic shock increases mortality which varies with the amount of early fluid administration and the timing of vasopressor titration.<sup>6</sup>

Third, it was seen in the above study (volume chasers)<sup>6</sup> that although an association existed between increasing vasopressor doses and increasing mortality, this association was lost when at least 2000 mL of fluid was administered. This implies the effects

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of volume resuscitation on the intensity of vasopressor dosing. However, the current findings of glycocalyx damage following rapid large-volume resuscitation are a cause for concern.<sup>7</sup>

Taken all, it is important to combine fluid and vasopressors early during septic shock resuscitation. While fluid administration improves tissue perfusion by increasing the preload, early vasopressors can help achieve this goal early by reaching the desired MAP early and reducing the risk of volume overload.

## REFERENCES

1. Boyd JH, Forbes J, Nakada TA, et al. Fluid resuscitation in septic shock: a positive fluid balance and elevated central venous pressure are associated with increased mortality. *Crit Care Med* 2011;39(2):259–265. DOI: 10.1097/CCM.0b013e3181feeb15
2. Malbrain MLNG, Van Regenmortel N, Saugel B, et al. Principles of fluid management and stewardship in septic shock: it is time to consider the four D's and the four phases of fluid therapy. *Ann Intensive Care* 2018;8(1):66. DOI: 10.1186/s13613-018-0402-x
3. Cinel I, Kasapoglu US, Gul F, et al. The initial resuscitation of septic shock. *J Crit Care* 2020;57:108–117. DOI: 10.1016/j.jcrc.2020.02.004
4. Bagshaw SM, Cruz DN. Fluid overload as a biomarker of heart failure and acute kidney injury. *Contrib Nephrol* 2010;164:54–68. DOI: 10.1159/000313721
5. Stolk RF, Pickkers P, Kox M, et al. Potentially inadvertent immunomodulation: norepinephrine use in sepsis. *Am J Respir Crit Care Med* 2016;194(5):550–558. DOI: 10.1164/rccm.201604-0862CP

6. Roberts RJ, Miano TA, Hammond DA, et al. Observation of variation in fluids administered in shock-characterization of vasopressor requirements in shock (volume-chasers) study group and SCCM discovery network. evaluation of vasopressor exposure and mortality in patients with septic shock. *Crit Care Med* 2020;48(10):1445–1453. DOI: 10.1097/CCM.0000000000004476
7. Hippensteel JA, Uchimido R, Tyler PD, et al. Intravenous fluid resuscitation is associated with septic endothelial glycocalyx degradation. *Crit Care* 2019;23(1):259. DOI: 10.1186/s13054-019-2534-2