

Fluid Bolus: How Much More?

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ABSTRACT

Fluid bolus in critically ill children is always a matter of concern and has to be balanced between benefits and harms. While optimizing pre-load is important in the golden hour period, fluid overload is a concern in ICU stay. Various dynamic parameters both clinical and device-guided assessment can help in optimizing fluid therapy.

Keywords: Fluid overload, Fluid responsiveness, Passive leg raising.

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Dear Editor,

The article titled "A Study to Compare Ultrasound-guided and Clinically-guided Fluid Management in Children with Septic Shock" by Sarkar et al.¹ was read with great interest. We appreciate the authors for their research and we also want to express our views about the article.

Ultrasound-guided resuscitation is gaining widespread utilization in guiding fluid bolus therapy in patients with shock. This study highlighted that patients who received fluid therapy guided by ultrasound had the lesser frequency of fluid overload than patients who received fluid bolus by clinically guided therapy. Though the duration of ventilation is same in both groups, additional results specifically mentioning the incidence of pulmonary edema in a clinically guided groups can give additional information regarding the acute effect of fluid bolus therapy. Methods to predict response to fluid bolus is still a matter of research with various dynamic parameters being reliable namely – passive leg raise (PLR), pulse pressure variation, stroke volume variation, pulse plethysmographic index, aortic or carotid blood flow velocity changes with respiration, ventilator maneuvers including end-expiratory occlusion, tidal volume challenge in addition to methods used in the indexed study.² One of the dynamic assessments of fluid response is the PLR test which mimics fluid bolus, has good accuracy, and could be used in ventilated or spontaneously breathing patients and also in patients with right heart failure.^{2,3} Surviving sepsis guidelines also recommend this PLR as a dynamic parameter for assessing fluid responsiveness in resource limited settings.⁴ A newer ultrasound modality is venous excess ultrasound (VExUS) score calculated utilizing inferior vena cava diameter, hepatic, portal and renal vein Doppler imaging correlates well with fluid status in children.⁵ Hence fluid bolus should be individualized and multiple dynamic parameters should be used whenever possible to guide fluid therapy in critically ill children. This study also shows that even fluid bolus therapy guided by ultrasound had positive fluid balance in approximately one-fourth of their study arm. This highlights that though ultrasound-guided therapy helps in guiding fluid bolus, a strict fluid calculation is necessary to prevent fluid overload in critically ill children.

We congratulate the authors for their study in utilizing multiple ultrasound-guided parameters to guide fluid therapy and also emphasize the fact that multiple parameters should be used whenever possible and PLR test is the as useful dynamic

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parameter in predicting fluid response along with other clinical parameters in resource-limited settings. Further studies involving multiple dynamic markers are in need of the hour to predict fluid responsiveness in ill children.

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