



## Correspondence

## Using ultrasound to guide fluid management in children



To the Editor,

We read with great interest the study by Choi et al. where they suggest the aorta area/the inferior vena caval (Ao/IVCA) area index had better correlations with the volume of fluid administered when compared to the inferior vena caval index (IVCI) and the aorta diameter/IVC diameter index (Ao/IVCD) and it may help determine the effects of fluid administration in children [1]. Though the study sounds scientific, we still have some questions regarding the study.

1. As the author stated the study was conducted at an academic hospital located in a city with a population of 1,000,000 with >24,000 visits to the PED each year, however, only 34 children were enrolled in this study over 10 months and the recruitment rate is too low. Can authors provide the number of children who were excluded from enrollment?
2. The study included children with vomiting or diarrhea who requiring fluid resuscitation and excluded patients with life-threatening shock. Of the enrolled patients, are there any patients with hypovolemic shock for vomiting or diarrhea, or septic shock for infectious diarrhea? If so, are they excluded or not?
3. As the ultrasound measurement conducted by an experienced physician, many patient-related factors such as obesity, lung hyperinflation, pneumothorax, and abdominal gaseous distention may still lead to measurement failed [2]. In addition, high positive end-expiratory pressure (PEEP), low tidal volume ventilation, spontaneous breathing efforts, and other local mechanical hindrances to blood return through the IVC all render it less accurate. Is there someone be excluded in this study for the reasons?
4. Ao/IVCA used to determine the effects of fluid administration was evaluated under the assumption that the preload was increased by the fluid administration. Studies have shown that only 25% of the crystalloid infusion which was infused for 30 min prior to cesarean delivery remained in the blood [3] and only 5% or less remained in the blood after 1 h in septic patients [4,5]. In this study, the children received 10 ml/kg of normal saline intravenously, every 30 min for 1 h and the aorta diameter and diameters of IVC measured in 5 min after IV fluid administration. So it is not clear how much administered fluid remained in the blood and whether it increases preload. Is this question considered by the author? And are there any other ways to replace the method of increasing preload?
5. In addition, we found there were some mistakes in this paper, for example, 1) the data of the age in Table 1 was missing; 2) the last sentence of abstract, "Ao/IVCA showed better correlations with the volume of fluid administered than IVCI and Ao/IVCA" should be

corrected to "Ao/IVCA showed better correlations with the volume of fluid administered than IVCI and Ao/IVCD".

In conclusion, ultrasound has been used as a simple, noninvasive and useful tool to guide fluid management in ICU and emergency department, but there is a long way, as mentioned above, to make it a very accurate method.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ajem.2018.10.052>.

## Conflicts of interest

The authors have no potential conflicts of interest to disclose.

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