Transoesophageal echocardiographic thoracic inferior vena caval index: Is it validated and accurate for identifying fluid responders?

We read with interest the research article by Shah and colleagues on “Goal-directed fluid therapy using thoracic inferior vena cava (IVC) index in patients with low left ventricular ejection fraction (LVEF) by transoesophageal echocardiography (TOE).”[1] We congratulate the authors for their great efforts. TOE provides valuable hemodynamic information in patients in whom access to transthoracic echocardiography (TTE) is difficult; which is a common scenario in the perioperative course of laparotomies.

We would like to raise a few queries related to the article.

The authors mentioned the background rationale for determining the usefulness of Delta-IVCD for guiding intraoperative fluid therapy in low LVEF patients. Conventionally, the usefulness of fluid therapy is indicated by identification of fluid responsiveness which is defined as a predefined increment in stroke volume after a predefined volume of fluid bolus over a short time, typically 10–15 min.[2] In our understanding, the authors have measured respiratory variation of intrathoracic part of IVC (Delta-IVCD) which physiologically would behave differently than the intra-abdominal IVC. The authors have not stated the rationale for the cutoff value of >12% for intrathoracic Delta-IVCD. However, cutoff >18% for abdominal Delta-IVCD has been described previously.[3] Respiratory variation of superior vena cava (SVC) diameter is accessible only through TOE and is considered to be more reliable (cutoff >36%) than IVC for prediction of fluid responsiveness, especially in critically ill patients.[4] Stroke volume variation (SVV) is another validated tool for fluid responsiveness. It would have been interesting if the authors would have looked at the best cutoff and the accuracy of Delta-IVCD for discriminating fluid responders from nonresponders and comparing it with previously validated tools like SVV or SVC respiratory variation.

In our opinion, it is difficult to conclude that Delta-IVCD directed IV fluids provide adequate tissue perfusion based on small sample size, absence of microcirculatory data, and lack of statistically significant difference ($P = 0.09$) in lactate values in two groups.

We express our concern about the omission of positive end-expiratory pressure (PEEP) in the study. Application of PEEP is universal in most of the studies testing fluid responsiveness and is unlikely to affect the performance of these tests. The omission of intraoperative PEEP may be detrimental and can increase the incidence of postoperative pulmonary complications.[5] We also have reservations against the use of the “furosemide rescue” in all patients in the absence of signs of LV failure or pulmonary edema just to target a predefined urine output.

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Conflicts of interest
There are no conflicts of interest.

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References
1. Shah SB, Bhargava AK, Hariharan U, Jain CR, Kulkarni A, Gupta N. Goal-directed fluid therapy using transoesophageal echocardiographic inferior venacaval index in patients with low left ventricular ejection fraction undergoing major cytoreductive surgery: A clinical trial. Saudi J Anaesth 2020;14:7-14.
2. Marik PE, Lemson J. Fluid responsiveness: An evolution of our understanding. Br J Anaesth 2014;112:617-20.
3. Barbier C, Loubières Y, Schmit C, Hayon J, Ricôme JL, Jardin F, et al. Respiratory changes in inferior vena cava diameter are helpful in predicting fluid responsiveness in ventilated septic patients. Intensive Care Med 2004;30:1740-6.
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4. Vieillard-Baron A, Chergui K, Rabiller A, Peyrouset O, Page B, Beauchet A, et al. Superior vena caval collapsibility as a gauge of volume status in ventilated septic patients. Intensive Care Med 2004;30:1734-9.

5. Sutherasan Y, Vargas M, Pelosi P. Protective mechanical ventilation in the non-injured lung review and meta-analysis. Crit Care 2014;18:211.

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