reviewed the evidence on the use of ultrasound method. SM submitted the letter. All authors read and approved the final manuscript.

Supplementary data

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Reply to: "Response to: A randomized-controlled trial comparing 20% albumin to plasmalyte in patients with cirrhosis and sepsis-induced hypotension [ALPS trial]"

To the Editor:

We want to thank Maimone *et al.* for taking keen interest in our recently published ALPS trial, comparing 20% albumin to plasmalyte for fluid resuscitation in sepsis-induced hypotension in critically ill patients.[1] We agree with their suggestions on using point-of-care ultrasound to assess volume status for guiding fluid management in patients admitted to the intensive care unit. Accurate assessment of the fluid status is the key in managing patients with complex hemodynamic alterations associated with organ dysfunction.[2] Unfortunately, we did not protocolize the fluid management in our patients using this technique. Our trial aimed to evaluate the two strategies, *i.e.*, 20% albumin and plasmalyte in patients with sepsis-induced hypotension. Notably patient enrolment, screening and randomization were initiated in the emergency department. As rightly mentioned by the authors, POCUS requires skilled and trained personnel.[3] It is primarily used for assessing dynamic changes in cardiac preload using heart-lung interactions. In addition, it facilitates the differentiation of lung pathologies and can aid in the measurement of inferior vena cava (IVC) diameter. It was not possible to perform a detailed POCUS for all patients included in our trial. However, we reported the assessment of IVC diameter, which we recorded for all patients. In addition, we observed a higher IVC diameter in patients who developed pulmonary complications. Therefore, monitoring the IVC diameter and collapsibility along with detailed POCUS could be very helpful in guiding fluid management in critically ill patients with cirrhosis and sepsis-induced hypotension or acute kidney injury (Fig. 1). In addition, we identified IVC diameter as an independent predictor of 28-day mortality, signifying the clinical relevance of fluid status as a determinant of clinical outcomes.

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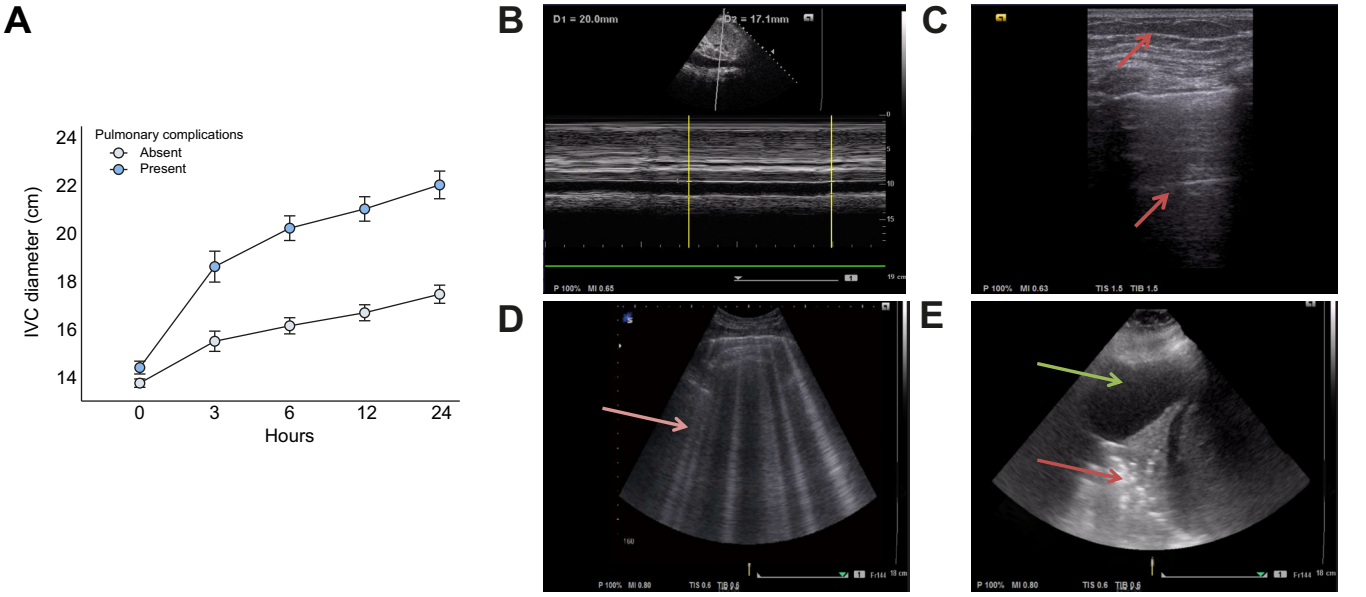

Fig. 1. The left panel highlights the variations in the inferior vena cava diameter with stratified with presence or absence of pulmonary complications and right and right panel represents the findings on lung ultrasound. (A) Graph depicting the change in IVC diameter from time to randomization up to 24 hours, stratified by the presence of pulmonary complications. The y-axis depicts the IVC diameter (in cm) and x-axis denotes time in hours post-randomization. Patients who developed pulmonary complications irrespective of the randomization group had significantly dilated IVC and a significant worsening was noted at all time points up to 24 hours compared to patients who did not develop a pulmonary complication. (B) IVC at the level of 2.5 cm from the drainage of the hepatic vein, with a respiratory collapsibility index of <50% (17.1/20). (C) Ultrasound chest: pleura and A lines. (D) B-Lines (pink arrow). (E) Pleural effusion (green arrow) and lung parenchyma with air bronchogram (red arrow). IVC, inferior vena cava. (This figure appears in color on the web.)

The potential for 20% albumin to cause pulmonary complications is worth re-emphasizing. This was also recently reported in the ATTIRE trial.[4] Similarly, the combination of albumin and terlipressin caused a higher frequency of pulmonary events in the CONFIRM trial.[5] The complex organ crosstalk in the context of sepsis in a critically ill patient with cirrhosis could be delineated by performing a detailed POCUS. The technique could provide an assessment of cardiac, pulmonary, and volume status to aid targeted management and avoid indiscriminate administration of intravenous fluids. Future studies incorporating POCUS for the assessment of fluid tolerance should be performed. We would also propose studies on POCUS for assessing cardiopulmonary status before administration of 20% albumin to see if this could reduce the incidence of pulmonary complications.

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Conflict of interest

The authors declare no conflicts of interest that pertain to this work.

Please refer to the accompanying ICMJE disclosure forms for further details.

Authors' contributions

Drafting of manuscript done by RM, Ultrasound images put by AD. Critical revision of manuscript done for important intellectual content by SKS.

Supplementary data

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Author names in bold designate shared co-first authorship

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