measurement, it is not a patient-specific diagnostic technique and cannot assist evaluation for ETT location that is at risk of endobronchial intubation. Placement of the ETT to a referenced distance, no matter how reliable, does not allow for the healthcare provider to be aware of how to determine inappropriate ETT location in a specific patient.

(3) As the technology of point-of-care ultrasound becomes more available, it is on each specialty to identify how this advancing modality can provide patient benefit. This study was created to evaluate if airway ultrasound to assess the ETT location could be one modality that should be evaluated in this manner. Clearly, the stethoscope remains a rapid assessment modality, but other specialties such as emergency medicine and critical care have spent the last decade "evaluating" point-of-care ultrasound as another rapid assessment tool. For example, critical care has demonstrated utility with ultrasound for evaluation of pulmonary edema,[10] while anesthesiologists more often rely on auscultation. In fact, emergency medicine has adopted point-of-care ultrasound training as a "core competency" for residency training and provides a year of fellowship training in clinical ultrasonography.[11]

In summary, both auscultation and point-of-care ultrasound can currently coexist as important diagnostic tools. Innovation in medicine does not mean replacement, and until the availability and cost are equal, one cannot replace the stethoscope with ultrasound. However, this day may come, and we should create room on our diagnostic tool belt for point-of-care ultrasound and evaluate how it can positively impact perioperative care.

Importantly, however, we need to understand that just as all medical students and training physicians receive years of training on the stethoscope, so should we develop appropriate training for ultrasound. Dr. Filly[12] wrote an Editorial in *Radiology* in 1988 entitled "Ultrasound: The Stethoscope of the Future, Alas" in which he stated: "As we look to the proliferation of US [ultrasound] instruments into the hands of untrained physicians, we can only come to the unfortunate realization that diagnostic sonography truly is the next stethoscope: used by many, understood by few." With thoughtful research, perhaps we can define the role of perioperative point-of-care ultrasound before this occurs.

Competing Interests

Dr. Ramsingh declares no competing interests relevant to the material above. He is a consultant for Edwards Life Sciences (Dallas, Texas). Dr. Cannesson declares no competing interests.

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Assessing the Effect of Exogenous Albumin on the Incidence of Postoperative Acute Kidney Injury in Patients Undergoing Off-pump Coronary Artery Bypass Surgery

To the Editor:

In a prospective, randomized, and placebo-controlled trial, Lee *et al.*[1] recently showed that administration of 20% exogenous albumin immediately before surgery increases urine output during surgery and reduces the risk of acute kidney injury (AKI) after off-pump coronary artery bypass surgery in patients with a preoperative serum albumin level of less than 4.0 g/dl. Many things in this study were done correctly. But to differentiate the effects of one factor on study endpoints, all the other factors have to be standardized in the study design. Several important factors in this study were not addressed well.

First, contrast angiography or ventriculography was not included in data analysis. Actually, preoperative contrast angiography or ventriculography was not rare among

patients undergoing cardiac surgery. Contrast-induced nephropathy is independently associated with increased risks of postoperative adverse renal events.[2]

Second, perioperative hemoglobin levels were not provided. Preoperative anemia is not rare among patients undergoing cardiac surgery and is an important risk factor for postoperative AKI. Anemic patients undergoing cardiac surgery are more susceptible to transfusion-related AKI than nonanemic patients are.[3]

Third, as shown in table 1,[1] mean volumes of blood transfusion and fluids during surgery and the postoperative period were not significantly different between the two groups. But total input volumes at all observed points had highly variable ranges. It was unclear whether serum creatinine levels applied in diagnosis of postoperative AKI had been adjusted based on the perioperative fluid balance of patients. Moore *et al.*[4] showed that using Acute Kidney Injury Network criteria for diagnosis of AKI, without adjusting serum creatinine levels for fluid balance, can underestimate the incidence and severity of AKI after cardiac surgery.

Finally, when assessing the association of albumin with postoperative AKI by multivariable analysis, only preoperative and intraoperative covariates were adjusted in this study. It has been shown that postoperative complications including low cardiac output syndrome, hypoalbuminemia, anemia, and sepsis are independent risk factors of AKI after cardiac surgery.[5] We argue that not taking postoperative covariates into account would have biased the true effect of exogenous albumin administration on the occurrence of postoperative AKI in this study.

Competing Interests

The authors declare no competing interests.

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In Reply:

We thank Drs. Zhang and Xue for their interest in our article[1] and appreciate the opportunity to answer their questions. First, we agree that preoperative coronary angiography with contrast media may be related to the development of postoperative acute kidney injury (AKI).[2] However, as shown in table 1 in our article,[1] there was no significant difference in the number of patients who underwent coronary angiography less than or equal to 7 days before surgery between the two groups. Additionally, our previous study showed that the timing of the coronary angiography, the type of contrast agent, or the amount of contrast agent did not affect the development of postoperative AKI in patients who underwent off-pump coronary artery bypass surgery.[3] Thus, this is not likely to have had an impact on our results.

Second, although we agree that perioperative anemia and transfusion are important risk factors for postoperative AKI,[4] we do not agree that "perioperative hemoglobin levels were not provided." We presented the preoperative hematocrit level, the intraoperative lowest hematocrit level, and the number of packed red blood cell units transfused during or after surgery in tables 1 and 2 in our article,[1] all of which were similar between groups. As we stated in our article, we also performed adjustment for preoperative hematocrit using logistic regression.

Third, we agree that adjustment of creatinine for fluid balance has been proposed for a more accurate assessment of AKI.[5] However, in our study, we did not calculate corrected serum creatinine for fluid balance due to inaccurate fluid balance information including incorrect counts of bleeding. Therefore, it is possible that the positive fluid balance may influence the diagnosis of postoperative AKI, and the differences in fluid balance between the two groups influenced our results. However, as shown in table 2 in our article,[1] although there was no significant difference between the two groups, slightly higher postoperative weight gain, which indicates more positive fluid balance, was shown in the control group. Given that the effects of adjustment are larger in patients with more positive fluid balance, the incidence of AKI in the control group may be more masked than that in the albumin group.

Finally, we also agree on the point that several confounding postoperative events could affect our results. Therefore, as the authors suggested, we performed additional analyses to assess the effects of adjustment for postoperative confounding variables (except postoperative hypoalbuminemia and sepsis due to the possibility of mediator and no occurrence, respectively). After additional adjustment for postoperative low cardiac output syndrome and anemia using logistic regression, similar protective effects of albumin treatment were found (odds ratio, 0.409; 95% CI, 0.195 to 0.859; $P = 0.018$ and odds ratio, 0.411; 95% CI, 0.196 to 0.862; $P = 0.019$, respectively).

Competing Interests

The authors declare no competing interests.