

LETTER

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Mixed colloids and acute kidney injury: a case of selection bias?

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In a previous issue of *Critical Care*, Frenette and colleagues [1] described a retrospective study of 984 cardiac surgery patients receiving mixed colloids, including hydroxyethyl starch (HES) 130/0.4 in 82% or HES 200/0.5 in 43%. In 25% or more of the patients, both HES solutions were used. A small minority (16%) received 5% or 25% albumin. An association was observed between albumin exposure and acute kidney injury (AKI).

Much essential information is not provided, including what colloids were administered, why, and when. How many patients received 5% albumin? 25% albumin? How often was albumin co-administered with HES 130/0.4? With HES 200/0.5? With both? In what co-administered doses? How much of each colloid was used for extracorporeal circuit priming? For volume expansion? How much albumin was used to correct hypoalbuminemia? What was the temporal relationship between albumin infusion and AKI development?

No serum albumin levels are reported. Yet preoperative hypoalbuminemia is a potent independent risk factor for renal failure in cardiac surgery patients (adjusted odds ratio 2.0, 95% confidence interval 1.3 to 3.2) [2]. A reported 15% of patients come to cardiac surgery with severe hypoalbuminemia (less than 25 g/L serum albumin), and the majority of those (58%) undergo elective procedures [2].

Albumin is typically reserved for a small minority of the highest-risk patients [3,4]. That practice may explain this study. The significantly lower HES 200/0.5 doses co-administered with albumin in the propensity-matched population suggest that albumin was substituted to mitigate the increased AKI risk of HES 200/0.5 previously reported by this same team of investigators [5]. With obvious potential selection bias and many unanswered questions, this study needs to be interpreted with caution.

Authors' response

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We agree with Groeneveld and colleagues that there are several unanswered questions regarding the use of albumin. Albumin administration has been associated with different outcomes depending on the type of population studied [6-9]. In the recent Albumin Italian Outcome Sepsis (ALBIOS) trial, administration of 20% albumin did not improve prognosis by correcting hypoalbuminemia, improving hemodynamic status, or restricting the total amount of fluid administered [9]. In addition, albumin is expensive and may carry an infectious risk.

In our study, we acknowledged that we could not rule out residual confounding despite the use of a propensity

score analysis and mentioned that we did not have data on serum albumin levels [1]. However, we described the timing and type of colloids administered and stated that the vast majority of the surgeries were elective. We used a propensity score analysis, which included the percentage and dose of synthetic colloids administered, to address any indication bias. However, our study does not provide a definitive answer on the administration of albumin in cardiac surgery patients. As we concluded, we believe that the safety of albumin-containing fluids on kidney function should be assessed in future cardiac surgery trials. The administration of a costly product currently associated with neutral or potentially negative outcomes in this population needs to be better delineated.

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Abbreviations

AKI: Acute kidney injury; HES: Hydroxyethyl starch.

Competing interests

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Authors' contributions

All authors participated in the conceptualization and composition of the letter. All authors revised the letter and read and approved the final manuscript.

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