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Tight Glycemic Control and Cardiac Surgery-Associate Acute Kidney Injury

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Keywords

acute kidney injury; cardiac intensive care; cardiopulmonary bypass; congenital heart disease; tight glycemic control; pediatric critical care; cardiac surgery

We appreciate the thoughtful commentary by Liu et al¹ regarding our secondary analysis of data from the randomized Safe Pediatric Euglycemia After Cardiac Surgery (SPECS) trial.^{2,3} In this study we found no relationship between tight glycemic control (TGC) and postoperative cardiac surgery-associated acute kidney injury (CS-AKI) in a large cohort of young children undergoing congenital heart surgery. In the parent study, subjects between 0-36 months of age undergoing cardiac surgery requiring cardiopulmonary bypass were randomized either to TGC or standard glucose management in the cardiac intensive care unit.^{3,4} The primary outcome was incidence of hospital-acquired infection (HAI).^{3,4} Preoperative and operative characteristics between the TGC and standard care group were similar and there were no differences in HAI between the two groups.^{3,4}

CS-AKI was assigned according to the Acute Kidney Injury Network criteria⁵ as originally established (including the 48-hour window), with the >0.1 mg/dL increase in serum creatinine being the sole modification. Moreover, the majority of CS-AKI occurred within the first 24 hours (93% at University of Michigan and 56% at Boston Children's Hospital) after surgery. As we describe in our limitations, we did not correct serum creatinine to fluid balance, which Basu et al and others have indicated may underestimate clinically significant CS-AKI.^{6,7}

We agree with Liu et al that, because we performed a retrospective secondary analysis of data from the SPECS database, we are unable to control for important covariates, including: hyper- and hypovolemia, blood loss, anemia, blood product transfusion, deleterious intraoperative and postoperative hemodynamics as well as many other possible covariates. This is a well-recognized limitation of retrospective studies in general, and one we acknowledge in our original paper. Future studies aimed at understanding the mechanisms underlying CS-AKI will need to account for these potential covariates. Nevertheless, our

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data adds to an increasing body of knowledge indicating no support for the use of TGC to prevent CS-AKI in young children undergoing congenital cardiac surgery.

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