Standardizing Care in Pediatric Continuous Kidney Replacement Therapy—Can We Reach Consensus Without Adequate Evidence?

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Continuous kidney replacement therapy (CKRT) is the predominant extracorporeal support for management of acute kidney injury, fluid overload, and metabolic derangements. Daverio and colleagues1 surveyed professionals from pediatric intensive care units (PICUs) in 20 countries across Europe. The study covered various domains of center and respondent characteristics, organizational aspects for education and training, CKRT duration, vascular access, approach to CKRT termination, anticoagulation, and fluid-removal strategies. Only a single response from each center was captured, with an impressive 76% response rate. Not surprisingly, there was substantial heterogeneity in practice across all domains of assessment. Perhaps the true testament to the high response rate was how this survey was disseminated, which leveraged an official organization: the European Society of Paediatric and Neonatal Intensive Care (ESPNIC). Members of ESPNIC might be more likely to complete a survey when it is disseminated by an official organization, which potentially aids in amplifying importance.

There are several issues with this survey study that should be underscored. This report encompasses only European PICUs1 and could not glean global variation in practice. Moreover, of the 161 responses from 211 PICUs analyzed, 52% of them came from the UK, Germany, Turkey, and Italy, so there may be substantial intracountry and intercountry heterogeneity, or even homogeneity, that has not been identified by this study. Elucidating patient characteristics was not the goal of this study due to the survey design, which limits translation to developing consensus recommendations, as the authors correctly identified. Interestingly, the practice patterns differed from what has been reported by other organizations, including an unpublished study from the Worldwide Exploration of Renal Outcomes Collaborative in Kidney Disease that described the clinical characteristics of 1000 children who received CKRT in North America and Europe. The most common reported form of anticoagulation used differed from recommendations in the Kidney Disease: Improving Global Outcomes (KDIGO) guidelines, underlining regional practice differences. Only about one-third of the centers used citrate, and we cannot determine if this finding was related to regional availability, cost, or other factors, such as resource constraints. The unanimous preference was for lines to be placed in the right internal jugular vein, consistent with KDIGO guideline recommendations. The caliber of lines used are much smaller than traditionally available in the US, emphasizing differences in access to right-sized equipment and disposables that challenge pediatric clinicians. Ideally, a balancing metric exploring line-associated thrombi would shed more light into best practices given the recent reports of increased hypotensive episodes with internal jugular lines.2

This study by Daverio and colleagues1 may not capture actual practice patterns as only 1 person per PICU was surveyed, potentially introducing confirmation bias and availability heuristic. Indeed, this situation might explain the surprisingly short time reported between the decision to initiate and initiating CKRT (2 hours) as it is not quite clear how this data point was collected and may be biased by recall or optimism. The authors found a notable lack of continuing education and yearly refreshers, but this finding could be attributed to the majority of survey responders being physicians (90% of respondents) and not necessarily being familiar with ongoing nursing education efforts in their centers. This survey study lacked detailed information across several domains of CKRT practice. Some of the most important areas to consider in future evaluations include practice differences in prescribing and delivering dose to ascertain the most optimal dose for children as well as nutritional

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practices. It is known that there are nutritional losses during CKRT. Identifying how and what changes are being made to nutrition during CKRT is essential to identify areas for improving protein and calorie delivery, optimizing short-term and long-term outcomes of growth and development.

To move forward, it is essential to identify gaps in education, training, and practice. The necessity of this approach was recently emphasized by the first pediatric Acute Disease Quality Initiative (ADQI). This group of experts provided consensus recommendations and suggestions for children receiving kidney support therapy to ensure high-quality programs and provide a general guide for prioritizing areas of focus for future research. The 22nd ADQI consensus meeting outlined minimum programmatic standards and quality metrics for delivering high-quality CKRT across the age spectrum. Before we can establish consensus, we need to understand the current practice. Daverio and colleagues have provided an important first step; however, there was insufficient granularity to truly get a scope of practice patterns across all European PICUs. Most pediatric CKRT knowledge has originated from adult studies, single-center pediatric reports, and a multicenter registry with selective enrollment of children from the US, making it especially challenging to identify which practice approach is likely to be associated with the best patient outcome. A single-center report comparing outcomes across 2 different eras demonstrated substantial practice change over the 10 years of study that did not translate to a discernable survival benefit across eras. Goldstein and colleagues compared survival among infants treated with CKRT using either adapted adult platforms or CARPEDIEM (Cardio-Renal Pediatric Dialysis Emergency Machine; Medtronic) and found improved survival to CKRT discontinuation in those treated with CARPEDIEM. It should be noted, however, that there was a nearly 20-year gap between the study periods of the 2 populations. It is likely that there have been substantial improvements in medical care in the past 20 years, independent of provision of CKRT. Consensus, although helpful, needs to be based on contemporary practice and recent supporting pediatric data.

In summary, data on CKRT practice and outcomes for generating best practice recommendations are sparse, limited to dated multicenter studies and small single-center reports. This ESPNIC survey study is a well-timed opportunity to better understand how to improve pediatric CKRT outcomes in Europe. Global efforts with stakeholder participation from relevant geographic areas are needed to extrapolate the methods to children across the world with adequate understanding of local resources to make tangible implementation of the lessons learned from a pragmatic reality.

ARTICLE INFORMATION
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REFERENCES


