in the immediate postoperative period, caused by inadequate monitoring and control of the homeostasis and inappropriate management of the cerebral perfusion and oxygen delivery.8-10

With all the above factors influencing the myocardial function and the neurodevelopment, it seems simplistic to propose a solution, or the scavenging of cardioplegia, as the magic bullet taking care of both the myocardial and cerebral protection, without analyzing and evaluating all the elements contributing to the overall outcomes.

References

Commentary: Custodiol-HTK: Should the burden be on the surgeon or the perfusionist?

Ibrahim Abdullah, MD,a,b and Zohair Al-Halees, MDb

Turner and colleagues present their experience with Custodiol-HTK cardioplegia (Custodiol-HTK Koheler Chemie, GmbH, Bensheim, Germany) administration and the influence of its right atrial scavenging on hyponatremia and seizures.1 They retrospectively analyzed all patients aged 18 years and younger who underwent cardiopulmonary bypass between January 2016 and March 2018 and found that 70% of patients in the nonscavenge group had serum sodium levels <130 mEq/L, whereas 21% of the patients in the scavenge group experienced the same. They further found that 87.5% of patients who had seizures had serum sodium levels <130 mEq/L, whereas no patient with a serum sodium level ≥130 mEq/L experienced a seizure.

From the 1Department of Pediatric Cardiac Surgery, Steven and Alexandra Cohen Children’s Medical Center, Northwell Health, New Hyde Park, NY; and 2Department of Pediatric Cardiac Surgery, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia.

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Address for reprints: Ibrahim Abdullah, MD, Department of Pediatric Cardiac Surgery, Steven and Alexandra Cohen Children’s Medical Center, Northwell Health, New Hyde Park, NY 11040 (E-mail: iabdullah1234@gmail.com).

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Their experience underscores the importance of avoiding hyponatremia. However, what is the best way?

Custodiol-HTK is 1 of a few revolutionary cardioplegia solutions where a single dose can provide myocardial protection for up to 3 hours.\(^1\) As such, Custodiol-HTK continues to gain increasing interest among pediatric heart centers. As the authors point out, approximately 31% of centers in North America are using Custodiol-HTK according to an international survey of perfusionists.\(^2\) However, this growing popularity of Custodiol-HTK does come with a real risk of hyponatremia that is not unique to the authors’ experience.\(^3\)

At King Faisal Specialist Hospital & Research Center in Riyadh, Saudi Arabia, we perform approximately 500 pediatric open heart procedures of all levels of complexity annually and switched to using Custodiol-HTK exclusively in 2009. The dose we typically give is 30 to 50 mL/kg, which can result in a significant volume. Hence, there is significant potential for hyponatremia and hemodilution. Initially, as it has been recommended, we used to scavenge the solution. This required bicaval cannulation with snares around the cavae and a right atriotomy. These steps are not part of all cardiac operations. Furthermore, spending 6 to 8 minutes focused on nothing but suctioning the solution was believed to be valuable time that could be utilized doing some other important steps. As such, our practice shifted to not scavenging the solution in patients not requiring entry into the right atrium. The task was transferred to the perfusion team. However, as the authors note, it requires meticulous monitoring of serum sodium level and correction by the perfusion team. Our protocol includes use of ultrafiltration during bypass keeping the hematocrit at ~30% with continuous online electrolyte monitoring. When needed, sodium chloride solution is added. If a second dose of cardioplegia is needed, we use a dose of 15 mL/kg. Applying these principles in our practice, we were able to more or less eliminate significant sodium fluctuations. We rarely see a sodium level <129 mEq/L. We only had 1 patient develop seizures related to Custodiol-HTK administration and that patient received 3 doses after which his sodium went down to 120 mEq/L.

The authors present an important study demonstrating the benefits of scavenging Custodiol-HTK and its influence on mitigating hyponatremia and seizures. The end goal of mitigating hyponatremia must remain the focus—whether it is accomplished by the surgeon or the perfusionist.

**References**