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Commentary: Two birds with one stone

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Intraoperative myocardial and cerebral protection play a very important role in determining the cardiac function and the neurodevelopment in the early and late follow-up. Turner and colleagues¹ observed that Custodiol-HTK (Koehler Chemi GmbH, Bensheim, Germany) cardioplegia provided excellent single-dose myocardial protection in pediatric patients undergoing cardiac surgery but caused fluctuations in serum sodium level during crossclamp, and this side effect was associated with a disturbing incidence of postoperative seizures. After introducing right atrial effluent scavenging of the cardioplegic solution to mitigate serum sodium level changes, they reported that this technique virtually abolished the occurrence of postoperative seizures in their pediatric cardiac patients.¹

It is certainly important to use a cardioplegic solution with the lowest possible incidence of associated negative effects, but the advantages of a single intraoperative procedure, in this case the scavenging of the cardioplegic solution from the right atrial effluent, should not be isolated from the big pictures of myocardial and cerebral protection.

Myocardial protection depends on several variables, all potentially interfering among each other.²⁻⁴ During the preoperative period, it is important to provide adequate oxygenation and oxygen delivery, maintenance of appropriate homeostasis, and myocardial function.² Intraoperatively, vital are the conduction of general anesthesia, with proper mechanical ventilation, anticoagulation and blood products management, as well as the

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CENTRAL MESSAGE

Myocardial and cerebral protection are dependent upon multifactorial variables, all interdependent. A solution targeting both has to be evaluated in relationship to all the involved variable.

cardiopulmonary bypass technique, with optimization of priming and circuit, a perfect conduction of flow, pressure, and temperature, with avoidance of any myocardial distension and accurate weaning strategy, in addition to obsessive control and maintenance of the homeostasis.³ Not to mention that not only the composition but also the method of administering the cardioplegic solution is also extremely important, with regard to the route, pressure, flow, temperature, and dose.⁴ And the immediate postoperative period is also extremely delicate, starting with the transport from the operating room to the intensive care unit, the continuous monitoring and stability of all vital and laboratory parameters, as well as the quality control of surgery ruling out residual intracardiac defects, appropriate oxygen delivery, maintenance of homeostasis and cardiac function, fluid balance, and adequate ventilatory and pharmacological support.

The neurodevelopment is also depending upon several factors, starting from the genetic predisposition, associated brain malformations, and prenatal events such as abnormal maternal-fetal environment, altered cerebral blood flow, and oxygen delivery, all known to be responsible for brain lesions already present at birth.⁵⁻⁷ The period preceding the first interventional or surgical procedure can cause brain injury because of inadequate blood flow and pressure, hypoxemia, metabolic acidosis, or a combination of the above. Poor cerebral protection can also occur during the perioperative period as well as

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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.

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

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Turner and colleagues present their experience with Custodial-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

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CENTRAL MESSAGE

The end goal of mitigating hyponatremia with Custodiol-HTK cardioplegia solution must remain the focus—whether it is accomplished by a surgeon or a perfusionist.

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

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