

# Author Response: Balanced Electrolyte Solutions in Diabetic Ketoacidosis: Where does Sterofundin Stand?

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## Dear Editor,

We appreciate the opportunity given to us by the letter to editor to clarify the non-inclusion of the prospective case-control observational study on Sterofundin™ in the recently published updated meta-analysis comparing balanced crystalloids and 0.9% saline for the resuscitation of diabetic ketoacidosis (DKA).<sup>1-3</sup> The screening period for our meta-analysis concluded on May 14, 2024, whereas the aforementioned study on Sterofundin™ was only published online on August 24, 2024.

The term “balanced crystalloids” refers to intravenous (IV) fluids with an *in vivo* strong ion difference (SID) similar to that of plasma (42 mEq/L) or electrolyte compositions, particularly chloride, closely resemble plasma levels.<sup>4</sup> Although, Plasmalyte-A and Sterofundin™ are considered balanced crystalloids, their composition differs. While the chloride content of Sterofundin™ (127 mEq/L) is lower than that of 0.9% sodium chloride (154 mEq/L), it remains higher than plasma chloride levels and has an *in vivo* SID of 29 mEq/L. In comparison, Plasmalyte A contains 98 mEq/L of chloride and has an SID of 50 mEq/L.

A recent meta-analysis, including randomized controlled trials, compared various balanced crystalloids across a wide range of clinical contexts.<sup>5</sup> Plasmalyte A administration was associated with lower post-infusion serum chloride concentrations compared to Sterofundin™ [mean difference (MD) of -0.83 mmol/L; 95% CI, -1.64 to -0.03 mmol/L] and higher base excess (MD of +0.65 mmol/L; 95% CI, +0.25 to +1.05 mmol/L). However, evidence directly comparing different balanced crystalloids in patients with DKA remains scarce. We agree with the colleagues, that further research comparing balanced crystalloids, especially Sterofundin™ is required. However, given the higher chloride concentration in Sterofundin™, it is counterintuitive to expect superior outcomes compared to Plasmalyte A.

Despite the physiological benefits of balanced crystalloids in DKA, such as a reduced risk of hyperchloremic metabolic acidosis, robust evidence on patient-centric outcomes, including the risk of acute kidney injury and mortality, is still lacking. Furthermore, the long-term effects of balanced crystalloids in patients with DKA are not well established. Further research is needed to determine an optimal fluid strategy for resuscitation in DKA. However, current evidence supports the use of balanced crystalloids in the resuscitation of patients with DKA and a review of guidelines recommending 0.9% sodium chloride in DKA.

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