

Nephrotoxicity by Administration of Hyperchloremic Solutions

To the Editor:

The title of the publication by Kancir *et al.*¹ implies lack of nephrotoxicity associated with the use of either 6% hydroxyethyl starch 130/0.4 or 0.9% NaCl during hip arthroplasty. The primary outcome variable was urinary concentrations of neutrophil gelatinase-associated lipocalin (u-NGAL). For all observation points, u-NGAL concentrations are reported as absolute and as values adjusted for creatinine (table 3). However, at the time of the highest u-NGAL concentrations (*i.e.*, at discharge; observation point “urine 4”), values of neither creatinine clearance (table 3) nor plasma creatinine concentration (table 4) are provided.

The authors describe the postoperative u-NGAL concentrations as only “slightly increased” and remaining “well below” the threshold of 100 ng/ml, considered to reflect acute kidney injury. However, at the time of patient discharge, median u-NGAL concentrations had increased 9- to 11-fold over baseline values, and the 75% quartile values of u-NGAL at discharge were 160.5 and 116.3 ng/ml in the hydroxyethyl starch and NaCl groups, respectively (table 3). This indicates that several patients of each group had u-NGAL concentrations well above the critical concentration of 100 ng/ml, reflecting the development of some degree of nephrotoxicity.

The authors mention in a somewhat passing fashion that their use of chloride-rich solutions may have contributed to the transient increases in u-NGAL concentrations. Infusion of 2 l of 0.9% NaCl in healthy individuals was associated with a 40% decrease of renal blood flow velocity and renal cortical tissue perfusion.² This was accompanied by a mean increase in serum chloride concentrations from initially 103 to 108.5 mmol/l within 60 min of starting the infusion. Additional evidence supports the adverse renal effects of hyperchloremic solutions.^{3–5}

Therefore, administration of hyperchloremic solutions might well have contributed to the clinically relevant increases in u-NGAL concentrations in some patients observed by Kancir *et al.*¹ There are no large prospective clinical studies clearly documenting an adverse effect of perioperative administration of hyperchloremic solutions on outcome. Nevertheless, intraoperative infusion of hyperchloremic 0.9% NaCl carries a high potential of inducing hyperchloremic metabolic acidosis,⁶ and acute hyperchloremia and hyperchloremic acidosis have numerous adverse effects.⁷ It may thus be prudent to avoid the perioperative administration of hyperchloremic solutions altogether whenever possible.

Competing Interests

The author has received lecturing honorarium from Fresenius Kabi AG, Bad Homburg, Germany.

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(Accepted for publication March 9, 2015.)

Is Hydroxyethyl Starch 130/0.4 Safe for the Kidney in Noncardiac Surgical Patients?

To the Editor:

The recent article by Kancir *et al.*¹ assessing nephrotoxicity of 6% hydroxyethyl starch (HES) 130/0.4 compared with 0.9% isotonic saline in the patients undergoing hip arthroplasty was of great interest. They showed no harmful effect of intraoperative infusion of 6% HES 130/0.4 on postoperative renal function. Many things of this study were well done. The authors used a prospective, double-blinded, placebo-controlled design and chose a sensitive and well-validated endpoint of acute kidney injury (AKI): neutrophil gelatinase-associated lipocalin (NGAL), which fulfills many characteristics of an appropriate “real-time” biomarker for AKI detection and is called as a troponin-like biomarker for human AKI.^{2,3} They had a consistent operation (elective hip arthroplasty). Also, they had tried to control most of the known factors affecting perioperative AKI, such as age, body mass index, preoperative comorbidities and medications, duration of surgery, intraoperative blood loss and transfusion, uses of vasoactive drugs.^{4,5} All these are strengths in the study design.