

Capsule Summary

Effect of Balanced Crystalloids on the Kidney

Crystalloid solutions are widely used in clinical practice for correction of fluid and electrolyte imbalance. Normal saline is the most widely used crystalloid solution. Emerging evidence suggests that balanced crystalloids which are more balanced with respect to plasma might have some advantages over normal saline particularly with regards to the kidney function. A recently published study in BMC Nephrology analysed the effect of balanced crystalloids on urinary biomarkers of acute kidney injury in critically ill adults.

Objective:

To better understand the effect of crystalloid composition on the development of tubular injury

Study Hypothesis:

- Urinary biomarkers of renal tubular injury would be lower in patients who received balanced crystalloids compared to the patients who received normal saline.
- Study Methodology: An ancillary study was conducted to the Isotonic Solutions and Major Adverse Renal Events Trial (SMART) between February 15 to July 15, 2016
- Compared the effect of balanced crystalloids in comparison with saline on urinary levels of neutrophil gelatinase- associated lipocalin (NGAL) and kidney injury molecule-1 (KIM-1) among 261 consecutively-enrolled critically ill adults admitted from the emergency department to the medical ICU.
- Informed consent was received from all the patients.
- Urine samples were collected from the patients 36 ± 12 h after hospital admission.
- NGAL and KIM-1 levels were measured using commercially available ELISAs

Study Results:

| | Balanced Crystalloid Group | Saline Group | Interpretation |
|----------------------|---|--|---|
| Number of patients | 131 | 130 | |
| Urinary NGAL Levels | (median, 39.4 ng/mg [IQR 9.9 to 133.2]) | (median, 64.4 ng/mg [IQR 27.6 to 339.9]) | Significantly lower in the balanced crystalloid group (p<0.001) |
| Urinary KIM-1 Levels | (median, 2.7 ng/mg [IQR 1.5 to 4.9]) | (median, 2.4 ng/mg [IQR 1.3 to 5.0]) | No difference between both the groups (p=0.36) |

Conclusion:

- Patients who received balanced crystalloids had significantly lower urinary concentrations of NGAL and similar urinary concentrations of KIM-1 compared to those who received saline.
- Use of balanced crystalloids resulted in a modest reduction in early biomarkers of acute kidney injury compared with saline

Information Source:

You can access the full article at <https://bmcnephrol.biomedcentral.com/articles/10.1186/s12882-021-02236-x>

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