Patient Specific Risk Factors for Hyperchloremia in Oncologic Emergencies

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Background: Administration of large amounts of intravenous fluids is common in oncologic patients for prophylaxis of adverse drug events (ADE) or in the setting of oncologic emergencies, including tumor lysis syndrome (TLS) and hypercalcemia of malignancy. Recent literature suggests a benefit to using balanced crystalloids over normal saline for prevention of acute kidney injury (AKI), acid/base disturbances, and in-hospital mortality in a variety of patient populations. In addition, fluids can lead to hyperchloremia, which has been shown to correlate with an increase in AKI and in-hospital mortality. Determining patient-specific variables that are associated with the development of hyperchloremia could help identify patients who would benefit from balanced crystalloids.

Objective: The primary aim of this study was to describe the risk for development of hyperchloremia in hematology/oncology patients receiving large volumes of intravenous 0.9% sodium chloride for oncologic emergencies or chemotherapy ADE prophylaxis. Secondary objectives include assessment of chloride exposure, incidence of AKI, and in-hospital mortality.

Methods: This was an IRB-approved, retrospective chart review completed at a large academic medical center in Charleston, South Carolina. Patients who were 18 years or older, admitted to MSUC Health parent location between January 14th 2014 and August 31st 2021, and received a chemotherapy regimen that required large volumes of 0.9% sodium chloride or who were considered high risk for tumor lysis syndrome were included in the study. Patients were excluded if they had hyperchloremia (serum chloride >110 mEq/L) at baseline, end stage renal disease defined as creatinine clearance <15 mL/min or requiring hemodialysis, those who only received fluids other than normal saline, or patients enrolled in a clinical trial.

Preliminary Results: Out of 291 patients included in the study, 126 developed hyperchloremia and 108 did not. Baseline characteristics were well balanced between the groups, except more patients in the hyperchloremia arm had AML (p=0.001). There was not a statistical difference in the amount of total fluid balance at the end of day 3 (p=0.632) or total volume of 0.9% sodium chloride administered between the groups (p=0.131). Patients in the hyperchloremia group received more ACE-I/ARBs, NSAIDs, contrast dye, diuretics, and antibiotics, with no difference in the incidence of acute kidney injury (p=0.128). The median hospital length of stay was 7 days longer in the hyperchloremia group (p=0.001), without a significant difference in ICU length of stay (p=0.876).

Conclusion: Patients who developed hyperchloremia received significantly more nephrotoxic medications and had a longer hospital length of stay compared to patients who did not develop hyperchloremia. Final analysis is ongoing to explore risk factors predictive for hyperchloremia.