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High dose vitamin C associated with acute kidney injury and mortality

Background: The effects of vitamin C on clinical outcomes in critically ill patients remain controversial due to inconclusive studies. Oxalic acid and oxalate toxicity have been shown to occur in myocardial tissue of patients with hereditary and possibly secondary hyperoxaluria. This retrospective observational cohort study evaluated the effects of vitamin C therapy on acute kidney injury (AKI) and mortality among septic patients.

Methods: Electronic medical records of 1390 patients from an academic hospital who were categorized as Treatment (received at least one dose of 1.5g IV vitamin C, n=212) or Comparison (received no, or less than 1.5g IV vitamin C, n=1178) were reviewed. Propensity score matching was conducted to balance several covariates between groups. Multivariate logistic regressions were conducted predicting AKI and in-hospital mortality among the full sample and a sub-sample of patients seen in the ICU.

Results: Data revealed that vitamin C therapy was associated with increases in AKI (OR=2.07 95% CI [1.46-2.93]) and in-hospital mortality (OR= 1.67 95% CI [1.003-2.78]) after adjusting for demographic and clinical covariates. When stratified to examine ICU patients, vitamin C therapy remained a significant risk factor of AKI (OR=1.61 95% CI [1.09-2.39]) and provided no protective benefit against mortality (OR= 0.79 95% CI [0.48-1.31]). The authors recommend ongoing use of high dose vitamin C in sepsis should be appraised due to observed associations with AKI and death.

Further Research:

The authors are reviewing this data base to evaluate if there is a dose of vitamin C that is associated with toxicity.

The authors are reviewing the NIH National COVID Cohort Collaborative (N3C) data base to assess if

high dose vitamin C when used to treat COVID-19 was associated with AKI and mortality. If the association persists in this data base additional studies of toxicity of vitamin C will be undertaken.

Multiple Logistic Regression Models Predicting Acute Kidney Injury and Mortality in the Total Population Performed after Propensity Score Matching (3:1) (n=848).

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Biography

Thomas McCune is the Chair of the Division of Nephrology Department of Internal Medicine at Eastern Virginia Medical School. His current areas of research include SARS-CoV-2 vaccination in transplant patients, APOL-1and other congenital kidney diseases, and technics to decrease AKI in healthcare settings.

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