

Title: Evaluation of a Rapid Hydration Protocol for Pediatric Patients on Chemotherapy

Background: Chemotherapeutic regimens including ifosfamide, cyclophosphamide, high dose methotrexate ($>500\text{mg}/\text{m}^2$), or cisplatin have a high incidence of toxicity, including hemorrhagic cystitis (HC), and acute kidney injury (AKI). Hydration before chemotherapy administration can be useful to assist in excretion of toxic metabolites and decrease occurrence of cystitis as well as decrease the incidence of AKI. However, the traditional pre-hydration process is cumbersome and time consuming for health care providers. A possible solution to this problem is administering hydration as a rapid bolus, immediately prior to chemotherapy.

Purpose: The purpose of this study is to evaluate the effectiveness and efficiency of rapid hydration for patients on high dose methotrexate, cisplatin, cyclophosphamide, and ifosfamide.

Methods: A retrospective chart review was performed and data was collected from the electronic health record from January 1st, 2019 to July 30th, 2021. Collected elements included patient demographics (age, gender, weight, race, BSA), medication list, length of hospitalization, incidence of toxicity including AKI and HC, time to start of chemotherapy, indication for therapy, urine pH, and urine specific gravity. Data analysis was comprised of calculated averages and nominal data. Ethical approval was granted by SSM Health IRB.

Results: Data was compiled from 138 pre-hydration events from 33 patients. There was a decreased time to initiation of chemotherapy using rapid pre-hydration (6.2 hours) compared to traditional pre-hydration (7.7 hours). This was due to being able to achieve goal urinary markers including urine pH and specific gravity sooner. Of the 13 toxicity events that occurred, 69.2% of events occurred in patients receiving the standard hyper-hydration protocol. The overall length of stay for the rapid pre-hydration group was 84.5 hours as compared to 91.2 hours in the traditional group.

Conclusions: Rapid pre-hydration resulted in expedited treatment and shorter length of stay without an apparent increase in adverse effects. There is little data exists comparing the efficacy of rapid hydration versus extended hydration in this population. Overall, more data is needed on this subject, but this study demonstrates that rapid pre-hydration is a viable alternative to traditional pre-hydration.