

## ABSTRACT

**THE EFFECTIVENESS OF HYDRATION IN PREVENTING KIDNEY  
TOXICITY AFTER HIGH DOSE METHOTREXATE  
IN ACUTE LYMPHOBLASTIC LEUKEMIA (ALL) PATIENTS**

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**Background:** Hydration prevents kidney toxicity by increasing glomerular filtration rate and inhibiting the deposition of methotrexate and its metabolite 7-OH methotrexate which can cause precipitated crystals at acidic pH of renal cells.

**Objective :** This study aims to analyze the effectiveness of hydration in preventing kidney toxicity after administration of high-dose methotrexate in ALL patients.

**Method :** The study used observational method. Data was collected in February to April 2019 period. Inclusion criteria were all patients who aged of 2 to 18 years. They were in a consolidation phase of ALL Protocols 2018 (standard or high risk) and had signed an informed consent. The effectiveness of hydration was reflected by measurements of urine pH, creatinine serum (Scr), BUN, and serum electrolytes in patients with Acute Lymphoblastic Leukemia in Children given methotrexate at a dose of 1000 mg / m<sup>2</sup>.

**Result :** The results showed that urine alkalinization was achieved at pH  $8.42 \pm 0.69$  and there was a significant difference in pH measurement after administration of hydration 500 ml and after administration of hydration 1000 ml ( $p < 0.05$ ). Serum creatinine (Scr) and BUN values showed there were no significant differences ( $p > 0.05$ ), Scr and BUN values were at the normal range. Scr values were  $0.49 \pm 0.13$  before hydration and  $0.53 \pm 0.44$  after hydration. BUN values  $5.80 \pm 2.75$  before hydration and  $9.51 \pm 5.96$  after hydration. However, there were an imbalance of serum electrolytes in LLA patients after hyperhydration administration, namely hyponatremia (100%), hyperkalemia (31.57%), hypokalemia (15.78%); hypercalcemia (5.265%), hypocalcemia (89.47%), hypermagnesium (84.21%) and hypomagnesium (5.26%). Electrolyte imbalance can be caused by aggressive hydration, patient nutrition problem, and LLA progression and the possibility of tumor lysis syndrome.

**Conclusion:** Hydration was effective in preventing kidney toxicity after administration of high-dose methotrexate. However, the administration of hydration could cause an electrolyte imbalance in the body. As a result, the closely serum electrolytes monitoring was needed after aggressive hydration.

**Keywords:** Hydration effectivity, ALL, urine pH , serum creatinine, BUN, serum electrolytes, kidney toxicity