Analisis asam 3-hidroksipropil merkapturat dalam urin pasien kanker payudara setelah pemberian siklofosfamid menggunakan kromatografi cair kinerja ultra tinggi - tandem spektrometri massa = Analysis of 3-hydroxypropyl mercapturic acid in breast cancer patient's urine after cyclophosphamide administration using ultra high performance liquid chromatography - tandem mass spectrometry / Cyril Muhammad

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Abstrak

ABSTRAK
Siklofosfamid merupakan obat antikanker yang umum digunakan dalam regimen kemoterapi untuk penyakit kanker payudara. Namun, penggunaan siklofosfamid dapat menyebabkan efek samping yaitu sistitis hemoragik yang dapat menyebabkan pendarahan saat berkemih dan berkembang menjadi kanker kandung kemih. Efek samping tersebut disebabkan oleh hasil samping dari metabolisme siklofosfamid yaitu akrolein. Akrolein akan diekskresikan melalui urin dalam bentuk metabolit yaitu 3-HPMA. Pada penelitian ini, dilakukan pengukuran kadar 3-HPMA dalam urin pasien kanker. Sampel urin diambil 4 jam setelah pemberian siklofosfamid dan urinalisis dilakukan untuk melihat resiko terjadinya hematuria. Analisis dilakukan secara KCKUT-SM/SM fase terbalik yang dilengkapi dengan sistem deteksi spektrometri massa triple quadrupole ESI positif. Preparasi sampel dilakukan dengan pengasaman dan dilusi. Metode analisis yang digunakan linier dengan rentang analisis 40-10000 ng/mL untuk 3-HPMA. Hasil analisis kadar 3-HPMA dalam 40 pasien kanker menunjukkan hasil yang sangat bervariasi, dengan konsentrasi terukur berkisar antara 113-9495 ng/mL dan kadar ternormalisasi kreatinin berkisar antara 650-5596 ng/mg kreatinin.
Pasien dengan hasil positif hematuria menunjukkan rata-rata kadar 3-HPMA yaitu 4839 ng/mg kreatinin, sementara untuk pasien dengan hasil negative hematuria menunjukkan rata-rata kadar yaitu 2419,431 ng/mg kreatinin.
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ABSTRACT
Cyclophosphamide is an alkylating agent commonly used in chemotherapy regimens for breast cancer, non-Hodgkins lymphoma, leukemia, and lung cancer. However, the use of cyclophosphamide can cause toxic side effects on the bladder, namely hemorrhagic cytitis which can cause hematuria and can later develop into bladder cancer. These side effects are caused by the byproduct of cyclophosphamide metabolism, acrolein. 3-HPMA is a stable metabolite of acrolein found in urine that serves as biomarker of acrolein. In this study, we developed a method to quantify 3-Hydroxy Propyl Mercapturic Acid (3-HPMA) in cancer patients urine. Urine samples were taken 4 hours after cyclophosphamide administration and urin alysis was done to observe the risk of hematuria. Analysis of 3-HPMA was performed by reversed phase UPLC-MS/MS equipped with triple quadrupole mass spectrometer positive ESI mode detection. The mobile phase used for analysis is 0,1% formic acid in water and in acetonitrile (90:10 v/v). The MRM was set at m/z 222.10>90.97 for 3-HPMA and 164.10 > 122.02 for the internal standard NAC. Sample preparation was done by acidification and simple dilution. The analytical method used is linear within the

consentration range of 40-10000 ng/mL. The results showed varied levels of 3-HPMA in 40 cancer patients urine, with measured concentrations ranging from 113-9495 ng/mL and creatinine-adjusted levels ranging from 650-5596 ng/mg creatinine. Patients with positive results of hematuria showed 3-HPMA levels that were relatively high with mean level of 4839 ng/mg creatinine.