

ABSTRACT

THE RELATIONSHIP BETWEEN URINARY *BROMOTYROSINE* LEVELS AND MONTELUKAST, BECLOMETASONE/FORMOTEROL, AND COMBINATION THERAPY OVER 3 MONTHS IN ASTHMA PATIENTS AT HARUM MELATI CLINIC, PRINGSEWU

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Background: Urinary *bromotyrosine* holds promise as a biomarker for asthma due to its stability and the non-invasive nature of urine sample collection. In asthma management, leukotriene receptor antagonists (LTRA) are often used as an alternative first-line therapy following inhaled corticosteroids.

Purpose: This research aims to explore the connection between urinary *bromotyrosine* levels and the effects of montelukast, beclometasone/formoterol, and combination therapy over a three-month duration.

Methods: The study involved 82 participants aged 6–65 years, recruited from Harum Melati Clinic, Pringsewu, between May and December 2023. Spirometry, urine tests, and differential counts were performed before and after a 3-month therapy period. Patients were grouped by obstruction severity into mild ($n = 66$) and moderate-severe ($n = 6$) categories, along with a non-asthmatic control group ($n = 10$). Only 28 patients completed the follow-up evaluation after 3 months. These participants were divided into three treatment groups: montelukast ($n = 14$), beclometasone/formoterol ($n = 5$), and combination therapy ($n = 9$). Urinary *bromotyrosine* levels were analyzed using the 3-BrY ELISA Kit EU3112.

Results: Urinary *bromotyrosine* levels were significantly higher in asthma patients compared to the control group (154.11 ng/ml vs. 11.87 ng/ml, $p = 0.000$). No significant changes were detected after montelukast therapy (104.24 ng/ml vs. 40.79 ng/ml, $p = 0.433$) or beclometasone/formoterol therapy (136.25 ng/ml vs. 33.20 ng/ml, $p = 0.345$). However, a significant decrease was observed in the combination therapy group (39.63 ng/ml vs. 11.13 ng/ml) (95% CI 3.90–42.43, $p = 0.028$).

Conclusion: The findings indicate that asthma patients have significantly higher urinary *bromotyrosine* levels compared to non-asthmatic individuals. A notable reduction in these levels was observed after 3 months of combination therapy, highlighting its potential effectiveness.

Keywords: asthma, urinary *bromotyrosine*, montelukast.

ABSTRAK

HUBUNGAN KADAR *BROMOTYROSINE* URIN DENGAN TERAPI MONTELUKAST, BECLOMETASON/FORMOTEROL, DAN KOMBINASI SELAMA 3 BULAN PADA PASIE ASMA DI KLINIK HARUM MELATI PRINGSEWU

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Latar Belakang : *Bromotyrosine* urin memiliki banyak keuntungan sebagai biomarker potensial penyakit asma mengingat stabilitasnya dan pengumpulan sampel urin yang bersifat non-invasif. Dalam manajemen tatalaksana asma *leukotriene receptor antagonist* (LTRA) merupakan obat alternatif lini pertama setelah kortikosteroid inhalasi.

Tujuan : Penelitian ini bertujuan untuk mengetahui hubungan kadar *bromotyrosine* urin dengan terapi montelukast selama 3 bulan.

Metode : Penelitian ini melibatkan 82 pasien berusia antara 6-65 tahun dari Klinik Harum Melati, Pringsewu dari bulan Mei – Desember 2023. Dilakukan uji spirometri, urin, *differential count* sebelum dan setelah terapi 3 bulan, diklasifikasikan derajat obstruksi ringan ($n=66$) dan sedang-berat ($n=6$) serta pasien non-asma untuk kontrol ($n=10$). Hanya 28 pasien yang datang untuk evaluasi setelah 3 bulan terapi. Pasien dibagi menjadi 3 kelompok, yaitu kelompok terapi montelukast ($n=14$), beclometason/formoterol ($n=5$), dan kombinasi montelukast dan beclometason/formoterol ($n=9$). *Bromotyrosine* urin dinilai dengan 3-BrY Elisa Kit EU3112.

Hasil : Kadar *bromotyrosine* urin penderita asma secara bermakna lebih tinggi dibandingkan dengan kontrol (154.11 ng/ml vs 11,87 ng/ml, $p=0,000$). Tidak terdapat perbedaan bermakna kadar *bromotyrosine* urin setelah terapi montelukast (104.24 ng/ml vs 40.79 ng/ml, $p=0,433$) dan setelah terapi beclometason/formoterol (136,25 ng/ml vs 33,20 ng/ml, $p=0,345$). Terjadi penurunan kadar *bromotyrosine* urin yang bermakna pada kelompok setelah terapi kombinasi montelukast dan beclometasone/formoterol (39.63 ng/ml vs 11.13 ng/ml) (95% CI 3.90-42.43, $p=0.028$).

Kesimpulan : Hasil penelitian menunjukkan pasien asma memiliki kadar *bromotyrosine* urin jauh lebih tinggi dibandingkan dengan non-asma. Kadar *bromotyrosine* urin menurun secara bermakna setelah terapi kombinasi (montelukast dan beclometason/formoterol) selama 3 bulan.

Kata Kunci : asma, *bromotyrosine* urin, montelukast.