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**PERBEDAAN KADAR *ASPARTATE AMINOTRANSFERASE*
DAN *ALANINE AMINOTRANSFERASE* BERDASARKAN
KELEBIHAN ZAT BESI PADA PASIEN
TALASEMIA BETA MAYOR**



**PROGRAM STUDI PATOLOGI KLINIS PROGRAM SPESIALIS
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PERBEDAAN KADAR *ASPARTATE AMINOTRANSFERASE* DAN *ALANINE AMINOTRANSFERASE* BERDASARKAN KELEBIHAN ZAT BESI PADA PASIEN TALASEMIA BETA MAYOR

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ABSTRAK

Latar Belakang: Pasien talasemia beta mayor memerlukan transfusi darah berulang yang berisiko menyebabkan kelebihan zat besi. Akumulasi besi terutama terjadi di hati dan dapat menimbulkan kerusakan hepatoseluler yang ditandai dengan peningkatan kadar enzim *transaminase*, yaitu *aspartate aminotransferase* (AST) dan *alanine aminotransferase* (ALT). Kadar feritin serum digunakan sebagai indikator cadangan besi tubuh, namun hubungan antara kadar feritin dengan perubahan AST dan ALT masih menunjukkan hasil yang bervariasi. Penelitian ini bertujuan untuk mengetahui perbedaan kadar AST dan ALT berdasarkan kelebihan zat besi pada pasien talasemia beta mayor.

Metode: Penelitian ini merupakan penelitian observasional analitik dengan rancangan potong lintang yang dilakukan di RS M. Djamil Padang pada periode Maret–Agustus 2025. Subjek penelitian terdiri dari 36 pasien anak talasemia beta mayor yang memenuhi kriteria inklusi dan eksklusi, diambil dengan metode *consecutive sampling*. Kelebihan zat besi ditentukan berdasarkan kadar feritin serum $<1.000 \mu\text{g/L}$ sebagai tidak berisiko dan $\geq 1.000 \mu\text{g/L}$ sebagai berisiko. Analisis statistik dilakukan menggunakan program komputer. Data numerik disajikan dalam bentuk median (minimum–maksimum) dan dianalisis menggunakan uji Mann–Whitney dengan batas kemaknaan $p < 0,05$.

Hasil: Median kadar AST adalah 40,50 U/L (22–191 U/L) dan median kadar ALT adalah 32,50 U/L (7–220 U/L). Kadar AST pada kelompok berisiko lebih tinggi dibandingkan kelompok tidak berisiko ($p=0,020$). Kadar ALT pada kelompok berisiko juga secara signifikan lebih tinggi dibandingkan kelompok tidak berisiko ($p=0,009$).

Kesimpulan: Terdapat perbedaan bermakna kadar AST dan ALT berdasarkan kelebihan zat besi pada pasien talasemia beta mayor, yang menunjukkan adanya keterlibatan fungsi hati akibat penimbunan besi.

Kata Kunci : Talasemia beta mayor, feritin, *aspartate aminotransferase*, *alanine aminotransferase*

DIFFERENCES IN ASPARTATE AMINOTRANSFERASE AND ALANINE AMINOTRANSFERASE LEVELS BASED ON IRON OVERLOAD IN PATIENTS WITH BETA THALASSEMIA MAJOR

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ABSTRACT

Background: Beta thalassemia major patients require repeated transfusions, which increase the risk of iron overload. Iron accumulation mainly occurs in the liver and may cause hepatocellular damage, reflected by elevated transaminase enzymes, namely aspartate aminotransferase (AST) and alanine aminotransferase (ALT). Serum ferritin is commonly used as an indicator of body iron stores; however, the relationship between ferritin levels and changes in AST and ALT remains inconsistent. This study aimed to determine the differences in AST and ALT levels based on iron overload in beta thalassemia major patients.

Methods: This was an analytic observational study with a cross-sectional design conducted at M. Djamil Hospital, Padang, from March to August 2025. The study included 36 pediatric patients with beta-thalassemia major who met the inclusion and exclusion criteria, selected using consecutive sampling. Iron overload was classified based on serum ferritin levels: <1,000 µg/L as non-risk and ≥1,000 µg/L as at-risk. Statistical analysis was performed using computer software. Numerical data were presented as median (minimum–maximum) and analyzed using the Mann–Whitney test with a significance level of $p < 0.05$.

Results: Median AST level was 40.50 U/L (22–191 U/L), and median ALT level was 32.50 U/L (7–220 U/L). Aspartate aminotransferase levels were significantly higher in the at-risk group compared to the non-risk group ($p = 0.020$). Alanine aminotransferase levels were also significantly higher in the at-risk group ($p = 0.009$).

Conclusion: There were significant differences in AST and ALT levels based on iron overload in beta thalassemia major patients, indicating hepatic involvement due to iron accumulation.

Keywords: Beta thalassaemia major, ferritin, aspartate aminotransferase, alanine aminotransferase