

## FUNCTIONAL -94 DEL/DEL ATTG POLYMORPHISM OF THE NFKB1 GENE AND RISK OF SEVERE ANEMIA IN CHILDREN WITH T-CELL ACUTE LYMPHOBLASTIC LEUKEMIA

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**Introduction:** The transcription factor NF- $\kappa$ B plays a central role in regulating inflammation, apoptosis, and hematopoiesis, being widely involved in tumor biology. A functional polymorphism located in the promoter region of the NFKB1 gene (-94 ins/del ATTG; rs28362491) has been associated with mRNA instability and modulation of gene expression. While this polymorphism has been described as a potential genetic risk marker and clinical modulator in hematological malignancies such as chronic lymphocytic leukemia (CLL), its role in T-cell acute lymphoblastic leukemia (T-ALL) remains poorly understood, particularly regarding its association with hematological adverse events such as severe anemia. **Objectives:** This study aimed to investigate the association between NFKB1 (rs28362491) genotypes and the presence of grade 3–4 anemia in pediatric patients with T-ALL treated at a referral hospital in Northern Brazil (Octavio Lobo Pediatric Oncology Hospital). **Methods:** The study was approved by the Research Ethics Committee of the Federal University of Pará (CAAE: 00905812.1.0000.0018). The sample included 14 patients treated according to the Berlin-Frankfurt-Münster-2002 and St. Jude Children's Research Hospital (SJCRH) protocols. Hematological toxicity data were classified using the Common Terminology Criteria for Adverse Events (CTCAE), version 4.0. Genotyping was performed by multiplex PCR, and statistical analyses were conducted using R software (version 4.3.3). **Results:** Among the patients evaluated, the Del/Del genotype was the most frequent (n = 7; 50.0%), followed by Del/Ins (n = 6; 42.9%) and Ins/Ins (n = 1; 7.1%). Chi-square analysis revealed a statistically significant association between NFKB1 genotype and the occurrence of severe anemia (p = 0.0169), with 71.4% of Del/Del carriers presenting this condition. Recessive model analysis (Del/Del vs. Del/Ins + Ins/Ins) indicated a significantly increased risk of anemia among Del/Del carriers (p = 0.0475; OR = 15.0; 95% CI = 1.03–218.3). **Conclusion:** These findings suggest that the NFKB1 -94 Del/Del polymorphism may be associated with

Increased susceptibility to severe anemia in pediatric T-ALL patients, potentially through NF- $\kappa$ B-mediated inflammatory mechanisms and impaired erythropoiesis. This genetic marker shows promise as a tool for hematotoxic risk stratification, supporting the need for validation in larger cohorts.

**Keywords:** T-cell Acute Lymphoblastic Leukemia; NF $\kappa$ B1 Polymorphism; Anemia.