



ORIGINAL ARTICLE

Comparison of biochemical and immunological profile of pediatric patients with acute myeloid leukemia in relation to healthy individuals^{☆,☆☆}



Fabiane L.F.Z. Sanches^{a,*}, Taís M. Nitsch^b, Maria Marluce S. Vilela^b,
Valdemiro C. Sgarbieri^c

^a Nutrition Course, Center for Biological and Health Sciences, Universidade Federal de Mato Grosso do Sul, Campo Grande, MS, Brazil

^b Centre for Research in Pediatrics, Department of Pediatrics, Faculty of Medical Sciences, Universidade Estadual de Campinas (UNICAMP), Campinas, SP, Brazil

^c Department of Food and Nutrition, Faculty of Food Engineering, Universidade Estadual de Campinas (UNICAMP), Campinas, SP, Brazil

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KEYWORDS

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Abstract

Objective: To compare the biochemical and immunological profiles of pediatric patients with acute myeloid leukemia (AML) with healthy children and adolescents.

Methods: This was a cross-sectional study in which 21 therapy-naïve patients with AML were compared with a group of 24 healthy individuals. The following data were analyzed: serum proteins, leucocytes and subgroups, erythrocytes, hematocrit, hemoglobin, platelets, cytokines in peripheral blood mononuclear cells cultures under spontaneous and BCG- or PHA-stimulated conditions, immunoglobulin A, and erythrocytic glutathione. Statistical analysis was performed using SPSS software, considering as significant p -values < 0.05 .

Results: Serum albumin levels were higher ($p < 0.0001$) in the control group, as well as all the parameters related to red blood cells ($p < 0.0001$). For leucocytes and subgroups, no statistical difference was found between the AML and the control groups. For cytokines, the concentrations were significantly higher under spontaneous and BCG-stimulated conditions for TNF- α , IL-6, IL-10, and IFN- γ in the control group. Under PHA-stimulated conditions, the concentration was higher ($p = 0.002$) only for IL-6. No difference was found between the two groups for the other cytokines and for IgA in the saliva. Erythrocytic glutathione was higher ($p < 0.0001$) in AML patients.

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^{☆☆} Study conducted at Universidade Estadual de Campinas (UNICAMP), Campinas, SP, Brazil.

* Corresponding author.

E-mail: fabianelaflor@gmail.com (F.L.F.Z. Sanches).

PALAVRAS-CHAVE

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Conclusions: It was possible to characterize the biochemical and immunological profile of pediatric patients with AML, as well as highlight some significant differences in these parameters when comparing with healthy children and adolescents.

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Comparação do perfil bioquímico e imunológico de pacientes pediátricos com leucemia mieloide aguda e de indivíduos saudáveis

Resumo

Objetivo: Comparar o perfil bioquímico e imunológico de pacientes pediátricos portadores de Leucemia Mieloide Aguda (LMA) em relação a um grupo de crianças e adolescentes saudáveis.

Métodos: Estudo transversal, em que foram avaliados 21 pacientes com LMA virgens de terapia e um grupo de 24 indivíduos saudáveis. Foram analisadas: proteínas séricas, leucócitos e subgrupos, eritrócitos, hematócrito, hemoglobina e plaquetas, citocinas em cultura de células mononucleares do sangue periférico sob condição espontânea e estimulada por BCG ou PHA, imunoglobulina A e glutatona eritrocitária. Análise estatística foi realizada através do software SPSS considerando $p < 0,05$.

Resultados: Albumina sérica foi superior ($p < 0,0001$) no grupo de controle, bem como, todos os parâmetros relacionados com os glóbulos vermelhos ($p < 0,0001$). Para os leucócitos e subgrupos não houve diferença estatística entre os pacientes com LMA e o grupo controle. As concentrações foram significativamente mais elevadas sob condições espontânea e estimulada por BCG para as citocinas TNF- α , IL-6, IL-10 e IFN- γ no grupo controle. Sob condição estimulada com PHA a concentração foi superior ($p = 0,002$) apenas para a IL-6. Não houve diferença estatística para as demais citocinas e para IgA salivar entre os dois grupos. Glutatona eritrocitária foi superior ($p < 0,0001$) nos pacientes LMA.

Conclusões: Diante do exposto foi possível caracterizar o perfil bioquímico e imunológico de pacientes pediátricos com LMA, bem como, evidenciar diferenças significativas em alguns desses parâmetros ao se comparar os indivíduos doentes e o grupo de crianças e adolescentes saudáveis.

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Introduction

Common types of cancer in the pediatric age range include leukemias, particularly acute lymphocytic leukemia (ALL) and acute myeloid leukemia (AML), central nervous system tumor, lymphoma, neuroblastoma, Wilms tumor, osteosarcoma, and Ewing's sarcoma. Children comprise 80% of ALL cases, and only 10% of AML cases. An increasing prevalence of pediatric cancer has been observed in Brazil.¹⁻³

Acute leukemia is a primary neoplasia of the bone medulla, characterized by a heterogeneous group of diseases in which there is a substitution of normal medullary and blood elements by immature cells (blasts) and accumulation of these cells in other tissues.⁴

According to Casciato,⁵ leukemic cells replicate slower than the corresponding normal cells. Hematopoiesis is abnormal even before the proportion of cells in the medulla shows a perceptible increase. The precursors of immature leucocytes exhibiting malfunctioning progressively substitute the bone medulla and infiltrate other tissues.

The signs and symptoms of acute leukemia result from the drop of blood cells, which lead to anemia, weakness, general discomfort, paleness, fatigue, palpitation, and dyspnea to

exercise. Fever and infections may occur as a consequence of decreased granulocytes.^{5,6}

The characterization of the biochemical and immunological profile of AML patients is important for nutritional and medical interventions and following normal growth and development of children and adolescents, in order to improve the immunological response and tolerance of patients to treatment, as well as their quality of life.

This study aimed to compare the biochemical and immunological profiles of pediatric patients with AML to those of healthy individuals matched in age.

Methods

Population

The studied sample comprised patients admitted to the Centro Infantil Boldrini, Campinas-SP, Brazil, for treatment of leukemia, immediately after the diagnostic of AML, and participation of a clinical trial of nutritional intervention.

The inclusion criteria were: a confirmed diagnostic for AML; treatment naivety; age range 0-19 years; having an informed consent signed by the patient or his/her legal

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