

# Acute lymphocytic leukemia associated with toxoplasmosis: case report

## *Leucemia linfoblástica aguda associada à toxoplasmose: relato de caso*

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### ABSTRACT

Rare clinical case of acute lymphocytic leukemia (ALL) associated with toxoplasmosis affecting a 23-year-old male patient with progressive dyspnea. Chest computed tomography revealed expansive lesions indicating right supraclavicular fossa lymph node enlargement and right pleural effusion. Toxoplasmosis serology was performed: positive for immunoglobulin G [IgG 180.6] and positive for immunoglobulin M [IgM 0.98]. Therefore, treatment for the infection was initiated and immunohistochemistry of left cervical lymph node revealed ALL. Consequently, chemotherapy treatment was introduced at an oncology center. The diagnosis of toxoplasmosis allowed treatment to be administered, preventing the worsening of the condition caused by chemotherapy-induced immunosuppression.

**Key words:** toxoplasmosis; precursor cell lymphoblastic leukemia-lymphoma; immunohistochemistry; pleural effusion.

### RESUMO

*Relatamos um caso clínico raro de leucemia linfoblástica aguda (LLA) associada à toxoplasmose em um paciente do sexo masculino, 23 anos, com quadro de dispneia progressiva. A tomografia de tórax revelou lesões expansivas, indicando linfonodomegalias em fossa supraclavicular direita e derrame pleural à direita. Sorologia realizada para toxoplasmose: imunoglobulinas da classe G (IgG) e da classe M (IgM) positivas – 180,6 e 0,98, respectivamente. Tratamento para a infecção foi iniciado; estudo imuno-histoquímico de linfonodo cervical esquerdo foi realizado, revelando LLA. Instituiu-se tratamento quimioterápico em centro oncológico. O diagnóstico de toxoplasmose permitiu que o tratamento fosse feito, impedindo que a imunossupressão induzida pela quimioterapia agravasse o quadro clínico.*

**Unitermos:** toxoplasmose; leucemia-linfoma linfoblástico de células precursoras; imuno-histoquímica; derrame pleural.

### RESUMEN

*Reportamos un caso clínico raro de leucemia linfocítica aguda (LLA) asociada a toxoplasmosis en un paciente masculino de 23 años con cuadro de disnea progresiva. La tomografía de tórax reveló lesiones expansivas, indicando agrandamiento de los ganglios linfáticos en fosa supraclavicular derecha y derrame pleural a la derecha. Examen serológico para toxoplasmosis: inmunoglobulinas G (IgG) e inmunoglobulinas M (IgM) positivas – 180,6 y 0,98, respectivamente. Se inició el tratamiento de la infección; la inmunohistoquímica de ganglio linfático cervical izquierdo reveló LLA. Se llevó a cabo la quimioterapia en un hospital oncológico. El diagnóstico de toxoplasmosis permitió hacer el tratamiento, impidiendo que la inmunosupresión inducida por la quimioterapia agravara el cuadro clínico.*

**Palabras clave:** toxoplasmosis; leucemia-linfoma linfoblástico de células precursoras; inmunohistoquímica; derrame pleural.

## INTRODUCTION

Toxoplasmosis is a zoonosis caused by the ubiquitous protozoa *Toxoplasma gondii*. Disease transmission involves consumption of water or food contaminated by mature oocysts (originated from the gastrointestinal tract of animals of the *Felidae* family) or by ingestion of raw meat that contain cysts. The infection by the protozoa in immunocompetent subjects is often asymptomatic. The disease is, therefore, more frequent in immunocompromised individuals [especially in those infected by the human immunodeficiency virus (HIV)]. In that group, immunodepression allows reactivation of latent foci of the parasite, that is, a conversion from bradyzoites into tachyzoites<sup>(1,2)</sup>.

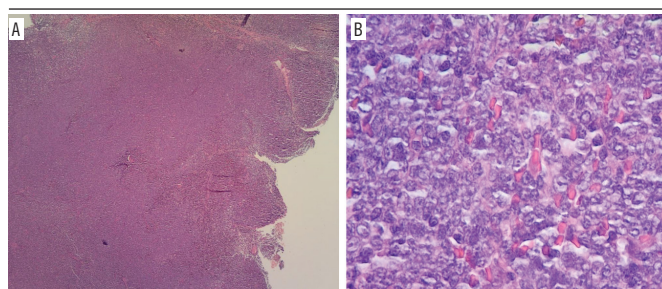
We present a rare case in the literature, in which a young adult patient, previously healthy and immunocompetent, was diagnosed with toxoplasmosis associated with acute lymphoblastic leukemia (ALL); both diseases manifested themselves, atypically, as extensive pleural effusion.

## CASE REPORT

A 23-year-old male patient was admitted to the intensive care unit (ICU) of Hospital e Maternidade Therezinha de Jesus (HMTJ) due to a 15-day progressive dyspnea; at evaluation, this symptom also occurred in rest. In the latest four months, he had presented night sweats, intermittent fever of 40°C, anorexia, weight loss and lymph node enlargements in cervical region. At physical examination, he presented palpable lymph nodes in cervical chains bilaterally, the largest on the left and in the right supraclavicular region. Oxygen saturation (SpO<sub>2</sub>): 97% with O<sub>2</sub> at 2 l/min via cannulae, respiratory rate of 26 breaths per minute (bpm) and abolished vesicular murmur in right hemithorax. Chest radiograph with evidence of large pleural effusion on the right pleuropulmonary cavity. Chest tomography prior to hospitalization presented expansive lesions compatible with lymph node enlargements in right supraclavicular fossa and mediastinum with pleural effusion on the right. Previous tests revealed Epstein-Barr virus serology was positive for immunoglobulin G (IgG) and negative for immunoglobulin M (IgM); positive toxoplasmosis IgG and IgM (180.6 and 0.98, respectively); negative HIV; leukocytes: 6,200, segmented: 42.2% and lymphocytes: 48.8%, with no atypias. Toxoplasmosis serology was repeated, confirming positivity for IgG and IgM. Thoracentesis was performed with the withdrawal of 1,000 ml of pleural fluid with characteristics of exudate, 5,800 leukocytes/mm<sup>3</sup> with a predominance of lymphocytes (90%); erythrocytes: 2,500/mm<sup>3</sup>. The patient underwent biopsy of the left venous angle.

He progressed with dyspnea reduction and was released from the ICU. However, three days later, he presented increased pleural effusion, and needed to undergo closed pleural drainage, with high daily output. Treatment for toxoplasmosis was initiated. Cervical lymph node biopsy revealed atypical lymphoid proliferation (**Figure**). Immunohistochemistry was then ordered. The **Table** presents the employed panel.

We, therefore, concluded it was a diffuse proliferation of atypical monotonous cells, findings compatible with lymphoblastic lymphoma/ALL of T CD3+ immunophenotype; common ALL antigen (CALLA) positive, with Ki-67 cellular proliferation index of 80%. The patient was transferred to an oncology center for chemotherapy.



**FIGURE** – A) Photomicrograph (HE, 2×): cervical lymph node biopsy; B) photomicrograph (HE, 40×): cervical lymph node biopsy demonstrating atypical proliferation  
HE: hematoxylin and eosin.

**TABLE** – Result of immunohistochemical analysis

Antibodies	Clone	Result
CD3	SP7	+
CD20	L26	-
CD10	56C6	+
Ki-67	MIB1	+
Bcl-2	124	+
TdT	EP266	+

TdT: terminal deoxynucleotidyl transferase.

## DISCUSSION

The association of toxoplasmosis with ALL is reported in the literature in some isolated cases. In a report from 1965, in the United States, a 27-year-old man diagnosed with ALL and treated with antileukemic drugs died from ventricular fibrillation, around five months after diagnosis. The autopsy revealed *T. gondii*-induced myocarditis<sup>(3)</sup>. In 1982, a report described by Brazilian researchers showed a case of a 4-year-old child in treatment for ALL who evolved with respiratory failure. The patient died and, after post-mortem pulmonary biopsy, cystic forms and trophozoites were found, what confirmed a rare involvement of lungs by the protozoa. In both

cases, the patients were undergoing chemotherapy with prednisone, methotrexate and 6-mercaptopurine<sup>(3,4)</sup>.

The use of chemotherapeutic drugs and other drugs with immunosuppressive potential can be associated to reactivation of latent foci of the parasite; the alteration itself in immunologic factors induced by the neoplasm could also influence this process. A meta-analysis from 2016 concluded that patients infected by

*T. gondii* can have increased susceptibility for the development of leukemia. Studies assess the parasite capacity to modify the ribonucleic microacid (miRNA) expression in the host cells and, thus, modify the genic expression and begin tumorigenesis<sup>(5-7)</sup>. In the present case, the diagnosis of toxoplasmosis allowed treatment to be administered, what prevented the progressive immunosuppression induced by leukemia and chemotherapy from worsening the disease.

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