

Case Report

Chronic *Cystoisospora belli* infection in an HIV/AIDS patient treated at the specialized assistance service in Porto Velho County – Rondônia.

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Abstract

Cystoisospora belli infection manifests as diarrhea, and can potentially progress to malabsorption in HIV patients. Here, we report a case of *C. belli* infection in an HIV/AIDS patient with chronic diarrhea symptoms for at least 2 years. Coproscopic analyses based on direct technique and modified Ziehl-Neelsen technique without a commercial kit were performed. The current case report highlights the protocol to be adopted in coproscopic analyses applied to HIV patients. The importance of including the appropriate parasitological testing of patients with chronic intestinal isosporiasis in parasitological test routines must be considered.

Keywords: *Cystoisospora belli*. HIV/AIDS. Laboratory Diagnosis.

INTRODUCTION

Gastrointestinal symptoms are commonly observed among HIV/AIDS patients, even after HAART (Highly active antiretroviral therapy) administration. These symptoms cause intense discomfort and reduce the patients' quality of life because most of these infections tend to become chronic. This occurs mainly because the gastrointestinal tract is a lymphoid organ highly affected by HIV infection¹. Changes in immune function are the determining factors for worsening of the infection. The depletion of T helper 17 cells, which protect the intestinal mucosa, results in impaired mucosal integrity and favors microorganism translocation². Gastric acid barrier decrease is another concerning factor that favors infections

caused by opportunistic microorganisms such as viruses, bacteria, fungi, and protozoa³.

Coccidia such as *Cryptosporidium spp.* and *Cystoisospora belli* are the main protozoan classes responsible for gastrointestinal infections in HIV/AIDS patients³. Symptoms in immunocompetent patients may be self-limiting; however, HIV/AIDS patients present with chronic diarrhea symptoms such as watery diarrhea, fever, myalgia, and weight loss, which may progress to chronic infection⁴.

C. belli oocysts measure approximately 30 × 12 µm and can be identified through direct visualization or staining. However, lack of experience in microscopic visualization can influence the results, leading to underdiagnosis, and consequently, compromising the patients' therapy.

CASE REPORT

This case report is about a 31 years old female patient, who has been HIV positive since 2011. She was treated with non-regular antiretroviral therapy (ART) based on Biovir and Kaletra regimens since the diagnosis. The patient was asymptomatic

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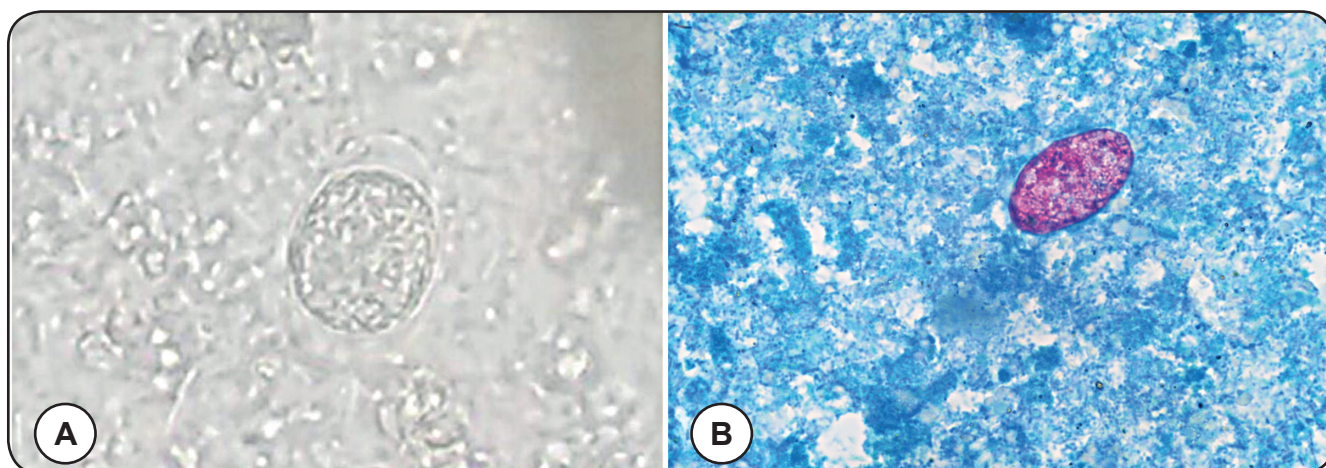


FIGURE 1: *Cystoisospora belli* identified using (A) direct technique and (B) Ziehl Neelsen technique.

with a CD4 of 510 cells/mm³. However, she started experiencing continuous watery diarrhea after discontinuation of the treatment in 2012. She reported 10 diarrhea episodes/ day when she sought for health care in the Specialized Assistance Service (SAS) of Porto Velho County - RO. In 2014, she resumed the non-regular ART based on Biovir and Efavirez regimens, according to her medical records. Although medication was reintroduced, she continued to experience diarrhea, significant weight loss, pale skin, but no fever. She was hospitalized for ten days in October 2015, when she was subjected to colonoscopy (normal results), coproculture (negative results) and abdominal tomography (normal results). During this period, the medical microbiology laboratory of CEPEM and FIOCRUZ/RO received the patient's samples, which were subjected to laboratory techniques in the following order: direct technique and modified Ziehl-Neelsen staining technique. The direct technique identified smooth- and hyaline-walled *C. belli* oocysts in the patient's diarrheal samples (**Figure 1A**). The modified Ziehl-Neelsen staining technique identified large non-sporulated oocysts presenting color characteristics of acid alcohol-resistant coccidian protozoa (**Figure 1B**).

More than one oocyst per field was observed when analyzed under 40 X objective lens in the first sample. The CD4⁺ T lymphocyte count in the biological sample analysis was 972 cells/mm³, whereas the viral load was <40.000, according to results from May 2015. When delivering the patient's result to her home, the research team collected drinking water samples for analysis purposes. Results showed that the water was consumed without undergoing any previous treatment. Water collection (multiple tubes) and analysis were based on parameters set by the National Health Foundation⁵. The water consumed by the patient presented high contamination levels (MLN/100 mL >16).

Results were disclosed to the Specialized Assistance Service (SAS) and the patient was subjected to oral therapy with 800/160 mg sulfamethoxazole + trimethoprim every 6 hours, for 10 days. Two sample collection sessions were performed after the treatment was over. Results revealed no evidence of oocysts in any of these samples, suggesting decreased parasitemia.

DISCUSSION

Cystoisosporiasis is an opportunistic infection, which causes persistent or chronic diarrhea in immunosuppressed patients, particularly in those with HIV/AIDS. The infection results from the ingestion of sporulated contaminated oocysts, which invade the enterocytes and undergo asexual and sexual cycles⁶. In addition, it mainly spreads through the intake of water contaminated with human fecal matter, besides being often associated with precarious sanitary conditions and low personal hygiene levels in the population. The prevalence of *C. belli* infection in Brazilian HIV/AIDS patients assessed in two different studies was 6.7% in Minas Gerais and 6.9% in Rio Grande do Norte^{7,8}.

Results of the case report presented herein recorded a *C. belli* count of higher than 200 cells/mm³ in an HIV/AIDS patient, thus suggesting chronic diarrhea for more than two years. Some studies indicate that cystoisosporiasis occurs in patients presenting CD4⁺ T lymphocyte counts higher than 200 cells/mm³.⁸. The count of CD4⁺ cells recorded in the assessed patient ranged from 510 to 972 cells/mm³ between 2012 and 2015. TCD4⁺ cell depletion involves the entire intestine and happens in the acute infection phase. TCD4⁺ cell decrease does not reflect on the peripheral blood, as it does at the gastrointestinal level. The mechanisms comprising the attack on gastrointestinal cells are not yet fully understood, despite being an important area of research⁹.

Studies conducted in Ethiopia showed high cryptosporidiosis and cystoisosporiasis rates in HIV population and have raised much public health concern¹⁰. Studies conducted in Uberaba County, MG (Brazil), found a high prevalence (16.9%) of enteric coccidia related to diarrhea, CD4⁺ T cell reduction, and to low CD4⁺ T lymphocyte count, which is a predisposing factor for protozoal infections. According to the aforementioned study, low CD4⁺ T lymphocyte count is a predisposing factor for protozoal infections. Studies found cryptosporidiosis prevalence after ART introduction, since this therapy suppresses HIV replication, leads to increase in circulating CD4⁺ T lymphocyte

count, enables intestinal repopulation and, subsequently, reestablishes mucosal immunity⁴.

Sanitation conditions are determinant factors for the incidence and permanence of cystoisosporiasis. According to the National Sanitation Information System (NSIS), only 41.01% of the population living in Rondônia State had access to water, 3.53% had access to sanitary sewage and only 4.54% of the generated sewage was treated in 2014¹¹. This result has direct impact on public health and on the quality of life, especially on the quality of life of HIV patients.

ART administration and, more recently, the introduction of combined ART (cART), significantly reduced the onset of many infectious diseases. However, patients do not always adhere to effective treatments, which reduces the effectiveness of the treatments; consequently, these patients become more susceptible to infectious diseases. Studies indicate that, unlike microsporidiosis and cryptosporidiosis, *Cystoisospora* prevalence increased from 0.4 per 1,000 patients in the pre-HAART era to 4.4 per 1000 patients in the HAART era¹².

C. belli recurrence has already been described in the literature. It is related to the parasite development when patients do not properly respond to the treatment. A study conducted with 1,600 HIV patients treated in the Infectious and Tropical Disease Service of Mayo National Hospital, in Peru, recorded six patients who reported recurrent chronic diarrhea due to treatment-resistant *C. belli*⁶.

This report addresses the ideal diagnostic methods that should be adopted by laboratories to analyze coproscopic samples from HIV patients. The laboratories should perform techniques other than the usual ones, thus increasing the likelihood of identifying other parasites, mainly coccidians. Furthermore, *C. belli*, which causes chronic intestinal infection, besides decreasing the quality of life of HIV patients, should be highlighted as a major public health concern.

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Conflicts of interest

The authors declare that there is no conflict of interest.

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