

## *Blastocystis hominis* infection in HIV/AIDS children with extraintestinal symptom: a case report



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### ABSTRACT

**Background:** *Blastocystis hominis* is an intestinal parasite that can induce both intra- and extraintestinal symptoms. This article aims to describe the symptom findings in cases of HIV children co-infected with *B. hominis*.

**Case Presentation:** A 3-year-old boy with HIV/AIDS came with diarrhea and skin rashes. The direct smear technique, formalin-ethyl acetate concentration technique, Jones medium culture, and trichrome staining were all used to investigate a single stool specimen from this patient. The results of the examination showed *B. hominis* infection with intensity <5/high power field (HPF). Extraintestinal symptoms such as skin rashes were not seen in this patient after appropriate treatment.

**Conclusion:** *B. hominis* infection can cause extraintestinal symptoms such as a red rash on the skin. When a patient presents with a skin rash of unknown origin, having their stool tested for parasites is a concern.

**Keywords:** *Blastocystis hominis*, HIV/AIDS, extraintestinal symptom, skin rashes.

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### INTRODUCTION

The number of HIV cases in Indonesia has an increasing trend, with a peak in 2019 of 50,282 cases.<sup>1</sup> In Indonesia, the prevalence in children aged 0-19 years covers 5.7% of the total cases in 2019. A decrease in immune status due to the pathogenesis of this disease makes it easy to get other co-infectious diseases. This co-infectious disease will result in prolonged diarrhea which can reduce the effectiveness of ARV therapy and absorption of nutrients in HIV/AIDS patients.<sup>2,3</sup>

One of the co-infectious parasitic diseases that can be found is *Blastocystis hominis*. *Blastocystis hominis* is a monocellular anaerobic intestinal protozoa that can infect humans and other animals.<sup>4</sup> The prevalence of *B. hominis* varies by country, although it is most common in tropical and subtropical areas with poor sanitation.<sup>5</sup> Previous studies describe a wide range of symptoms and signs associated with *B. hominis* infection, including asymptomatic, intestinal symptoms (diarrhea, abdominal discomfort, flatulence, constipation), and extraintestinal symptoms (urticaria and pruritus).<sup>5-8</sup> The wide range of symptoms associated with *B. hominis* infection makes it difficult to diagnose the disease without first identifying the parasite or its components. Microscopic, culture, immunoserology, and molecular examination

can all be used to diagnose *B. hominis*.<sup>8</sup> This study aims to describe the findings of signs and symptoms of *Blastocystis hominis* in children with HIV/AIDS, especially regarding extraintestinal symptoms.

### CASE REPORT

A 3-year-old boy was admitted to the pediatric outpatient ward, after suffering from diarrhea for about seven days with no mucous or blood. He was suffering from diarrhea three times a day, with slight stool waste. Other symptoms that the patient is experiencing include nausea and vomiting. The patient's vital signs revealed a pulse rate of 122 beats per minute, a body temperature of 37.7°C, a weight of 9.5 kilograms, and a height of 89.5 centimeters. During a physical examination, there were sunken eyes, decreased skin turgor, and a rash on the extremities.

This patient had recently been diagnosed with HIV stage three, pulmonary tuberculosis, and was taking anti-tuberculosis medication. Both of the patient's parents were asked about their HIV history. The patient had a history of close contact with pets such as chickens, a history of not washing fruit/vegetables, and a history of not washing hands before eating. The patient's parents rejected the patient's history of interaction with recreational springs, contact with others who had

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diarrhea, past of not washing hands after defecation, and habit of not defecating in the toilet. Bottled water is the primary source of daily drinking water.

According to a CD4<sup>+</sup> laboratory examination results on September 22<sup>nd</sup>, 2021, the percentage of CD4<sup>+</sup> was 13%, and absolute CD4<sup>+</sup> was 225 cells/ $\mu$ L. These findings indicate that the patient is suffering from severe immunodeficiency. The direct smear method, formalin-ethyl acetate concentration technique, Jones medium culture, and trichrome staining were used to investigate parasites from a single stool specimen. The parasites were identified as *Blastocystis hominis* and *Entamoeba coli* after a direct smear test. The *B. hominis* was discovered at <5/HPF. The formalin-ethyl acetate concentration technique, Jones medium culture, and trichrome staining all confirmed the positive results of the direct smear examination. Figure 1 and Figure 2 show the findings of these inspections.

ARV medication was initiated in the patient with zidovudine, lamivudine, and efavirenz. The patient was also given trimethoprim/sulfamethoxazole (at a dose of 6/30 mg/kg BW) once a day for seven days. After seven days of therapy, the same procedure was used to examine the stool specimen. There were no symptoms and signs found during the second visit. The *B.*

*hominis* was not found in the direct smear examination, but the culture examination still gave positive results. The *B. hominis* treatment was discontinued, and the patient was educated about the infection.

## CASE DISCUSSION

*B. hominis* infection has a vast spectrum of symptoms and signs. It could be from asymptomatic to symptomatic, from intestinal to extraintestinal. The most common extraintestinal symptom associated with *B. hominis* infection is skin rash, and it will disappear after appropriate treatment.<sup>9-11</sup> This manifestation is caused by the pattern of *B. hominis* infection that activates the IL-3, IL-4, IL-5, and IL-13 pathways to stimulate Th2 cells and mediate the release of IgE as an allergic response. *B. hominis* also activates complementary pathways that produce anaphylatoxins C3a and C5a to interact with mast cells and basophils, which then induce the release of histamine.<sup>12</sup>

In the case above, close contact with animals, poor hygiene, and immunodeficiency status could be identified as risk factors for *B. hominis* infection. *Blastocystis* spp. are known to infect mammals and poultry, with overlapping subtypes (STs) in both mammals and poultry, leading to the

suspicion that the disease is spread via the fecal-oral route.<sup>13,14</sup> Previous studies have revealed multiple *Blastocystis* subtypes found in primary school-age children in Indonesia with the prevalence of 67.95%, 26.4 %, 3.8%, and 1.9% for ST3, ST1, ST2, and ST4, respectively.<sup>15</sup> Each of these subtypes has hosts other than humans, such as poultry, primates, and ungulates, which means that if these species have close contact with humans, they are at a higher risk of *Blastocystis* infection.<sup>14,16</sup> Another risk factor for *B. hominis* infection is not washing hands and food before eating them. According to previous studies, *Blastocystis* spp. can survive for one month at 25°C and two months at 4°C; nevertheless, it is easily removed by washing hands with a common disinfectant.<sup>17</sup>

Immunodeficiency status is still a debate whether *Blastocystis* infection is an opportunistic infection or not. *B. hominis* infection has been reported to be more common in patients with low CD4+ counts.<sup>18</sup> However, a recent meta-analysis study has revealed that *B. hominis* infection is not an opportunistic parasite, where there is no difference in the proportion of infections in immunocompromised and immunocompetent patients.<sup>19</sup>

## CONCLUSION

*B. hominis* infection can cause extraintestinal symptoms such as a red rash on the skin. When a patient presents with a skin rash of unknown origin, having their stool tested for parasites is a concern.

## CONFLICT OF INTEREST

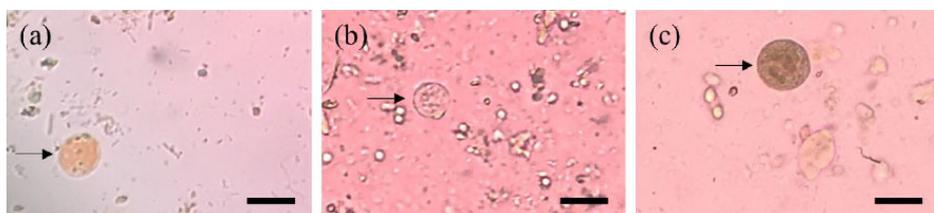
The authors have no potential conflicts of interest to disclose.

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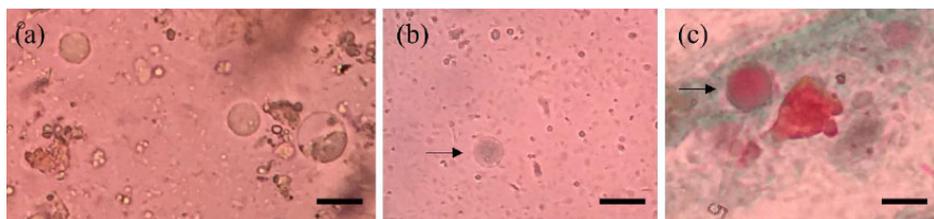
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**Figure 1.** Parasites were found in a stool sample under the microscope. (a) Vacuolar morphology of *B. hominis* with Lugol; (b) Granular morphology of *B. hominis* in normal saline; (c) *Entamoeba coli*. Bar Scale: 12.5  $\mu$ m.



**Figure 2.** *B. hominis* findings in Jones culture media and Trichrome staining. (a) Vacuolar morphology of *B. hominis*; (b) *B. hominis* cyst; (c) Trichrome staining of *B. hominis* reveals vacuoles with great color intensity. Bar Scale: 12.5  $\mu$ m.

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## AUTHOR CONTRIBUTION

Conceptualization and methodology, MBP, AD, EEHM; clinical study, MBP, AD; data collection, MBP; analysis and writing, MBP, IWAP; review, MBP, IWAP; guarantor, MBP, AD. All authors have read and agreed to publish the manuscript.

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