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Intestinal parasitic infections in HIV/AIDS patients presenting with diarrhoea in Jakarta, Indonesia

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cayetanensis;
Blastocystis hominis

Summary We investigated the occurrence of intestinal parasites in Indonesian HIV/AIDS patients with chronic diarrhoea prior to administering antiretroviral therapy. The influence of age, CD4⁺ cell count and season on parasite occurrence was also studied. In total, 318 unconcentrated stool samples were analysed using Lugol's iodine and modified acid fast staining to detect intestinal coccidia. Most samples (94.5%) were from males aged 21–40 years with CD4⁺ counts ≤ 50 cells/mm³. Parasites were found in 84.3% of samples (single species infections, 71.4%; polyparasitism, 12.9%), with protozoan pathogens occurring most commonly. *Cryptosporidium* (4.9%), *Cyclospora cayetanensis* (4.5%) and *Giardia duodenalis* (1.9%) were the most frequent single infections, but *Blastocystis hominis* (72.4%) was the most commonly occurring protist. *Cryptosporidium* and *C. cayetanensis* occurred in 11.9% and 7.8% of all (single and mixed) infections. The most common co-infection was with *B. hominis* and *Cryptosporidium* (6.3%). Intestinal protozoan pathogens were detected more frequently in cases with CD4⁺ counts ≤ 200 /mm³. No seasonal influence was determined for *Cryptosporidium*, *C. cayetanensis* or *B. hominis*, but gross seasonal disturbances may have influenced our findings. Intestinal parasites should be looked for routinely in this group of individuals and should be treated to reduce complications and the likelihood of transmission.

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1. Introduction

Infections in HIV-infected individuals can reduce both their quality of life and life span, especially those who are severely immunosuppressed with a CD4⁺ T-lymphocyte count < 200 cells/mm³.^{1–3} Indonesia currently faces a severe problem with HIV; its incidence has increased rapidly and

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currently available data are likely to underestimate its incidence. The most recent data on the status of the HIV epidemic in Indonesia indicated that 190 000 people were living with HIV/AIDS and that more than 4 million Indonesians are at high risk of contracting HIV, including clients of sex workers (3.1 million) and the partners of clients of sex workers (1.8 million).⁴

HIV immunodeficiency can predispose to severe and prolonged diarrhoea from intestinal infections, including parasites. Diarrhoea is a significant cause of morbidity observed in the majority of studies^{5–7} and is most strongly associated with low CD4⁺ counts. It is the second leading cause of hospital visits in developing nations. There is a strong negative association between duration of diarrhoea and CD4⁺ levels.⁷

Intestinal parasitic infections that are asymptomatic or cause self-limiting diarrhoea in immunocompetent individuals can cause profuse diarrhoea in immunocompromised individuals, generally accompanied by weight loss, anorexia, malabsorption and, in some cases, fever and abdominal pain. In such patients, the opportunistic parasites *Cryptosporidium* spp.,^{8–10} *Strongyloides stercoralis* and the microsporidia can disseminate to various organs, including the bronchia, bile and liver ducts, producing symptomatology specific to the affected organ(s).

Between 30% and 60% of HIV-infected patients suffer from infectious diarrhoea, most of which is persistent or chronic,^{11,12} and diarrhoea can be the first manifestation of AIDS that makes the patient seek medical advice/treatment. Parasitic infections are recognised causes of chronic diarrhoea in HIV/AIDS and can result in significant morbidity and mortality,^{5,6} therefore effective detection and treatment are important components that reduce disease complications and prolong life span. Data from the HIV Clinic, Cipto Mangunkusumo Hospital, indicate that chronic diarrhoea was the third most common presentation (after oropharyngeal candidosis and pulmonary tuberculosis), accounting for 27% of first presentations to the clinic (unpublished data, HIV Clinic, Cipto Mangunkusumo Hospital, Jakarta, Indonesia).

The season can influence the transmission of protozoan parasites, particularly *Cryptosporidium* spp. and *Cyclospora*. Both have been associated with either warmer or wetter seasons, depending on geographical location,^{13–15} and *Cyclospora cayetanensis* is the main protozoal cause of diarrhoea in adult foreign residents during the wet season in Indonesia.¹⁵ To investigate the influence of season on patient presentation to the HIV clinics, the first recorded date of a diarrhoeic patient's visit to the HIV clinics was analysed with respect to the wet (October–March) or dry (April–September) season.

The objective of this study was to determine the range of intestinal parasites commonly found in individuals with HIV/AIDS presenting with diarrhoea in Jakarta and whether age, CD4⁺ cell count or season influenced the occurrence of parasitic infection.

2. Materials and methods

2.1. Study population

A descriptive, prospective, cross-sectional study design was used. All samples analysed in this survey were submitted to

the Department of Parasitology, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia, over a 29-month period (November 2004 to March 2007). Standard laboratory investigations of infectious diseases in Indonesian HIV clinics include intestinal parasites, *Mycobacterium tuberculosis*, and hepatitis B and C viruses. A total of 318 patients aged 5 months to 55 years, with laboratory-confirmed HIV and diarrhoea for >4 weeks, were identified for inclusion in the study. Following stool sample submission, all HIV patients were prescribed co-trimoxazole prophylactically for toxoplasmosis and *Pneumocystis pneumonia* and those with oropharyngeal candidosis were treated with fluconazole. Samples were not randomised.

2.2. CD4⁺ cell counts

CD4⁺ counts were determined by flow cytometry (BD FACSCalibur; BD Biosciences, Franklin Lakes, NJ, USA) in two Jakarta HIV/AIDS centres (Cipto Mangunkusumo Hospital and Dharmas Cancer Hospital), according to WHO recommendations.

2.3. Parasitology

One freshly voided stool was analysed from each person, without concentration, using Lugol's iodine. Each sample was placed on three separate slides and analysed by three trained microscopists in the Department of Parasitology, University of Indonesia. Also, two unconcentrated smears were air dried, methanol fixed and stained using a modified acid fast technique to detect *Cryptosporidium* spp., *Isoospora belli* and *C. cayetanensis*.¹⁶ Intestinal microsporidia were not sought as the stain components were unavailable in Indonesia at the time.

2.4. Statistics

Analyses were performed using SPSS version 12.0 statistical software (SPSS Inc., Chicago, IL, USA). A bivariate analysis was performed to investigate the association between incidence of parasitism and age, seasonal variation and CD4⁺ counts. A *P*-value <0.05 was considered significant.

3. Results

Of the 318 HIV patients studied, 80% were from the HIV Clinic, Cipto Mangunkusumo Hospital, and the remainder were from other hospitals in Jakarta. In total, 9 samples were collected in 2004 (from November), 145 in 2005, 148 in 2006 and 16 up until March 2007. Their age stratification was as follows: 3.1% aged ≤5 years; 2.5% aged 6–20 years; 68.2% aged 21–30 years; 14.5% aged 31–40 years; 3.5% aged 41–50 years; and 1.3% aged >50 years. No information on age was available for 22 individuals. The age range of the majority of the cohort was 21–40 years. Males constituted 94.5% of the study population.

Of the 318 cases, only 160 parasitised cases had CD4⁺ cell count data. The majority (54%) of cases had CD4⁺ counts of ≤50 cells/mm³, 20% and 14% had CD4⁺ counts of 51–100 cells/mm³ and 101–200 cells/mm³, respectively, whilst only

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