

Correlation Between Intestinal Protozoan Infection and Diarrhea in HIV/AIDS Patients

Author(s): Ochigbo U E, S D J, Goselle O N, Njab J , Abelau M A

Abstract

From May to December, 2006, stool samples from 900 patients attending four hospitals in Abuja, Nigeria were collected and examined for the presence of intestinal protozoan. The aim of the study was to determine if correlation exists between intestinal protozoan infection and diarrhea in HIV/AIDS patients. Of the 900 individuals sampled, 700 were HIV seropositive while 200 were seronegative. A significant difference (P.

KEYWORDS: Intestinal protozoan, HIV/AIDS, Diarrhea, Abuja-Nigeria.

Introduction

The World Health Organization (2006) defines diarrhea wasting syndrome along with a positive HIV serology test to be an AIDS defining illness. The etiology of such diarrhea could either be parasitic, bacteria, fungal, enteric virus or HIV itself. (Soave and Framm, 1997).

Diarrhea has been reported to be one of the most common presenting complaints in HIV-infected individuals with the infections etiological agents including both opportunistic agents that consistently cause severe, chronic or frequent gastrointestinal disease and non-opportunistic agents that usually cause acute, treatable diarrheal illness (Smith et. al. 1998). Opportunistic infections constitute a major health problem in patients infected with HIV with intestinal parasitic diseases as the commonest and are a major cause of morbidity and mortality in HIV positive individuals worldwide. (Chaisson et. al. 1998). Several species of protozoan have been associated with acute and chronic diarrhea in HIV disease. The most commonly reported include *Cryptosporidium parvum*, *Isospora belli*, *Microsporidium* species, *Giardia intestinalis*, *Entamoeba histolytica* and *Cyclospora* spp (Gupta et. al. 2008).

Diarrhea is a major gastrointestinal symptom in HIV infection affecting 90% of patients and it becomes more frequent as immunodeficiency progress. Diarrhea and weight loss are independent predictors of mortality (Sharpstone et. al. 1999). Gastrointestinal involvement in HIV/AIDS is almost a universal and significant disease occurring in 50-90% of patients

while diarrhea can be a presenting manifestation or a life threatening complication in HIV patients sometimes during the course of the disease. (Awole et. al. 2003).

Much attention is currently being focused on the detection of specific pathogens as cause of diarrhea in HIV patients since its correct treatment could improve the patients general well being (Caraballo et. al. 2001). This study therefore aims to incriminate the protozoan and investigate the correlation between parasitic protozoan infection and diarrhea in Abuja Nigeria. However, the study was limited in that it never graded diarrhea into acute or chronic and also financial constraints never allowed for CD4+ T-cell count.

Materials and Methods

The study was conducted between May-December 2006 in 3 secondary health facilities (Asokoro District Hospital, Maitama District Hospital and Wuse General Hospital) and one tertiary health facility (National Hospital) all in Abuja, the Federal Capital Territory of Nigeria located at latitude 90 41 60N and longitude 70 311 60E. It has an undulating terrain and 3 marked weather conditions of rainy season, dry season and a brief interlude of harmattan. The total annual rainfall ranges between 1100mm and 1600mm. The average annual temperature ranges between 27 oC- 30 oC.

Ethical clearance: The ethical clearance committee of the various centres approved the study: REF/FCDA/HHSS/MDH/GEN/155/I (for Maitama District Hospital); REF/FCTA/HHSS/ADH/GEN/99/Bol./II/263 (for Asokoro District Hospital); REF/FCTA/HHSS/WGH/EST/4/VOL.II (for Wuse General Hospital) and the National Hospital Abuja. Informed consent was obtained from volunteers and questionnaires administered to them according to the various hospital guidelines.

Subject selection and sample collection: 900 persons were studied comprising 700 HIV – seropositive and 200 HIV seronegative patients (whom we assume are normal and have no HIV). Samples from the seronegative patients were used as control. Stool samples were collected from patients within a period of 24 hrs and taken to the laboratory for processing and examination. Specimens that could not be

processed immediately were preserved in 10% formalin to prevent bacterial action (Mohandas et. al., 2002).

Examination of samples

Amoebae, flagellates and ciliates -were identified using the formal-ether concentration method (Markell et. al., (1986). It was specifically done for the identification of amoebae viz: *Blastocystis hominis*, *Entamoeba histolytica*, *Entamoeba coli*, *Giardia lamblia* and *Balantidium coli*.

Euccocidians- Modified Ziehl Neelson (Z-N) staining method was employed for the identification of Euccocidians. It was done for the identification of *Cryptosporidium parvum*, *Cyclospora cayetanensis* and *Isospora belli*.

Microsporidium- were identified using the modified Giemsa stain technique of Markell et. al. (1986) and specifically used for the detection of *Enterocytozoon bienersi*.

Statistical Analysis: All data's were analyzed statistically using chi-square.

References

- Anup, P., Dipika, S., Kakali, M.D. (2005). Asymptomatic cryptosporidiosis in a periurban slum setting in Kolkatta, Indian-a pilot study. *Japanese Journal of Infectious Disease* (name of journal must be abbreviated), 58:110-111.
- Awole, M., Genre-Selassie, S., Kassa, T. and Kibru, G. (2003). Prevalence of intestinal parasites in HIV-infected adult patients in Southwestern Ethiopia. *Ethiopian Journal of Health Development*, 17(1): 71-78.
- Caraballo, A., Orozco, I. and Munoz, L. (2001). Intestinal parasitic infections in Human Immunodeficiency Virus (HIV) positive individuals in Southeastern Venezuela. *Bol. Chil de parasitol*, 57:3-4.
- Chaisson, R.E., Gallant, J.E., Keruly, J.C., Moore, R.D. (1998). Impact of opportunistic disease on survival in patients with HIV infection. *AIDS*, 12:29-33.
- Cotte, L., Rabodonirina, M., Piens, M.A., Perreard, M., Mojon, M. and Trepo, C. (1993). *Journal of Acquired Immune Deficiency Syndrome*, Sept; 6(9): 1024-9.
- Crawford, F. G. and Vermund, S.H. (1988). Human cryptosporidiosis. *Critical Review of Microbiology*, 16:113-140.
- Chowdhary, A.S. and Joshi, M. (2002). Spectrum of parasitic infections in AIDS associated diarrhea. Abstract no. 10953. 14th International Conference on AIDS. July 7-12, Barcelona, Spain.
- Gupta, S., Narang, S., Nunavath, V. and Singh, S. (2008). Chronic diarrhea in HIV patients: prevalence of coccidian parasites. *Indian Journal of Medical Microbiology*, 26(2): 172-5.
- Gupta, S., Mathur, P., Singh, S. (2006). Multiple opportunistic intestinal infections in a patient co-infected with human immunodeficiency virus and Hepatitis B virus: A case report. *Tropical Gastroenterology*, 27:97-98.
- Hunter, G., Bagshawe, A. F., Babso, K.S., Luke, R. and Provic, P. (1992). Intestinal parasites in Zambian Patients with AIDS. *Transaction of the Royal Society for Tropical Medicine and Hygiene*, 86:543-54.
- Ikeh, E. I., Obadofin, M.O., Brindeiro, B., Baugher, G., Frost, F., Vanderjagt, D and Glew, R.H. (2006). Intestinal parasitism in Rural and Urban areas of North Central Nigeria: an update. *The Internet Journal of Microbiology*, 2 (1):1-12.
- Lindo, J.F., Dubon, J.M., Ager, A.L. (1998). Intestinal parasitic infections in human immunodeficiency virus (HIV)-positve and HIV-negative individuals in San Pedro Sula, Honduras. *American Journal of Tropical Medicine and Hygiene*, 54: 431-435.
- Kumar, S.S., Ananda, S. and Lakshmi, P. (2002). Intestinal parasitic infection in infected patients with diarrhea in Chennai. *Indian Journal of Medical Microbiology*, 20:88-91.
- Markell, E.K., Voge, M. and John, D. (1986). *Medical Parasitology* 6th ed. W.B. Sandeas Company, London 383pp.
- Mohandas, K., Sehgal, R., Sud, A. and Malla, N. (2002). Prevalence of intestinal parasitic pathogens in HIV – Seropositive individuals in Northern India. *Japanese Journal of Infectious Disease*, 55:83-84.
- Mota, P., Rauch, C.A., Edberg, S.C. (2000). Microsporidia and Cyclospora: epidemiology and assessment of risk from the environment. *Critical Review of Microbiology*, 26(2):69-90.
- Mukhopadhyaya, A., Ramakrishna, B.S., Kang, G. (1999). Enteric pathogens in south Indian HIV-infected patients with and without diarrhea. *Indian Journal of Medical Research*, 109:85-89.
- Ramakrishnan, K., Shenbagarathai, R., Uma, A., Kavitha, K., Rajendran, R. and Thirumalaikolundusubramanian, P. (2007). Prevalence of Intestinal Parasitic Infestation in HIV/AIDS Patients with Diarrhea in Madurai City, South India. *Japanese Journal of Infectious Disease*, 60:209-210.
- Sadraei, J., Rizvi, M.A., and Baveja, U.K (2005). Diarrhea, CD4+ cell counts and opportunistic protozoa in Indian HIV-infected patients. *Parasitological Research*, 97: 270-3.
- Sharpstone, D., Neild, P., Crane, R. (1999). Small intestinal transit, absorption and permeability in patients with and without diarrhea. *Gut*, 45:70-76.

21. Smith, P.D., Lane, H.L., Gill, V.G., Manilchewitz, J.P., Quinnan, G.V., Fauci, A.S. (1988). Intestinal infections in patients with AIDS: Etiology and response to therapy. *Annals of Internal Medicine*, 108:328-33.
22. Soave, R. and Framm, S.R. (1997). Agents of diarrhea. *Medical Clinicians of North America.*, 81(2): 427- 447.
23. Viroj, W. (2001). Intestinal parasitic infections in Thai HIV-infected patients with different immunity status. *BMC Gastroenterology*, 2001, 1:3.
24. WHO case definitions of HIV for surveillance and revised clinical staging and immunological classification of HIV- related disease in adults aged 15 years or older. SEARO Publications on HIV/AIDS: 2006 Available from:<http://www.searo.who.int>.

Illustrations

Illustration 1

Table 1, 2, 3

Table 1: Number of stool samples obtained per hospital

Hospital	No of samples from HIV seropositive patients	No of samples from HIV seronegative patients
National Hospital Asokoro	200	50
District Hospital Wuse General	171	50
Hospital Maitama District	186	50
Hospital	143	50
Total	700	200

Table 2: Intestinal Protozoans detected in HIV positive and HIV negative individual.

Intestinal Protozoans	No of samples from HIV positive (%)	No of sample from HIV negative (%)
<i>Blastocystis hominis</i>	6(2.83)	2(0.94)
<i>Cryptosporidium parvum</i>	64(30.19)	1(0.39)
<i>Cyclospora cayetanensis</i>	9(4.25)	0
<i>Isoospora belli</i>	5(2.36)	0
<i>Enterocytozoon bieneusi</i>	8(3.77)	0
<i>Entamoeba histolytica</i>	78(36.79)	5(2.36)
<i>Entamoeba coli</i>	10(4.72)	3(1.46)
<i>Giardia lamblia</i>	16(7.55)	4(1.89)
<i>Balantidium coli</i>	1(0.47)	0
Total	197(92.93)	15(7.08)

Table 3: Intestinal Protozoan detected in HIV positive and HIV negative patients and their correlation with diarrhea.

Intestinal protozoan	<u>HIV Seropositive patients</u>		<u>HIV seronegative Patients</u>	
	No of sample infected(%)	No of samples with diarrhea (%)	No of samples infected(%)	No of samples with diarrhea (%)
<i>B. hominis</i>	6(2.83)	1(16.67)	2(0.94)	0
<i>C. parvum</i>	64(30.19)	58(90.63)	1(0.39)	0
<i>C. cayetanensis</i>	9(4.25)	7(77.78)	0	0
<i>I. belli</i>	5(2.36)	5(100)	0	0
<i>E. bienewisi</i>	8(3.77)	8(100)	0	0
<i>E. histolytica</i>	78(36.79)	77(98.72)	5(2.36)	2(40)
<i>E. coli</i>	10(4.72)	3(30)	3(1.46)	1(33.33)
<i>G. lamblia</i>	16(7.55)	10(62.50)	4(1.89)	2(50)
<i>B. coli</i>	1(0.1)	0	0	0

Illustration 2

Table 4

Prevalence of multiple intestinal protozoans detected in HIV/AIDS and HIV negative Patients and their correlation with diarrhea.

Protozoans	<i>HIV/AIDS patients</i>		<i>HIV-negative patients</i>	
	No infected (%)	No with diarrhea	No infected (%)	No with diarrhea (%)
<i>B. hominis</i>	3(0.4)	0	0	0
<i>B. hominis</i> with <i>E. histolytica</i>	4(0.6)	2(50.0)	3(1.5)	0
<i>B. hominis, G. Lamblia</i> and <i>E. histolytica</i>	4(0.6)	3(75.0)	0	0
<i>C. Parvum</i>	4(0.6)	0	0	0
<i>C. parvum</i> and <i>E. histolytica</i>	57(8.1)	54(100)	1(0.5)	0
<i>C. parvum, E. histolytica</i> and <i>E. Coli</i>	6(0.9)	4(66.7)	0	0
<i>C. parvum</i> and <i>G.</i> <i>lamblia</i>	3(0.4)	2(66.7)	0	0
<i>C. parvum, G. lamblia</i> and <i>E. histolytica</i>	1(0.1)	0	0	0
<i>C. cayetanensis</i>	2(0.3)	0	0	0
<i>C. cayetanensis, E. coli</i> and <i>E. histolytica</i>	3(0.4)	3(100)	0	0
<i>C. cayetanensis</i> and <i>E. histolytica</i>	4(0.6)	4(100)	0	0
<i>C. cayetanensis</i> and <i>G. lamblia</i>	5(0.7)	4(80.00)	0	0
<i>I. belli</i> and <i>E. histolytica</i>	1(0.1)	1(100)	0	0
<i>I. belli</i> and <i>G. lamblia</i>	8(1.1)	8(100)	0	0
<i>E. hieneusi</i>	2(0.2)	2(100)	0	0

Illustration 3

Table 5

Table 5: Summary of the frequency of occurrence of intestinal protozoan among study population in Abuja.

Total	Single infection		Dual infection		Multiple infection		
	<i>With parasite</i>	<i>With diarrhea</i>	<i>With parasite</i>	<i>With diarrhea</i>	<i>With parasite</i>	<i>With diarrhea</i>	<i>With</i>
HIV/AIDS positive 24(55.8%)	7(29.2%)	3(42.9%)	12(50%)	12(100%)	5(20.8%)	4(80%)	
HIV/AIDS negative 7(63.6%)	3(42.9%)	2(66.7%)	4(57.1%)	2(50%)	0(0%)	0(0%)	
Total	10	5	16	14	5	4	31
							23

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