

A Study of *Cryptosporidium parvum* Infection in HIV/AIDS Patients Presenting With Diarrhea at Different CD4 T-Cell Count

Deepa Upadhyay¹, Mahesh Kumar^{2*}

¹M.Sc (medicine) Microbiology, Senior Demonstrator, Department of Microbiology, R.N.T. Medical College, Udaipur, Rajasthan, India

²M.Sc (medicine) Microbiology, Senior Demonstrator, Department of Microbiology, R.N.T. Medical College, Udaipur, Rajasthan, India

Original Research Article

*Corresponding author
Mahesh Kumar

Article History

Received: 15.05.2018

Accepted: 24.05.2018

Published: 30.05.2018

DOI:

10.36347/sjams.2018.v06i05.058



Abstract: Gastrointestinal infections are very common in patients with HIV infection or AIDS. Diarrhea is a common clinical presentation of these infections. The etiologic spectrum of enteric pathogens causing diarrhea includes bacteria, parasites, fungi and viruses. The presence of opportunistic parasites *Cryptosporidium parvum*, *Cyclospora cayentanensis*, *Isospora belli* and *Microsporidia* are documented in patients with AIDS. Cryptosporidiosis in immunocompetent hosts is usually mild, self-limiting and recovers within a few weeks. In contrast, the infection may have a severe, chronic and even fatal clinical course in immunocompromised individuals. 1) Observation of *Cryptosporidium parvum* infection in HIV/AIDS patients presenting with Diarrhea. 2) Its correlation with CD4 T-Cell Count. This study was carried out in the Department of Microbiology, R.N.T. Medical College and Hospital, Udaipur, Rajasthan. Total 50 stool and blood samples from HIV positive patients were processed. Stool samples were processed for detection of *Cryptosporidium parvum* by modified acid fast stain technique and blood samples for CD4 T-Cell counts. Out of 50 stool samples of HIV positive patients 30 (60%) were positive for *Cryptosporidium parvum*. Blood samples from these patients tested for CD4 T-Cells, showing that *Cryptosporidium parvum* infection occurred in patients with CD4 T-Cells counts range 14- 484/ μ l and median CD4 T-Cell counts was 269/ μ l. Out of 30 positive samples 18 (60%) were males and 12(40%) were females. The present study highlights the importance of testing for intestinal parasites in patients who are HIV positive and emphasizes the necessity of increasing awareness among clinicians regarding the occurrence of these parasites in this population.

Keywords: Cryptosporidiosis, HIV, AIDS, CD4 T-Cells.

INTRODUCTION

People with human immunodeficiency virus (HIV) are vulnerable to infection called “opportunistic infection, because they take opportunity by a weakened immune system. Since the beginning of HIV epidemics these infections have been recognized as common complications of HIV infection [1-3]. A decrease in CD4+ T Cells count is at least partially responsible for the profound immunodeficiency that leads to various opportunistic infections in HIV infected persons [4]. The relative frequencies of specific opportunistic diseases may vary in different countries and even in different areas within the same country [5]. T-Cells are involved in cell mediated immunity. Functionally they are divided by the expression of CD4 + and CD8+ markers. HIV damages immune system, it targets CD4 cells. The virus grabs onto the surface of a cell, gets inside and become a part of it. As infected CD4 cells multiply, it also makes more copies of HIV virus. *Cryptosporidium* has assumed great importance as a

frequent cause of intractable diarrhea in HIV/AIDS patients and immunocompromised subjects. *Cryptosporidium* is a coccidian unicellular protozoan parasite. It completes its life cycle in a single host man [6].

MATERIALS AND METHODS

This study was carried out in the Department of Microbiology, R.N.T. Medical College and Hospital, Udaipur, Rajasthan. Total 50 stool and blood samples from HIV positive patients were processed. Stool samples were processed for detection of *Cryptosporidium parvum* by modified acid fast stain technique and blood samples for CD4 T-Cell counts.

Microscopy

Stool samples were requested from patients who presented with diarrhea. Samples were collected in a wide mouthed container. The presence of *Cryptosporidium parvum* oocysts was confirmed by

examining the stool samples by modified Ziel – Neelsen’s stain. The smears were flooded with carbol fuchsin for 15 minutes. Decolorizing was done by 2% H₂SO₄ for 5 minutes. Counter stain was done with Loeffler’s methylene blue for 15-20 sec. By this staining oocysts appear as red acid fast spheres with 4-6 µm size, against a blue background.

CD4+ T Cell Count

Blood samples were received for CD4 T Cell Count. Count was done by Partec Flow Cytometric analysis.

RESULTS

Out of 50 stool samples of HIV positive patients 30 (60%) were positive for *Cryptosporidium parvum*. Out of 30 positive samples 18 (60%) were males and 12(40%) were females. Blood samples from these patients tested for CD4 T-Cells, showing that *Cryptosporidium parvum* infection occurred in patients with CD4 T-Cells counts range 14- 484/µl and median CD4 T-Cell counts was 269/µl. *C. parvum* was most commonly observed in patients with CD4 counts <300/µl.

DISCUSSION

Parasitic infection remains an important cause of morbidity and mortality in developing countries especially among HIV infected persons [7]. In present study, prevalence of infection with *Cryptosporidium parvum* was 60%, which is similar with the study carried out by S.M. Darji *et al.* (2009-2010) in which positivity was 74% at Ahmedabad, Gujrat[8]. The prevalence of *Cryptosporidium parvum* was 12% in study by SV Kulkarni, R.Kairon, SS Sane at NARI (ICMR) PUNE [9] and in another study by Basak, Boses, S Mallick SK Ghosh AK its prevalence was 28% [10]. This difference was due to different level of endemicity of parasites and sample size. Detection of *C.parvum* significantly below the CD4 T-Cell count of <300/µl indicates the typical opportunistic nature of these parasite.

CONCLUSION

Intestinal parasitic infection and diarrhea were common in HIV infected patients with low CD4 Counts. The present study highlights the importance of testing for intestinal parasites in patients who are HIV positive and emphasizes the necessity of increasing awareness among clinicians regarding the occurrence of these parasites in this population.

REFERENCES

1. Kanabus A, Fredriksson-Bass J, Noble R. HIV-related opportunistic infections: prevention and treatment. *AIDS-Care-Watch*. 2006;3:1-1.
2. Centers for Disease Control (CDC). Update on acquired immune deficiency syndrome (AIDS)--United States. *MMWR. Morbidity and mortality weekly report*. 1982 Sep 24;31(37):507.

3. Selik RM, Haverkos HW, Curran JW. Acquired immune deficiency syndrome (AIDS) trends in the United States, 1978–1982. *The American journal of medicine*. 1984 Mar 1;76(3):493-500.
4. Talib VH, Khurana SK, Pandey J, Verma SK. Current concepts: tuberculosis and HIV infection. 1993.
5. Kaplan JE, Hu DJ, Holmes KK, Jaffe HW, Masur H, De Cock KM. Preventing opportunistic infections in human immunodeficiency virus-infected persons: implications for the developing world. *The American journal of tropical medicine and hygiene*. 1996 Jul 1;55(1):1-1.
6. Annatnarayan and Panikar. Text book of Parasitology.
7. World Health Organization. Intestinal protozoan and helminthic infections. Report of a WHO Scientific Group, Geneva, 27 October-1 November 1980. 1981.
8. Darji SM, Pethani JD, Shah PD, Kada MT. Study of Intestinal Parasitic Infection in HIV Infected Patients. *GCSMC J Med Sci.*;2.
9. Kulkarni SV, Kairon R, Sane SS, Padmawar PS, Kale VA, Thakar MR, Mehendale SM, Risbud AR. Opportunistic parasitic infections in HIV/AIDS patients presenting with diarrhoea by the level of immunosuppression.
10. Basak S, Bose S, Mallick SK, Ghosh AK. Intestinal parasitic infections in HIV seropositive patients-A study. *J Clin Diagn Res*. 2010 Jun;4:2433-7.