

A Study on the Prevalence of *Cryptosporidium* in HIV Positive Patients

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(Received 16 July 2007; accepted 26 Nov 2007)

Abstract

Background: AIDS is acquired by infection with HIV (human immuno-deficiency virus). It leaves the host susceptible to malignant and unusual infections especially opportunistic ones. Most of AIDS patients infected with opportunistic parasitic infections die because of chronic diarrhea and deaths due to *Cryptosporidium* diarrhea in AIDS patients are considerable in the recent two decades. The aim of this study is to find *Cryptosporidium* parasite in AIDS patients referring to the center of Diseases consultation in Kermanshah province and to determine the frequency of infection in those patients.

Methods: In this study stool and blood samples were collected from 75 AIDS patients referring regularly to the Center of Diseases Consultation in Kermanshah and the gathered information were filled in the questionnaires together with their personal information regarding their names, sex and etc. Stool samples were tested using direct and formalin ether methods and then the smears that were dyed using modified acid fast staining were examined. Peripheral blood samples were used to determine the CD₄ counts.

Results: The results showed that the frequency of infection with *Cryptosporidium* in AIDS patients was 26.7% (20 cases).

Conclusion: According to the study, as the number of CD₄ decreased in the patients, the probability of infection with opportunistic parasites increased and increase in the number CD₄ that is normally accompanied with strengthening the body immune system resulted in the decrease in the frequency of infection with *Cryptosporidium*.

Keywords: *Cryptosporidium, acquired immuno-deficiency syndrome, CD₄ count, Iran*

Introduction

The pandemic disease caused by the Im-muno-Deficiency Virus (HIV) that leads to Acquired Immuno-Deficiency Syndrome (AIDS) in human being has undermined the other causes of Immuno-Deficiency (1, 2). The cause of the disease is a virus from retrovirus class in humans (3). The Virus attacks to cells carrying CD₄ antigen which

infection and critical period. It is accompanied by the emergence of unusual infection, malignancy and, finally opportunistic infections during the critical period.

HIV infection diagnosis is usually carries out applying ELISA method to detection antibody and, western blot analysis recording the patient's status during chronic incubation is done via counting CD₄ in peripheral blood samples and rate of CD₄/CD₈ number. Normally, this proportion is almost two times or more and it has reverse proportion in these

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patients (3). The most of the HIV positive patients infected to opportunistic parasitic infections dies because of chronic diarrhea (1, 2). Those patients whose cellular immunity has been weakened due to HIV, opportunistic parasitic infections such as toxoplasmosis, cryptosporidiosis, isosporiasis and microsporidiasis, display a high prevalence rate (1, 2, 4-7).

Cryptosporidium sp is a protozoon that can cause diarrhea in farm animals and children. Diarrhea in immunocompetent children is self-limiting, while it causes chronic gastroenteritis in immunocompromised individuals (8). The mortality rate due to *Cryptosporidium* diarrhea in people infected with HIV, particularly AIDS, has been considerable in the last few years (8, 9). *Cryptosporidium* has pandemic distribution and its mortality rate is increased in different parts of world. About 0.6 to 4.3 percent of children with gastroenteritis has been reported in the developed countries while, it is 3- to 30 percent in underdeveloping countries (8, 9). *Cryptosporidium* displays two quite different clinical manifestation in human: A) the acute gastroenteritis which is self-limiting found in people who have normal immunity: B) chronic and long-lasting diarrhea seen in people infected with immune deficient system (10, 11).

Oral paromomycin is recommended for AIDS-infected patients as an effective and tolerable drug for treatment and, its efficiency depends on its dose/age (2, 12, 13). In a study on 35 AIDS+ patients several intestinal parasitic infections have been reported as follows: *E. histolytica*, *Cryptosporidium*, *G. lamblia*, *Microsporidia* and *Cyclospora* (14). The other studies on HIV+ patients in Africa have reported microsporidiasis, cryptosporidiosis and isosporiasis with chronic diarrhea (6). Kotler by biopsy method also separated *Microsporidium*, *Cryptosporidium* and *Isospora* in HIV+ patients (14). Sauda and Zamariolil (15) has reported, *Cryptosporidium* and *Isospora* in Brazil, Philip

(16) *G. lamblia*, *Cryptosporidium* and *E. histolytica* in north America and Pape (17) also separated *G. lamblia*, *Cryptosporidium* and *E. histolytica* in USA.

The aim of this study therefore, was to find out *Cryptosporidium* parasite in AIDS patients admitted to the Center of Diseases Consultation in Kermanshah Province (west of Iran) and to determine the frequency of infection in those patients.

Materials and Methods

This research was a cross-sectional, descriptive study, in which descriptive comparative study stool and blood samples were collected from 75 AIDS patients referred regularly to the Center of Diseases Consultation in Kermanshah and the collected data was filled in the questionnaires together with their personal information, including their name, sex and etc. Informed consent was taking of all participants. Stool samples were examined using direct wet mount and formalin-ether concentration technique and then the provided feces smears stained using modified acid fast method were examined. Peripheral blood samples were used to determine the CD4 counts. All data analyzed by descriptive statistics.

Results

Regarding sex distribution of the participants, there were 5(7%) females and 70 (93%) males in HIV+ group. Figure 1 shows the distribution of age in HIV+ patients in this study. Out of the total number of HIV+ patients, 26.7% (20 cases) were infected with *Cryptosporidium*. In addition, the frequency of infection with parasites was observed using CD4 counting as follows (Fig. 1): In group number 200 CD4, 7 patients (8.3%) were infected, in the group with CD4 counting 200-350, 6 patients (8%) were infected and, in the group with CD4 counting >500,

one patient (1.3%) had *Cryptosporidium*. Also the patients in the study were divided into 5 age groups. Their number and out of 20 people infected with *Cryptosporidium* who were studied, 11 people were suffering

from chronic diarrhea (Table 1), most up whom were in groups with the average CD4 counting of <200 and 200-350, according to Fig. 2.

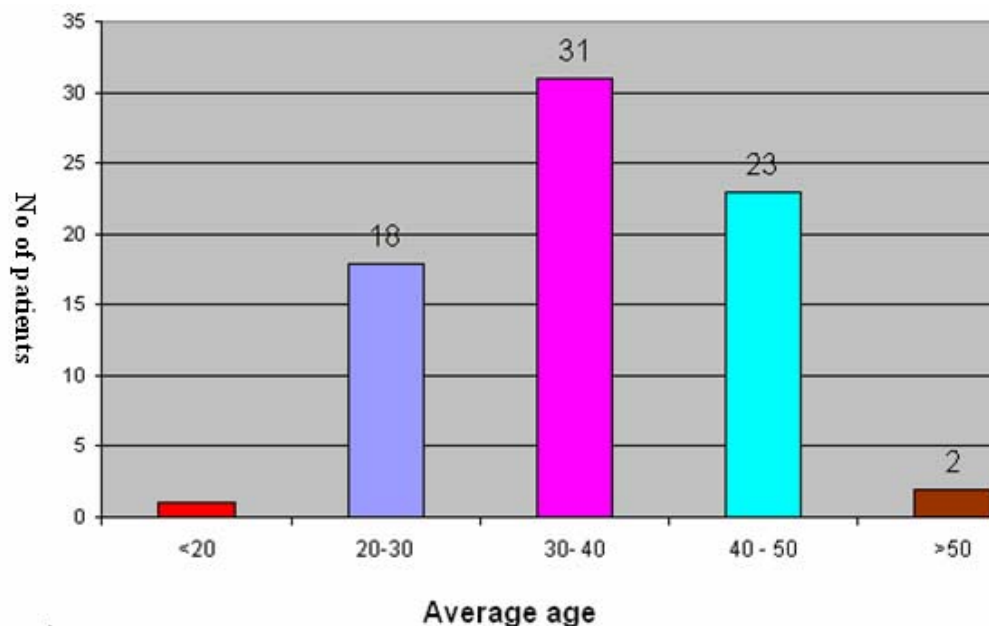


Fig. 1: Comparison infected people with noninfected people to *Cryptosporidium* in HIV+ Patients admitted to Kermanshah Consulting Disease Center in 2005

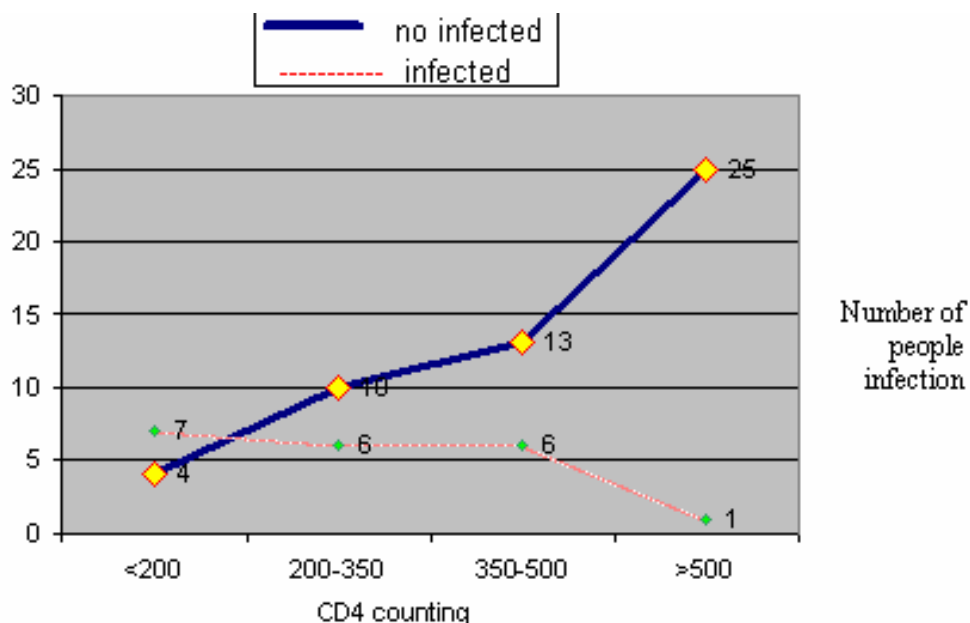


Fig. 3: Comparison infected people with noninfected people to *Cryptosporian* Patients admitted to Kermanshah Consulting Disease Center in 2005

Table 1: Comparison of CD4 Counting with *Cryptosporidium* infection and diarrhea

Diarrhea	<i>Cryptosporidium</i> Infection	CD ₄ Counting	No.
+	+	351	1
+	+	159	2
+	+	143	3
+	+	183	4
+	+	265	5
+	+	127	6
+	+	169	7
+	+	139	8
+	+	282	9
+	+	220	10
+	+	166	11

Discussion

The present study showed that *Cryptosporidium* infection in HIV+ patients is medium rate in comparison with other studies. The results also verified that the low CD4 counts had more probability of infection with this opportunistic parasite and an increase in CD4 counts and consequently an increase in immune-system resistance, the rate of infection decreases. Since *Cryptosporidium* is one of the diseases capable of even causing death, a lot of researches have been done on it. In most of the cases a high prevalence is reported. *Cryptosporidium* prevalence in HIV+ patients was reported by Pape, Kotler, Brandanezeu and Sauda as 30%, 23%, 33.3% and 19.5% respectively (18, 15). Also another study carried out in Imam Khomeini Hospital (Tehran) in 1995 on 35 patients, has reported 11.4% infection (14). Hazrati-Tappeh et al reported 11.5% and 3.48% infection rate in renal transplants and hemodialysis patients, respectively (19). It is noteworthy that comparing the result of reports with each other and interpreting them in absolute terms regarding each other is not logical, since

the prevalence of the intestinal infections is closely related to cultural, environmental, social and economic factors.

Like the previous studies, it was confirmed in this study that the rate of developing an opportunistic infection of *Cryptosporidium* is inversely proportionate to CD4 counting (4, 7-9, 13, 14, 16, 17) and in people with a CD4 under 400 or 200 the infection rate is higher as well as more intensive. Since CD4 count done using Floctometric method has not been simultaneous with parasitology test, and there have been intervals of a few months between these two tests, it is difficult to get a valuable interpretation of results. In spite of the people infected with *Cryptosporidium* who usually displays critical clinical symptoms such as diarrhea, these patients had long-lasting constipations due to using drugs in different ways (injection, oral, smelling and etc). This caused an incompatibility between clinical symptoms and parasites isolated.

In Conclusion, to put it in a nutshell, it can be claimed that the intestinal parasitic and opportunistic infections which are self-limiting in healthy people and do not need any therapy, cause long-lasting diarrhea in HIV+ patients and finally, many cases lead to death. Also considering the CD4 counting, lower CD4 count has more probability of developing this opportunistic infection in adult patients.

Acknowledgements

This research was supported in part by Chancellor of Research, Hamadan University of Medical Sciences, hereby gratefully acknowledged. We express great appreciation to Miss M Azhdari for sincere cooperation.

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