

CRYPTOSPORIDIOSIS AMONG HIV POSITIVE INTRAVENOUS DRUG USERS IN MALAYSIA

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Abstract. A study conducted at the Tampin Drug Rehabilitation Center in Malaysia established a high prevalence (23%) of asymptomatic carriers of *Cryptosporidium* among exposed HIV positive intravenous drug users (IVDUs). A majority of them were young adults and among the ethnic groups, the Malay HIV positive inmates had the highest prevalence of *Cryptosporidium* infection.

INTRODUCTION

Organisms of the genus *Cryptosporidium* were recognized and named over 80 years ago but these small, obligate, intracellular protozoans remained until recently nothing more than a biomedical curiosity. Prior to 1980, infections with species of *Cryptosporidium* were considered rare in animals, and in humans they were thought to be the result of intrusion of a little-known opportunistic pathogen in immune deficient individuals, outside its normal host range.

Beginning in 1982, our concept of these protozoan parasites changed to the realization that they are important, widespread causes of diarrheal illness in humans and some domesticated animals. In immunocompetent persons, *Cryptosporidium parvum* may cause a short term diarrheal illness that resolves spontaneously. However, in the immunocompromised host, cryptosporidiosis presents as a life-threatening, prolonged, cholera-like illness for which there is to date no known effective treatment. Thus the finding of this parasite in the immunocompromised host, especially patients with acquired immunodeficiency syndrome (AIDS), usually carries an ominous prognosis.

There is little information about this infection in Malaysia. A study among pediatric patients from the gastroenteritis ward of Klang Hospital in 1987 showed a 4% prevalence of *Cryptosporidium* (Mendez *et al*, 1988). Another study done at University Hospital showed a 2.1% prevalence (Ng *et al*, 1993). A recent study in Kelantan showed 11.4% positives among young children of 7 years and below admitted into hospital because of diarrhea. Among children with

diarrhea in the community in Kelantan, 10.6% of those submitted stools samples were infected with *Cryptosporidium* (Lai, 1992).

There are no figures on the prevalence of the infection among patients with immunodeficiency syndrome in this country but positive cases have been diagnosed among them. A majority of HIV positive cases in Malaysia are intravenous drug users (IVDUs) and therefore we have selected a drug rehabilitation center as our study population.

MATERIALS AND METHODS

This study was conducted at the Tampin Drug Rehabilitation Center (Pusat Serenti Tampin) from April to December 1992. The 168 inmates included in this study were IVDUs. They had been screened for HIV infection by the ELISA technique and confirmed by the Western blot technique three months to one and a half years prior to this study. At this time they had no signs and symptoms of acquired immunodeficiency syndrome (AIDS) and 90% of them were young adults, less than 40 years old. 76.4% were Malays, while Chinese and Indians each constituted 11.8%, 53% had been IVDUs for 1-5 years, 27% for 6-10 years. All the inmates in this center, regardless of their HIV antibody status, were allowed to mingle with each other. An anonymous questionnaire regarding drug use and sexual, social, and medical history was completed during a personal interview.

Single stool samples from 100 inmates who were HIV positive and another 68 who were HIV negative were collected in 2.5% potassium dichromate and

stained with modified Ziehl-Neelsen stain to look for *Cryptosporidium* oocysts and counterchecked using the immunofluorescence technique.

RESULTS

Of the 168 IVDUs included in this study, 100 were positive for HIV (Table 1). *Cryptosporidium* was positive in 23 out of the 100 HIV positive IVDUs (prevalence 23%). None of the HIV negative IVDUs had *Cryptosporidium* in their stools.

From Table 2, it was observed that the majority of *Cryptosporidium* positive HIV positive IVDUs were Malays, followed by Indians and Chinese with 27.8%, 14.2% and 7.1% prevalence, respectively.

The prevalence of cryptosporidiosis was also noted to be highest among the younger age group between 21-40 years as shown in Table 3. Table 4 shows the risk factors associated with HIV transmission among the study population. Apart from all of them being IVDUs, 31% of them were bisexuals, 2% homosexuals, 67% heterosexual; only 1 had received a blood transfusion. No significant correlation ($p < 0.05$) was seen between duration of IVDU and prevalence of *Cryptosporidium* infection (Fig 1).

Table 1

Prevalence of cryptosporidiosis among IVDUs with or without HIV Infection.

IVDUs	No. examined	No. positive for <i>Cryptosporidium</i>
HIV + ve	100	23
HIV - ve	68	0

Table 2

Prevalence of cryptosporidiosis among HIV positive IVDUs according to ethnic group.

Ethnic Group	Total HIV cases	<i>Cryptosporidium</i> positive (%)
Malay	72	20
Chinese	14	1
Indian	14	2

Table 3

Prevalence of cryptosporidiosis according to age.

Age Group (years)	Total HIV positive	<i>Cryptosporidium</i> positive	(%)
21-30	40	10	25.0
31-40	50	12	24.0
> 40	10	1	10.0

Table 4

Risk factors associated with HIV transmission.

Risk factor	Total HIV positive	<i>Cryptosporidium</i> positive	(%)
IVDU	100	23	23.0
Homosexual	2	0	0.0
Bisexual	31	9	29.0
Heterosexual	67	14	20.9
Blood transfusion	1	0	0.0

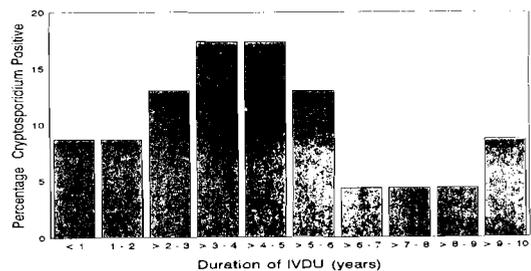


Fig 1—Cryptosporidiosis among HIV positive IVDU's

DISCUSSION

It is interesting to note that the 23 positive cases of cryptosporidiosis had come from IVDUs who were HIV positive and none from the HIV negative IVDUs. The association between cryptosporidiosis and HIV infection is well recognized and the effects of heroin addiction in causing abnormalities in both humoral as well as cellular immunity has been described by Brown *et al* (1974). However none of the cases had diarrhea or other symptoms of cryptosporidiosis and they acted as asymptomatic

carriers of *Cryptosporidium*. This is probably not an uncommon phenomenon and is consistent with the findings of Ravn *et al* (1991) who found the occurrence of asymptomatic carriers of *Cryptosporidium* to be a frequent occurrence in exposed AIDS patients, just as it is in non-immune children in locations where cryptosporidiosis is hyperendemic. It is also possible that their immunological status is still normal or slightly lower or the infective dose is too small, as we could not find *Cryptosporidium* oocysts among the HIV negative inmates. Zar *et al* (1985) also reported asymptomatic carriage of *Cryptosporidium* in the stool of a homosexual man with AIDS and they stated that the presence of cryptosporidiosis in AIDS was often underappreciated.

Among the ethnic groups, Malays had the highest prevalence of cryptosporidiosis. This is partly because Malays form the largest group of IVDUs in the drug rehabilitation center, as well as in the country at large. Navaratnam *et al* (1989) reported that about half (47.6%) of the total known addicts over the period 1975-1986 were Malays.

The prevalence of cryptosporidiosis was highest (with 25%) in the age group 21-30 years followed by the age group 31-40 years (24% prevalence). Navaratnam *et al* (1989) found that a majority (66.8%) of drug dependants detected over a 10 year period had initiated drug use between the age of 15 to 24 years. However, trends in the age at onset of drug use indicates a significant change towards an older age of initiation: prior to 1979, a majority of drug dependents, reported each year, had initiated drug use in their teens. However since 1979, the majority had started drug use in their twenties.

IVDUs make up the majority of AIDS cases in Malaysia and IVDU is one of the most important risk factors associated with HIV transmission. This differs from The US Centers for Disease Control (CDC) reports in the years 1978 to 1982 where the majority of American AIDS patients were homosexual men (Guinan *et al*, 1984). Small *et al* (1983) reported patients with the syndrome of opportunistic infection and AIDS did not appear to be confined to homosexual populations but also occurred in drug abusers of both sexes. Among the risk factors associated with HIV transmission other than IVDU, bisexuals were noted to have the highest prevalence of *Cryptosporidium* infection with 29%, followed by heterosexual with 20.9%. This is consistent with the findings of Navin *et al* (1987) that

the largest number of *Cryptosporidium* infections occurred in homosexual or bisexual men (4.2% infection rate). This correlates with the hypothesis that oral-anal contact contributes to the transmission of *Cryptosporidium* infection.

No statistically significant correlation ($p < 0.05$) was shown between the prevalence of cryptosporidiosis and the duration of IVDU in this study. There are several factors contributing there to. Firstly, the duration of IVDU does not indicate the duration of HIV infection. Secondly, the general hygiene practices of individual inmates are different. Also the immunological status of each individual, as we have yet to determine, may be different. It is well known that the tendency towards developing symptomatic cryptosporidiosis shows consistent trends towards more advanced HIV disease. Alternatively, however, a long incubation time may result, at least in part, from infection with relatively small inocula, too small to establish infection in immunocompetent subjects.

Studies have shown that the duration of the disease during HIV infection is related to the degree of immunocompetence of the host. Self-limited cryptosporidiosis is associated with a higher CD4 count, CD4 to CD8 ratio, and hematocrit, although only the CD4 count is an independent predictor of self-limited disease. Flanigan *et al* (1992) reported that in his study group all patients with CD4 counts of 180 cells/mm³ or more had self-limited *Cryptosporidium* infection. In contrast, in patients with CD4 counts of less than 140 cells/mm³ who had cryptosporidiosis, 87% developed persistent disease.

In conclusion, risk factors such as a history of parenteral drug abuse and sexual promiscuity were significantly correlated with HIV seropositivity as well as cryptosporidiosis. From our experience, we conclude that *Cryptosporidium* is among the sexually transmitted enteric pathogens that cause what is collectively known as the gay bowel syndrome; and that the work-up of any patient with unexplained gastroenteritis should include a stool examination for *Cryptosporidium* oocysts.

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