

STUDY OF INTESTINAL PARASITE CARRIAGE IN HIV+ PATIENTS AT THE MOHAMMED V MILITARY HOSPITAL IN RABAT, MOROCCO

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ABSTRACT

Background: Intestinal parasitosis is a public health problem in developing countries. Our study proposes to know the frequency and the favoring factors of intestinal parasitosis in HIV positive patients often very exposed to severe clinical manifestations given their immune status.

Patients and Methods: This is a prospective descriptive study, carried out over a period of 1 year from March 2022 to March 2023, in the laboratory of parasitology and mycology of the HMIMV in Rabat.

Patients with positive HIV serology, with or without digestive signs, were included.

A parasitological examination of the stools was carried out in these patients with, in addition to the standard techniques, the modified Ziehl-Neelsen.

Results and Discussion: 28 patients were included; the average age is 45.4 years with a sex ratio M/F of 6. The rate of parasitic infections is 42.8%, made up exclusively of protozoa, with an overall prevalence of intestinal coccidia at 14.3%. These results are in agreement with certain studies concerning the predominance of protozoa. There was a positive relationship between CD4 count and parasite species. found, our study showed that intestinal coccidiosis being more frequent from a CD4 count of less than 200 elements per mm³, this is in agreement with the literature of which opportunistic intestinal parasitosis are intimately linked to the immune status and in particular the CD4 count.

Conclusion: The intestinal parasitism of our patients is made exclusively of protozoa which are indicators of hygiene.

Hygiene promotion, systematic stool examination or, failing that, deworming of patients will certainly reduce this prevalence.

Keywords: Intestinal parasites – Opportunistic parasites – AIDS – Intestinal coccidiosis

INTRODUCTION

Intestinal parasitosis is a real public health problem, especially in Third World countries where overcrowding, lack of drinking water and hygiene are felt. [1]

The repercussions of intestinal parasitosis on the well-being of individuals or communities are more or less serious depending on various factors: the parasitic species in question, the intensity of the infestation, the nutritional state and especially the immune status of the person. infested. [2] Indeed, in addition to the usual intestinal parasitosis, immunosuppression exposes

to opportunistic enteric parasitic infestations which can cause sometimes fatal chronic diarrhoea, as is the case with infection by the human immunodeficiency virus (HIV.) Where opportunistic digestive parasitosis are infections classifying the AIDS stage.

Despite the advent of triple antiretroviral therapy, intestinal parasitosis is still frequent in HIV-infected patients [3], hence the interest, even in the absence of diarrhea, of carrying out standardized fecal examinations in HIV-infected patients.

The Moroccan studies that have been concerned with this problem are not numerous and the present study aims to contribute to the study of the epidemiology of intestinal parasitosis in patients infected with HIV in Morocco.

Three specific objectives were formulated during this epidemiological investigation:

- Establish the prevalence of intestinal parasitosis in HIV+ patients.
- Comparison of results with other series.
- Insist on prophylaxis and preventive measures.

MATERIALS AND METHODS

This is a prospective descriptive study carried out in the Parasitology Mycology laboratory of the Mohammed V Military Instruction Hospital in Rabat, over a period of one year from March 2022 to March 2023.

This study focused on stool parasitological examinations (SPE) of HIV+ patients sent to the Laboratory of Parasitology and Medical Mycology of HMIMV-Rabat.

The patients included were patients with positive HIV serology, with or without digestive signs.

Each patient included in the study received a dry, transparent, sterile and hermetically sealed container beforehand in order to collect the stool samples. One or three samples, if possible, will be taken one day apart.

The samples are sent to the Parasitology and Mycology laboratory within the following hour. For each pot, we assigned a code to maintain anonymity.

Upon arrival of each sample, the collected stools are examined according to the following steps:

- Macroscopic examination: to note the aspect, the color, the consistency and the possible presence of blood, mucus and adult forms of parasites.
- A microscopic examination in the fresh state (0.9% saline solution) to study the mobility and shape of the vegetative forms of protozoa, to look for eggs or nematode larvae.
- A microscopic examination after staining (Lugol 2% or Merthiolate Iodine Formaldehyde) to study the morphology of the parasites, especially the cystic forms of the protozoa (amoeba nuclei).
- Ziehl Neelson staining modified to highlight the oocysts of intestinal coccidia.
- Concentration techniques (physical-chemical technique of Ritchie and physical technique of Willis).

Slides are read first at low magnification (x100) to detect helminth eggs and larvae, then at medium magnification (x400) to look for vegetative and cystic forms of protozoa.

In addition, all the stools produced contributed to a study using the Multiplex PCR technique (FilmArray™ Gastrointestinal Panel).

RESULTS

1- Descriptive analysis of the population studied

During the study period, we included 28 patients with 84 stool parasitological examinations (EPS), the majority of our patients are soldiers with 04 female spouses and one civilian patient. These patients are aged 24 to 72 years with a mean age of 45.4 years and a median of 48 years. The M/F sex ratio is 6 (24 men and 4 women).

2- Descriptive analysis of the infected population

We found 12 out of 28 patients carrying one or more intestinal parasites, either a prevalence of 42.8%. Among these parasitized subjects, 58.3% were poly-parasitized.

2-1: Distribution of parasitized patients according to age

The distribution of infected patients by age group is as follows (Table 1)

Table 1: Prevalence of parasitism according to age groups

Age range (years)	24-35	36-55	>56
Number of examined patients	9	14	5
Number of parasitized patients	5	3	4
Prevalence of intestinal parasitism (%)	55.5	21.5	80
Prevalence of intestinal polyparasitism (%)	40	100	50

2-2: Distribution of parasitized patients according to sex:

Concerning parasitized patients, we noted a male predominance (91,7%), with a sex ratio (M/F) of 11. (Table 2).

Table 2: Distribution of parasitized patients according to sex.

Sex	♂	♀
Number of examined patients	24	4
Number of parasitized patients	11	1
Prevalence of intestinal parasitism (%)	45,8	25
Prevalence of intestinal polyparasitism (%)	54,5	100

2-3: Distribution of parasitized patients according to CD4 count

According to the CD4 count, the parasitized or non-parasitized patients were distributed as follows (Table 3):

Table 3: Parasitism by CD4 count

CD4 count	Number of cases (+)	Number of cases (-)
>500elements/mm ³	2	4
200-499elements/mm ³	1	3
<200elements/mm ³	9	1

2-4: Study of collected parasitosis

The intestinal parasitism in our study was dominated by protozoa which represent 100% of the total parasites isolated, distributed between amoebae (30%), flagellates (5%), coccidia (20%) and *Blastocystis hominis* (45%).(Figure 1).

The table 4 represent a summary of the incidence of the various parasites isolated.

Distribution of Protozoa

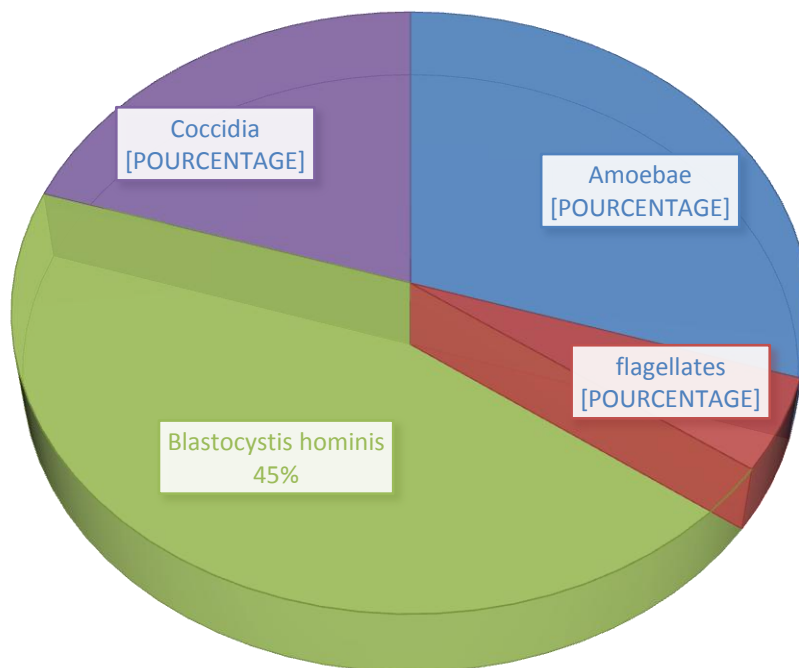


Figure 1: Distribution of different Protozoa.

Table 4: Summary of the incidence of the various parasites

	Parasite	Number of parasitized patients	Specific parasite index (%)	Index in relation to parasitized patients	% Of parasite out of total parasites
AMOEBAE	<i>E. coli</i>	4	14,28	33,33	20
	<i>E. nana</i>	2	7,14	16,66	10
FLAGELLATE	<i>G. intestinalis</i>	1	3,57	8,33	5
<i>B. hominis</i>		9	32,14	75	45
COCCIDIA	<i>Cryptosporidium sp</i>	3	10,71	25	15
	<i>Isospora belli</i>	1	3,57	8,33	5

2-5: Distribution of parasitic species according to CD4 count

Our study showed a high parasite prevalence (80%) in patients with a CD4 count < 200 elements/mm³ (Table 5).

Table 5: Distribution of parasitic species according to CD4 count

Parasite	< 200 elements/mm ³		200-500 elements/mm ³		>500elements/mm ³	
	Number	%	Number	%	Number	%
<i>Entamoeba coli</i>	3	18,7	0	0	1	33,3
<i>Endolimax NANUS</i>	1	6,3	0	0	1	33,3
<i>Entamoebahistolytica</i>	0	0	0	0	0	0

FLAGELLATE	<i>Giardia intestinalis</i>	1	6,3	0	0	0	0
	<i>Blastocystis hominis</i>	7	43,7	1	100	1	33,3
COCCIDIA	<i>Cryptosporidium</i> <i>sp</i>	3	18,7	0	0	0	0
	<i>Isospora belli</i>	1	6,3	0	0	0	0
Total parasites		16		1		3	

DISCUSSION

This cross-sectional epidemiological survey was carried out among HIV+ patients, with a total of 28 patients and an average age of 45.4 years.

From the results obtained, it appears that more than 42% of patients harbor one or more parasites in their intestine. This overall prevalence rate remains comparable to those reported by Mohammed Awolé in southwestern Ethiopia, Cornelius Kibet Kipyegen in Kenya (Baringo) and Zeynudin in Ethiopia (jimma) which are respectively 44.8%, 39.56% and 50.9%. On the other hand, it appears lower than the infestation rates reported by Elba Guadalupe Rodríguez-Pérez in Mexico and L. Badaoui in Morocco (Casablanca) which are respectively 69% and 80%. [4] [5] [6] [7] [8]

In addition, authors of other studies reported lower parasitic incidences compared to our series: Natane Barbosa Barcelos in Brazil (28.88%), Pavie in France (17%), Dhruva Hari Chandi in India (23.75%) [9] [10][11].

This difference in prevalence could be explained initially by the size of the population studied (small), by the method of recruiting patients (symptomatic or not), the immune status (CD4 count), the diagnostic methods used and finally by the socio-economic level and above all the level of hygiene of the patients recruited.

The study of intestinal parasitism according to age, in our series, does not find a statistically significant difference, in general, the relationship of intestinal parasitosis in HIV-infected patients and age, is a function of the evolution of this retroviral infection, the frequency of which increases with age. [7]

Regarding the prevalence of intestinal parasitism according to the sex of the patients, we noted that the parasite prevalence is higher in the male sex compared to the female sex. This finding was confirmed in other similar studies by Juliette Pavie who reported a slight male predominance [10].

Our study showed that intestinal coccidiosis being more frequent from a CD4 level of less than 200 elements per mm³, this is in agreement with the literature of which opportunistic intestinal parasitosis are intimately linked to the immune status and in particular the CD4 level.

The intestinal parasites isolated in our patients are protozoa, no case of helminths was found. These results agree with those reported by other authors concerning the predominance of protozoa, agents of dirty hands diseases, faecal peril and dirty food [11] [12].

Non-pathogenic protozoa, reflecting a defective level of hygiene and continuous contact with faeces, are comparable to pathogenic protozoa in our series with a prevalence of 30%.

Regarding non-pathogenic amoebas, our results are comparable to those of the survey conducted in Ouagadougou, where the prevalence is 27.7% [13]. Epidemiologically, the two species of non-pathogenic amoeba found in our series are in decreasing order of prevalence: *Entamoeba coli* (14.28%) and *Endolimax nana* (7.14%). Furthermore, *Entamoeba histolytica* was not detected in our study.

Giardia intestinalis is the only flagellate encountered in this study, it was detected in 1 patient, either 3.57% of the patients examined. If Luciana Ventura Cardoso shows a similar rate (3.5%), others, on the other hand, show higher rates [14] [15] [16].

Blastocystis hominis remains the most isolated protozoan in our series with a prevalence of 32.1%, of which 55.5% of these patients present with diarrhea.

The majority of studies conducted on HIV+ patients did not identify this parasite in their series, however Angel Arturo Escobedo and Li-Guang Tian reported a prevalence of 25.3% and 19.2% respectively [15][17].

Cryptosporidium sp: Our study detected an overall prevalence of coccidia of 14.28%, which remains comparable to that reported by Angel Arturo Escobedo(16.4%) [15]. Cryptosporidiosis is a frequent cause of chronic diarrhea in HIV-infected patients in industrialized countries, with a prevalence of 8% to 23% in the USA and 37% in Europe.

Isospora belli: This parasite is cosmopolitan with a variable prevalence depending on the region, indeed it is a parasite which is mainly found in the tropical and subtropical zone with a prevalence which can go up to 20% of parasitosis in patients infected with HIV, while it does not exceed 2% in temperate regions (France for example). Among our patients, we isolated a case of *Isospora belli* in a military patient who had a history of travel to tropical areas.

CONCLUSION

The results of this study are intended to develop measures to limit the spread of these conditions by raising public awareness and applying appropriate hygiene measures. The methods used have made it possible to highlight all the parasitic forms that may be present for better confirmation of the diagnosis.

This study also shows us that as long as the conditions are favorable, intestinal parasitosis will continue their transmission and perpetuation and therefore will always constitute a public health problem. Prevention is the only treatment; it is based on simple individual rules and collective hygiene which, in turn, requires greater resources.

The results obtained are preliminary and this study must be deepened and extended over a longer period. Preventive measures must be maintained with, in particular, an education of HIV-positive patients, insisting on faecal hygiene, the appropriate treatment of water and food to fight against these parasites.

CONFLICT OF INTEREST: All authors declare that they have no conflict of interest.

BIBLIOGRAPHY

- [1] S. El-Kourabi, « Portage parasitaire intestinal chez la femme enceinte. », Thesis, 2011. [En ligne]. Disponible sur : <http://ao.um5.ac.ma/xmlui/handle/123456789/1956>
- [2] « Importance des parasitoses intestinales en santé publique », *Bull. Organ. Mond. Santé* 1988 661 23-34, 1988, [En ligne]. Disponible sur : <https://apps.who.int/iris/handle/10665/46696>
- [3] D. K. Mintaet al., « Les parasitoses digestives chez les patients infectés par le VIH/SIDA dans les services de médecine interne et de maladies infectieuses à l'Hôpital du Point "G" Bamako - Mali. », 2007. [En ligne]. Disponible sur : <https://www.bibliosante.ml/handle/123456789/3171>
- [4] C. K. Kipyegen, R. S. Shivairo, et R. O. Odhiambo, « Prevalence of intestinal parasites among HIV patients in Baringo, Kenya », *Pan Afr. Med. J.*, vol. 13, p. 37, 2012.
- [5] A. Zeynudin, K. Hemalatha, et S. Kannan, « Prevalence of opportunistic intestinal parasitic infection among HIV infected patients who are taking antiretroviral treatment at Jimma Health Center, Jimma, Ethiopia », *Eur. Rev. Med. Pharmacol. Sci.*, vol. 17, n° 4, p. 513- 516, févr. 2013.
- [6] E. G. Rodríguez-Pérez, A. Y. Arce-Mendoza, É. I. Montes-Zapata, A. Limón, L. É. Rodríguez, et K. Escandón-Vargas, « Opportunistic intestinal parasites in immunocompromised patients from a tertiary hospital in Monterrey, Mexico », *Infez Med*, vol. 27, p. 168- 74, 2019.
- [7] L. Badaoui et R. B. A. Oulad Lahcen, « Parasitoses opportunistes digestives chez les adultes infectés par le VIH : Aspects épidémiologiques Opportunistic digestive parasitic infections in adults infected with HIV :epidemiological expression », *J. Maroc. Sci. Médicales*, vol. Vol. 19, p. No 2 (2014), juin 2015, doi: 10.48401/IMIST.PRSM/JMSM-V19I2.2552.
- [8] M. Awole, S. Gebre-Selassie, T. Kassa, et G. Kibru, « Prevalence of intestinal parasites in HIV-infected adult patients in Southwestern Ethiopia », *Ethiop. J. Health Dev.*, vol. 17, n° 1, Art. n° 1, 2003, doi: 10.4314/ejhd.v17i1.9783.
- [9] N. B. Barcelos, L. de F. e Silva, R. F. G. Dias, H. R. de Menezes Filho, et R. M. Rodrigues, « Opportunistic and non-opportunistic intestinal parasites in HIV/ AIDS patients in relation to their clinical and epidemiological status in a specialized medical service in Goiás, Brazil », *Rev. Inst. Med. Trop. São Paulo*, vol. 60, n° 0, mars 2018, doi: 10.1590/s1678-9946201860013.
- [10] J. Pavie et al., « Prevalence of opportunistic intestinal parasitic infections among HIV-infected patients with low CD4 cells counts in France in the combination antiretroviral therapy era », *Int. J. Infect. Dis.*, vol. 16, n° 9, p. e677- e679, sept. 2012, doi: 10.1016/j.ijid.2012.05.1022.
- [11] D. H. Chandi et S. J. Lakhani, « Intestinal Parasite Infestation in HIV Infected Patients in Tertiary Care Center. », *J. Pure Appl. Microbiol.*, vol. 15, n° 3, p. 1602- 1608, sept. 2021.
- [12] J. Aviles, J. C. Yombi, C. Erostequi, M. Torrico, et R. Yanez, « Intestinal Parasitic Infections in Adult Living with HIV in Cochabamba Bolivia », *Infect Diag Treat*, vol. 4, n° 136, p. 2577- 1515, 2020.
- [13] H. Y. O. de Ouagadougou, « PARASITOSSES DIGESTIVES ET INFECTION PAR LE

VIRUS DE L'IMMUNO-DEFICIENCE HUMAINE À OUAGADOUGOU », *Médecine Afr. Noire*, vol. 44, n° 2, 1997.

[14] S. K. Babatunde, A. K. Salami, J. P. Fabiyi, O. O. Agbede, et O. O. Desalu, « Prevalence of intestinal parasitic infestation in HIV seropositive and seronegative patients in Ilorin, Nigeria », *Ann. Afr. Med.*, vol. 9, n° 3, 2010.

[15] A. A. Escobedo et F. A. Núñez, « Prevalence of intestinal parasites in Cubanacquiredimmunodeficiency syndrome (AIDS) patients », *Acta Trop.*, vol. 72, n° 1, p. 125- 130, janv. 1999, doi: 10.1016/S0001-706X(98)00091-6.

[16] Luciana Ventura Cardoso, Katia JairaGalisteu, ArlindoSchiesariJúnior. Enteroparasitasempacientesinfectados pelo HIV-1/AIDS emumaunidade de referência do noroestepaulista na era da terapiaantirretroviral de alto impacto. Revista da SociedadeBrasileira de Medicina Tropical November 2011

[17] S.-X. Zhang, F.-Y. Kang, J.-X. Chen, L.-G. Tian, et L.-L. Geng, « Risk factors for Blastocystis infection in HIV/AIDS patients with highly active antiretroviral therapy in Southwest China », *Infect. Dis. Poverty*, vol. 8, n° 1, p. 89, oct. 2019, doi: 10.1186/s40249-019-0596-7.