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RESEARCH ARTICLE

Tuberculosis and intestinal parasitosis coinfection in Mahajanga, Madagascar.

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ABSTRACT

Tuberculosis and intestinal parasitosis with their coinfection are among public health problems in developping countries. This preliminary study aims to determine the prevalence of coinfection, investigates relationship between infestation of parasites and age, gender, residence, occupation or BMI of patients and to identify the parasites species. A prospective study was then conducted at the Pneumology and Phthisiology hospital unit in collaboration with the UHC PZaGa laboratory from December 2015 to October 2016. Patients with tuberculosis to whom was performed parasitological examination of stool were included in the study. In whole, 60 TB patients were investigated. The prevalence of the coinfection was 15%. All the infested patients were male ($p < 0.05$). The age of TB patients varied from 17 to 68 ($p>0.05$). A large majority of them were from rural area (67%). This result was statistically significant ($p<0.05$). Patients from rural area were mostly hit by the infection ($p<0.05$). The parasitic infestation was not associated to the body mass index of TB patients ($p>0.05$). Four species of parasites were identified, namely Ancylostoma duodenale, Strongyloides stercoralis, Giardia intestinalis and Entamoeba coli, respectively with 45%, 22%, 22% and 11%.
Few TB patients were screened with parasitological examination of stool. This study showed how significant the analysis was before improving therapy and care.

KEYWORD

Tuberculosis, intestinal parasites, coinfection.

History

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INTRODUCTION

Relationship between tuberculosis (TB) and intestinal parasitic infections in human is part of public health concern in areas with co-endemicity, particulatly in developping countries. However, some authors pretended that investigations were not enough on these coinfection [1,2], as the case of Madagascar where it is undocumented. Coinfection may inhibit significantly the immune system of hosts [1]. The high prevalence of intestinal parasites had exacerbated a high morbidity on patients with tuberculosis and stressed the importance of stool examination and care provided to them [3]. This study aims to determine the prevalence rate of coinfection, to establish relationship between parasitic infestation and age, gender, residence, occupation or with the body mass index and to identify species of parasites.

MATERIALS AND METHOD

A prospective cross-sectional study was carried out for three months from December 2015 to October 2016 within the UHC Zafisaona Gabriel laboratory. Patients tested positive with Mycobacterium tuberculosis and admitted to the Pneumology and Phthisiology Unit and who had parasitological examination of stool, were recruited as study participants after they gave consents. The procedure of TB screening complied with country recommendations from the Ministry of Public Health using the Ziehl Neelsen staining to detect Acid-Alcohol resistant bacillus (BARR) at direct examination of samples. The search for intestinal parasites was performed with two techniques namely direct examination especially for the vegetative and parasite concentration using Mercurothiolate-Iodine formalin stain (MIF) for cystic forms, eggs or larva.

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RESULTS & DISCUSSION

Inevitably, co-infection would increase the complexity of control and prevention on tuberculosis and parasitic diseases. Some studies reported immunomodulation characteristics of co-infection beween TB and intestinal helminths. Helminths very clearly alter the magnitude of the mycobacteria-specific cytokine responses, altering the control of the mycobacteria growth. Mycobacteria-induced immune responses are suppressed by helminth infections [4]. Helminth-induced Th2 and T reg responses impinge on host resistance against M. tuberculosis infection. Th1 response is reduced in helminth co-infected hosts. Helminth-induced alternatively activated macrophages contribute to enhanced susceptibility to tuberculosis [5].
Amidst the 60 TB patients, the prevalence of the parasitic infestation was 15%. Which was also the case in China (14,9%) in 2012 [6]. Our result is higher than that in

Table 1: Clinical forms of Tuberculosis.

Tuberculosis aspects	Newly diagnosed cases N=55(54%)	TB relapse N=3(05%)	Re-treatment cases N=2(04%)	Total N=60(100%)
Pulmonary TB	33(56%)	02(4%)	1(02%)	36(60%)
Miliary tuberculosis	05(08%)	1(02%)	1(02%)	7(12%)
Pleural tuberculosis	11(18%)	-	-	11(18%)
Pott's disease	5(08%)	-	-	5(08%)
Association of Miliary tuberculosis-pulmonary TB	01(02%)	-	-	1(02%)

Table 2: Coinfection Tuberculosis-intestinal parasites and associated risk factors.

Variables	Total N=60(%)	Intesitinal parasites positive N=09(15%)	Intestinal parasites negative N=51 (75%)	p value
Gender				0.04
▪ Male	41(68%)	09(15%)	32(53%)	
▪ Female	19(32%)	00	19 (32%)	
Adult (=18yrs old)				0.27
▪ Yes	58(97%)	08(13%)	50(84%)	
▪ No	02(3%)	01(1.5%)	01(1.5%)	
Residence area				0.01
▪ Urban	43(72%)	03(5%)	40(67%)	
▪ Rural	17(28%)	06(10%)	11(18%)	
Body Mass Index				0.18
▪ <19kg/m2	47(78%)	09(15%)	38(63%)	
▪ =19kg/m2	13(22%)	00	13(13%)	

Table 3: Intestinal parasites infestation.

Intestinal Parasites	Total N=9 (100%)
Ancylostoma duodenale	4 (45%)
Strongyloïdes stercoralis	2(22%)
Giardia intestinalis	2(22%)
Entamoeba coli	1(11%)

Table 4: Coinfection of clinical forms of tuberculosis and intestinal parasitosis.

TB aspects	Newly diagnosed cases N=7(78%)	TB relapse N=1(11%)	Retreatment TB N=1(11%)	Intestinal parasites N=9(100%)
Pulmonary TB	2(22%)	-	-	2(22%)
Miliary tuberculosis	1(11%)	1(11%)	1(11%)	3(33%)
Pleural tuberculosis	3(33%)	-	-	3(33%)
Association of miliary tuberculosis-pulmonary TB	1(11%)	-	-	1(11%)

Ethiopia with 5.7% [7]. Nevertheless, such figure is widely below that reported in Ethiopia with a rate of 49% [8].

In this study, pulmonary tuberculosis and pleural tuberculosis were found predominant (Table 1). The age of TB patients infested with parasitic infections ranged from 17 to 68 years old with a mean age of 43. No relationship was associated between coinfection and age, or the body mass index of patients. Although, a significant association was observed with gender, or residence (Table 2). Coinfection was mainly located on men [2]. However, other investigations reported an overwhelming figure on women. According to these authors, women were more exposed to parasitic infestation because of their occupation as farm keepers [6].

The rise of coinfection between tuberculosis and intestinal parasitosis is also linked with occurrence of HIV infection on TB patients [8]. Unfortunately no HIV screening was achieved all along our study. It showed that patients with extrapulmonary tuberculosis were the mostly infested (Table 4). Such result was different from those reported in Ethiopia where pulmonary tuberculosis were the frequently encoutered form of coinfection with intestinal parasitosis [2].

In this study, hookworm was found to be the predominant intestinal parasite in TB patients (Table 3). This result is concordant with the finding of other studie done in Ethiopia [7]. Alemayehu et al had found that the infestation with hookworm and nematodes were the most frequent infestations. The prevalence was high comparing to those from others intestinal parasites [7]. The frequency of those parasites is linked to the condition of hot and wet climate of the region which enhance its survival and growth.

The identified protozoa were Giardia intestinalis (22%) and Entamoeba coli (11%) (Table3). On the other hand, Franke and al. reported in Peru that protozoa were mostly encountered on children with tuberculosis [9]. These species are transmitted in the cystic form through uncooked, badly washed foods (fruits, vegetables, lettuces…) and from water and drink drawn from rivers contaminated with human excreta and which did not undergo prior treatment [10, 11]. In Ethiopia, the association of two or more parasites is common on patients with tuberculosis [8].

As limitation of the study, TB patients had only a single parasitological examination of stool. It is a possibility that in case of three examinations, the prevalence of co-infection would be increased.

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CONCLUSION

The study enabled us to understand that TB-intestinal parasitosis coinfection is common in Mahajanga with a fairly high prevalence. Indeed, a systematic screening of intestinal parasites is compulsory on all patients with tuberculosis for collective and individual prevention purposes related to this infestation. Unfortunately, few TB patients had achieved parasitological examination of stool. It would be desirable that the Ministry of Public health insert the research of co-infection between tuberculosis and intestinal parasitic infection free of charge in a national policy program to improve caretaking of patients.

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