

Ascaris lumbricoides and Strongyloides stercoralis associated diarrhoea in an immuno-compromised patient

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Abstract: As a part of ongoing research work on the prevalence and epidemiology of enteric parasites associated with HIV/AIDS patients, field visits were made in the Churachandpur district of Manipur during the period of February to May 2016, with a view to assess the occurrence/prevalence of opportunistic parasites in these immuno-compromised group of patients. During this field visit, a 40 year old HIV seropositive female, who worked as an outreach worker in one of the drug de-addiction centres, complained of experiencing diarrhoea since two and half months back. She also gave a history of loose motion/intermittent diarrhoea, on and off for the past 1-2 years. On laboratory investigation, using the standard parasitological techniques, she was diagnosed as suffering from *Ascaris lumbricoides* and *Strongyloides stercoralis* infection. Single infection either with *Ascaris lumbricoides* or *Strongyloides stercoralis* is of common occurrence, however concurrent infection with these two parasites is of infrequent occurrence. Moreover, *Strongyloides stercoralis* infection is of utmost clinical importance as this parasite often causes disseminated/hyperinfection syndrome in the HIV/AIDS patients resulting in the rapid deterioration of the general health and occasionally the death of the patient.

Key Words: *Ascaris lumbricoides*, HIV infection, *Strongyloides stercoralis*

I. Introduction

Individuals with HIV/AIDS are prone to a number of infections caused by various biological agents, by virtue of their immuno-compromised status⁽¹⁾. Previous workers have already reported the occurrence of a number of parasites in HIV/AIDS patients of Manipur in general^(2,3) and Churachandpur district in particular⁽⁴⁾. Although there are reported cases of strongyloidiasis associated with HIV infection in Manipur^(5,6), so far no literature/published report is traceable with regard to dual infection of HIV seropositive patient with that of the *Ascaris lumbricoides* and *Strongyloides stercoralis* especially in the Churachandpur district of the state. In the present paper, we report a case of concurrent infection of *Ascaris lumbricoides* - *Strongyloides stercoralis* in a 40 year old HIV positive tribal (female) patient of this district, Manipur.

II. Materials and Methods

Two consecutive fresh and three preserved faecal specimens (preserved in 10% buffered formalin and 2.5% potassium dichromate) were collected from the patient for the present study. The faecal /stool sample was collected as per the standard guidelines⁽⁷⁾. Detection, recovery and identification of the life cycle stages of the parasite(s) were done by adopting the following standard guidelines/ techniques⁽⁸⁾:

1. Normal saline method
2. Iodine wet preparation method
3. Formol ethyl acetate concentration technique
4. Baermann modified funnel technique

A high powered binocular compound microscope (Olympus) and a stereoscopic dissecting binocular microscope were used for the detection and observation of the parasites; the former for the detection and observation of egg/ova, cyst(s) and oocyst(s) of protozoan parasites, while the latter for the observation of larvae of helminth parasites. A calibrated compound microscope (Olympus- 71692) was used for studying the morpho-anatomical structures and for measuring the dimension(s) of the life cycle stage(s) of the parasite(s) being observed. A high resolution compound microscope (Nikon, Eclipse E-200) was used for microphotography.

III. Results

The ART naive patient was apparently healthy and had a CD₄ cells count of 450 cells/ μ l at the time of sample collection. On taking personal/clinical history of the patient, it was revealed that she was a widow with two children and worked as a commercial sex worker (CSW) for earning a livelihood for her family before joining the drug de-addiction centre as an outreach worker. She joined the centre about 3 years back. There was no history of pain in the abdomen and no record of other major health problems in the last one year or so. However, she complained of experiencing loose motion/intermittent diarrhoea, on and off for the last 1-2 years. Although she relied on anti-diarrhoeals whenever she experienced diarrhoea; the moment diarrhoea subsides/resolves, she stopped taking the drugs ignoring the prescribed period of treatment.

On laboratory investigation, the sample was found negative for blood and mucous; however, a number of fertilized corticated eggs/ova (45-60 μ m in dimension) of *Ascaris lumbricoides* (Fig. I) were observed. A large number of vermiform, elongated, worm/larvae like structures were also observed in the sample. No cyst or trophozoite was detected in the sample. On further examination using Baermann modified funnel and ethyl acetate concentration technique, a number of fusiform worm like structures were observed. When the concentrate was again examined using a stereoscopic dissecting microscope, structures very much akin to that of rhabditiform larvae of nematodes were observed. These structures were then examined under a compound microscope having a high resolution power (Nikon, Eclipse E-200), so that the detailed morphological and anatomical structures can be observed and studied. Ultimately, they were identified as rhabditiform larva (L1) of *Strongyloides stercoralis* based on WHO criteria^(7, 8). Using a calibrated compound microscope (Olympus-71692), the dimensions of the larva and its internal accessory structures were measured. The larvae were found to have possessed a fusiform body having a length of 241.8 – 249.6 μ m and a breadth of 15 μ m when measured at the body median; a double bulbed oesophagus having one corpus and one end bulb joined by a short isthmus besides possessing a buccal cavity having a length of 4 μ m. A germinal primordium having a dimension of 22 μ m was also observed at the posterior region of the larva.

Therefore, based on the presence of the above mentioned systematically important & taxonomically valid diagnostic characters and identifying criteria for the rhabditiform larvae of *Strongyloides stercoralis*⁽⁷⁾, the present larvae have been identified and confirmed as the rhabditiform larva of *S. stercoralis* (Fig. II).

Thus, based on the above mentioned parasitological observations and findings, the patient was confirmed as a case of *Ascaris lumbricoides*-*Strongyloides stercoralis* co-infection. This laboratory finding report was submitted to the relevant authorities (Medical Officer in-charge) of the drug de-addiction centre for treatment compliance.

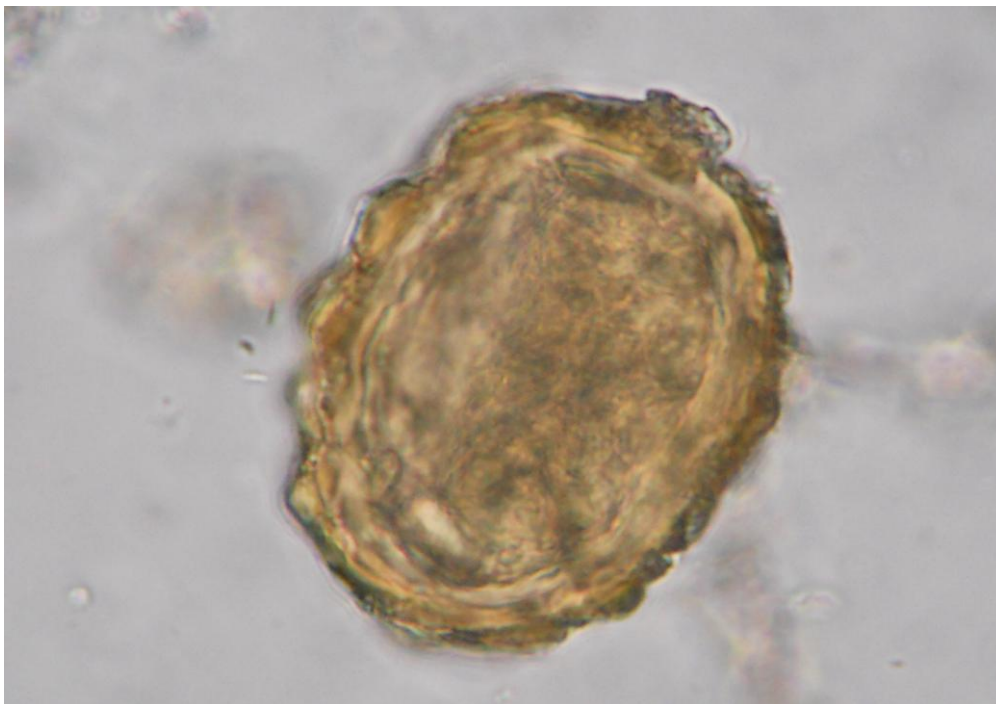


Fig. I Fertilized corticated egg of *Ascaris lumbricoides* [Ethyl acetate concentration technique, 40x]



Fig. II Rhabditiform larva (L1 stage) of *Strongyloides stercoralis* [stained with Dobell's Iodine, 10x]

IV. Discussion

Helminthic infection influences the HIV disease progression by regulating the host immune response both at cellular and humoral level, as the result of a strong T-helper 2 type (Th2) cytokine profile^(9,10,11,12,13,14). Parasites like *Strongyloides stercoralis*, *Ascaris lumbricoides*, *Trichuris trichiura* and hookworm which are known to be strongly associated with a Th2 cytokine shift accompanied by eosinophilia could represent a condition associated with rapid immuno-competence deterioration. Strongyloidiasis usually produces asymptomatic or mild infections but develops into severe disseminated strongyloidiasis in patients with HIV/AIDS. Ascariasis in adults also affects the immune system in a way that is likely to increase the risk of infection by HIV and tuberculosis⁽¹⁵⁾.

Strongyloides stercoralis and *Ascaris lumbricoides* are soil transmitted intestinal nematodes that infect human population especially those people living in the tropical and subtropical regions. The normal habitat of these parasites is the small intestine although the preferred site of feeding is the mucosal lining of the upper part of the small intestine. These parasites damage the mucosal and epithelial layers of the gastrointestinal tract either by mechanical action or through the release of parasite specific excretory or secretory antigens that are lethal or toxic to host tissue or cell.

Human infection occurs percutaneously in case of *S. stercoralis* via contaminated soil, while ingestion via contaminated food/water is the general rule in case of *A.lumbricoides*. In immuno-competent hosts, infection with *S. stercoralis* causes a minor health problem with symptoms like transient diarrhoea, abdominal pain etc. but in some individuals, there may be no signs and symptoms and upto 30% of the infected patients may remain asymptomatic. In certain cases, an infected patient may remain asymptomatic or latent for decades. Moreover, strongyloidiasis is difficult to diagnose because the parasite load is low and the larval output is irregular. This parasite can cause opportunistic infection with symptomatic diarrhoea in HIV patients whose CD₄ count is low.

Patients with immuno-compromised/immuno-suppressed status such as HIV/AIDS, malignant tumors, severe malnutrition, prolonged steroid therapy (e.g. rheumatoid arthritis), HTLV-1 infection, and renal transplantation etc are prone to develop hyper-infection syndrome, when they are infected by *Strongyloides stercoralis*.

In Manipur, previous workers have reported a prevalence of this parasite ranging from 3.2% to 27.2% amongst the HIV/AIDS community, depending upon variation in the regional endemicity (rural/urban), occupation (susceptible or high risk population includes farmers and/or vegetable growers), geographical factors, the level of literacy, the standard of living, the knowledge of health & hygienic practices, and whether the patient experience diarrhoea or not^(4,16), however, as far as literature review and our present knowledge is concerned, this finding is probably one of the infrequent case of concurrent infection of *A. lumbricoides* and *S. stercoralis* in an apparently healthy ART naive tribal patient in the Churachandpur district of Manipur.

Avoiding exposure to the infective stages of parasites can probably reduce the incidence of acquiring these infections. However, this is not always practicable. Therefore, with a view to cater the immediate healthcare and prompt treatment requirement of these immuno-compromised group of patients, whenever an HIV infected individual complains of diarrhoea or any other gastrointestinal problem, and if the patient is suspicious of such an infection, then there should be compulsory testing of the patient to ascertain the involvement of any parasite or pathogen. Thus, early detection of parasitic infections (if any) will be of immense importance and value for suggesting effective interventional, management and treatment/prophylactic measures towards improving the quality of life for the people living with HIV/AIDS (PLHA), thereby minimizing the morbidity and mortality.

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