Research Paper MEDICAL SCIENCE

Diagnosis of Strongyloides Stercoralis by Stool Microscopy: Screening Tool in an Immunocompromized Patient

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ABSTRACT

Strongyloides stercoralis an intestinal nematode, causes the disease Strongyloidiasis, which is defined by acute manifestation, autoinfection and hyper infection leading to persistent and fatal disseminated infections in immunocompromised hosts. Effective treatment is dependent on early detection of larvae in stool. We report a case of a 45-year old male patient on steroid therapy for Psoariasis admitted in Skin ward with history of diarrhoea on and off for past one week. A routine stool examination was done with wet mount and Lugol's iodine mount. Microscopic observation of wet mount preparation of stool concentrate with saline, Iodine and LPCB revealed numerous rhabditiform larvae of Strongyloides stercoralis that were identified by the characteristic morphology. He recovered with normal lab findings within two days of treatment with Ivermectin. Early diagnosis is a real challenge; therefore high index of suspicion is required to get immunocompromised patients with high eosinophil count screened for Strongyloides stercoralis by stool microscopic examination. It is associated with high mortality rate, hence definitive and an early diagnosis is required to start appropriate therapy.

KEYWORDS Strongyloides stercoralis, Intestinal nematode, Rhabditiform larvae Immunocompromised host

Introduction

Among helminths, Strongyloides stercoralis is a soil-dwelling nematode with a worldwide distribution, especially in tropical and subtropical countries, affecting probably

100 million humans.1In temperate climates, strongyloidiasis is mainly found in institutionalized persons, immigrants, or veterans. It was the last group for which S. stercoralis was first described, in 1876, when French troops returning from Indochina presented with severe diarrhea.2Biologically, S. stercoralis is unique among worms causing human disease in its ability to multiply within the definitive host, thus completing an entire life cycle within one human being.

Strongyloides stercoralis has a complex life cycle including a direct, an auto infective and a non-parasitic free-living developmental cycle.3 Humans become infected by filariform larvae which penetrate directly through the skin coming in contact with the soil. Only parasitic females are found in the host where they are embedded in the sub mucosa of the duodenum and parthenogenetically produce dozens of embryonated eggs a day. These hatch in the gut lumen of the host and the first-stage larvae(Rhabditiform larvae) are passed out in faeces and either develop into infective third-stage larvae(filariform larvae) or into free living adult males and females. Alternatively, larvae may develop to the third stage(filariform larvae) still within the gastrointestinal tract and penetrate the intestinal mucosa or perianal skin, restarting a new infection cycle without ever leaving their host.

The uncomplicated intestinal form of disease produces nonspecific abdominal symptoms with or without mild sporadic diarrhoea. Many infected patients are completely asymptomatic. Acute infection can lead an urticarial rash at the larval penetration region of the skin. Pulmonary symptoms including dyspnoea, cough, rhonchi, wheezing occur afterwards. Autoinfection is the major characteristic that separate Strongyloides stercoralis from the other parasite forms. Patients with Strongyloides infection when in immunosuppressive states viz. AIDS, malignancy, steroid therapy etc are prone to develop massive strongyloidiasis called hyper infective syndrome which may be life threatening. Severe diarrhoea, malabsorption, paralytic ileus, peritonitis, meningitis, brain abscess may occur in hyper infective condition. The mortality rate of disseminated infections has been estimated to be as high as 87%.4

Definitive diagnosis of strongyloidiasis is usually made on the basis of detection of larvae in the stool.5 However, in the majority of uncomplicated cases, the intestinal worm load is often very low and the output of larvae is minimal.6A number of techniques have been used to discern larvae in stool samples, including Baermann concentration method, formalin ethyl acetate concentration (FEAC), Harada-Mori culture and agar plate culture (APC).7

Here, we report a case of a 45-year old male patient on steroid therapy for Psoariasis admitted in Skin ward with history of diarrhoea on and off for past one week and was successfully treated with Ivermectin 6mg daily for consecutive three days.

Case History

A 45-year old male Psoriatic patient on steroid therapy for six months admitted in Skin ward with history of diarrhoea on

and off for past one week. A routine stool examination was done as the patient had diarrhoea. Occult blood was positive and Gross examination of stool specimen showed watery consistency, brownish in colour, alkaline in reaction with plenty of mucus. Microscopic examination of saline wet mount and Lugol's iodine mount was negative for any ova and cyst.

Detection of Strongyloides Larva by direct stool microscopy is an efficient tool for diagnosing strongyloidiasis. Corticosteroid treatment is considered as a common denominator in the list of immunosuppressive diseases associated with hyper infection. Therefore it is extremely important to remember the association of Strongyloidiasis. Stool specimen was concentrated using formol-ether concentration technique. Microscopic observation of wet mount preparation of stool concentrate with saline, Iodine and LPCB revealed numerous rhabditiform larvae of Strongyloides stercoralis that were identified by the morphology (200-250 X 15 µm) with short mouth and double bulb oesophagus as shown in Fig. 1-3.

In Harada-Mori technique, a filter paper was smeared with the stool sample and inserted into a 15 ml conical centrifuge tube containing 3-4 ml of warm distilled water. The tube was covered by a cotton plug and maintained upright in a rack at 25-28°C, and kept for 10 days. The tube was checked daily by withdrawing a small amount of fluid from the bottom of the tube, and examined microscopically.(Figure-4) Diagnostic criteria for S. stercoralis larvae detection by microscopy: First stage larva (L1), 200-300 µm x 16- 20 µm with short buccal cavity, rhabditiform oesophagus (1/3 body length), and prominent genital primordium.8

Discussion

Intestinal nematode S. stercoralis usually causes little or only subtle pathology in healthy individuals, allowing the infection to remain undiagnosed and untreated for years.

Thus, the parasite can persist in the host, perpetuating parasite dispersal and the risk of infection among the community. It has the tendency to develop severe disease in immunocompromised patients and is a major public health concern. The prevalence of S. stercoralis is thought to be severely underestimated due to the low sensitivity of the currently available diagnostic tools and a dearth of specialized surveys.

The most widely used method for the identification of human intestinal helminthes infections in our set up is direct saline and Lugol's iodine mount of stool. The performance of formol-ether concentration methods and parasite-specific concentration methods like the Baermann technique, Harada-Mori filter paper culture and the nutrient agar plate method are reported to be much more sensitive than routine stool microscopy.

In addition, immunocompromised hosts with S. stercoralis infection should have close follow-up with documentation of successful eradication of the infection. Infection with intestinal nematodes especially Strongyloides stercoralis is not uncommon in developing countries and in other parts of the world in patients taking irnmunosuppresants.[9-11] Occult intestinal infection can sometimes remain quiescent over decades becoming apparent while on immunosuppresants.[12] Immunosuppressive therapy leads to defective T cell function, which overwhelms the host defences increasing the mortality and morbidity.

In this case, the patient on long term corticosteroid therapy developed fulminant hyper infection and the diagnosis made by random microscopical examination of the stool. He was successfully treated with Ivermectin (6mg) for three days. Stool sample became negative for larvae of S.stercoralis after 2 days of initiation of specific therapy.

Conclusion

Strongyloidiasis is a curable disease. Early diagnosis and appropriate therapy will reduce the mortality and morbidity. Unless severely infected, the clinical signs and symptoms are generally not severe and frequently nonspecific. The possibility of Strongyloides stercoralis infection should be considered as a causative agent of diarrhoea particularly in immunocompromised patient. Timely initiation of appropriate therapy before the development of significant complications would be life-saving. The present report therefore, strongly emphasizes that patients on immunosuppressive medications should be screened for extensive investigation of specimens, with Strongyloidiasis suspicion, in addition to looking for other microbial agents prior to therapy and also periodically to prevent the development of this fatal but potentially treatable condition in immunocompromised hosts.

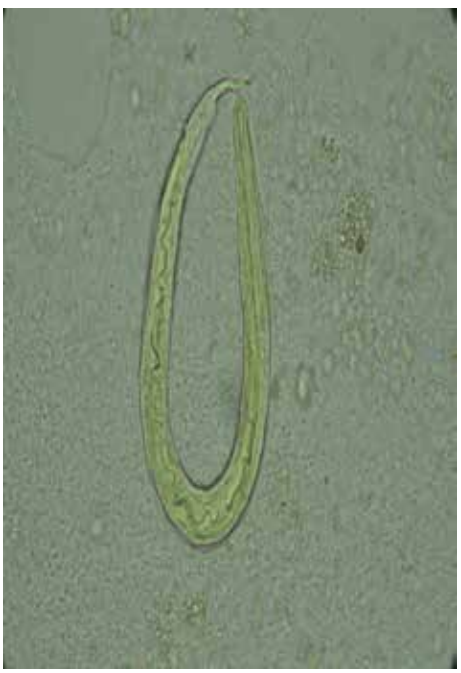

Figure 1: Wet mount showing Rhabditiform Larva 1000x

Figure 2: Iodine mount showing Rhabditiform Larva 1000x

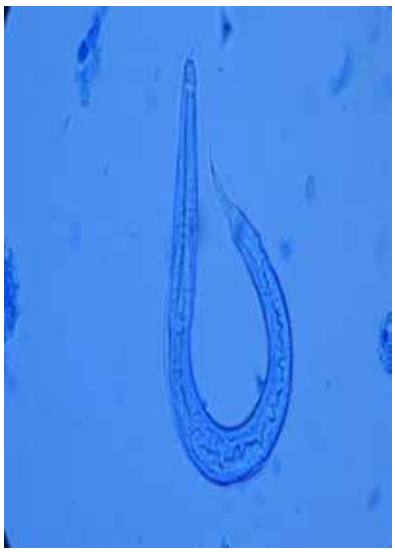

Figure 2: LPCB mount showing Rhabditiform Larva 1000x

Figure -4 showing Larva in Haradamori Test Tube culture at Day-2

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