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Original Research Paper

Internal Medicine

A CASE REPORT ON STRONGYLOIDES STERCORALIS INFECTION IN EASTERN PART OF INDIA

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ABSTRACT A 45 year aged male presented in a tertiary care hospital setting in Kolkata,West Bengal, India with pain abdomen, diarrhoea, anorexia, weakness and generalized anasarca for 4 months. The diarrhea was watery in nature, occurred 10 -20 times per day and mostly postprandial. On examination patient had mild pallor, facial puffiness and significant pitting pedal edema. His blood pressure at admission was 100/50 mm of Hg . Chest and abdominal examination was normal. Initial investigations revealed mild anemia (Hb 10.3) eosinophilia (E 8%), severe hypoalbuminemia (1.4 mg/dl)and mild hyponatremia(127meq/l). Serum IgE was high more than 2500. CECT abdomen (Figure 1) revealed submucosal fatty infiltration starting from colon and extending to stomach wall. Upper GI.Endoscopy showed nodular duodenum with inflammatory changes (Figure 2) and biopsy (Figure 3) revealed highly inflamed duodenal mucosa having sections of parasitic worms embedded within crypts. The lamina propria showed eosinophilic infiltration. .His stool sample was positive for Strongyloides stercoralis. The patient was started treatment with Ivermectin (anthelmintic). After one month there was significant improvement in his clinical symptoms. This study focusses on the prevalence of a neglected tropical disease in the eastern part of India where very few cases are reported till date.

KEYWORDS : Strongyloides stercoralis infection, parasitic worms, larvae, antihelmintic

INTRODUCTION

Strongyloidosis is an infection caused by a nematode in the genus Strongyloides. It is important to note that there are more than 40 species within the genus that can infect birds, reptiles, amphibians, livestock and other primates like humans. Strongyloides is more commonly found in areas that are relatively warm and moist, in rural areas or in agricultural areas mostly. [Marcos LA et al.,2008]

The primary etiologic agent of human strongyloides, a neglected tropical disease is Stongyloideles stercoralis. Severe strongyloidosis is often linked to alcoholism, corticosteroids and HTLV-1coinfection(Human T-cell Leukemia Virus- Type1), hematologic malignancies eg.

Leukaemia, lymphoma,and transplant receipients. The prevalence of this disease is higher among individuals from socioeconomically disadvantaged backgrounds as well as institutionalized populations.[Keiser et al.,2004]

Tracing back history, during World War II, allied soldiers in Japanese custody faced deprivation, malnutrition, and tropical diseases. Certain tropical diseases, particularly his S. stercoralis infection, has been practiced for more than 30 years since his release from captivity, with an overall infection rate of 15% recorded [Robson D et al.,2009]

Transmission Of The Infection

Strongyloides stercoralis being a soil- transmitted helminth, the main route of infection is contact with soil contaminated with free-living larvae. When the larvae come into contact with the skin, they penetrate the skin and move through the body, eventually reaching the small intestine where they burrow and lay eggs.

Unlike other soil-borne helminths such as hookworms and whipworms, its eggs do not hatch until they enter the environment, whereas S. stercoralis eggs hatch into larvae in the intestine. Most of these larvae are excreted in the faeces, but some mature and burrow into the intestinal wall or penetrate the skin around the anus to quickly reinfect the host. This property of S. stercoralis is called autoinfection. The significance of self-infection is that if an individual does not receive treatment specific for S. stercoralis, he/she may remain infected for life. Schad G.,1989]

In addition to ground contact and self-infection, there are rare cases of human-to-human transmission in the following cases of institutionalized patients like admissions during organ transplantation, daily living assistance facilities mainly in Western countries, long term facilities and day care centres.[Reference: Schar F et al., 2013]

Signs And Symptoms Of Strongyloidosis

Most individuals are not aware of when they got infected. For those who do, a localized rash may appear quickly. A cough usually appears after a few days. Abdominal symptoms usually appear after about 2 weeks, and larvae are detected in the faeces after about 3-4 weeks.

Diagnosis Of Strongyloidosis

Nematode infections are most often diagnosed with a blood test. This Strongyloides ELISA test is a qualitative enzyme-linked immunosorbent assay for the detection of antibodies to Strongloides in human serum or plasma specimens. The most sensitive test was IFAT with a sensitivity of 93.9% (IC 89.5-98.3) followed by IVD-ELISA with a sensitivity of 91.2% (86.0-96.4). [Bisoffi, Z et al.,2014]

Diagnosis of strongyloidiasis is usually made by microscopic detection of strongyloidiasis larvae (rhabditiform and possiblyfilariform) in faeces, duodenal fluid and/or biopsy specimens, and possibly in sputum of disseminated infections. increase.[Regnath, T et al.,2004; Grove D I., 1996].

Differential Diagnosis

Parasitic Conditions	Non parasitic Conditions
acute schistosomiasis (Katayama fever); ascariasis;	• Dermatological conditions polyarteritis nodosa ; systemic lupus erythematosus;

Parasitic Conditions	Non parasitic Conditions
amoebiasis; human hookworm infection with Ancylostoma duodenale or Necator americanus; zoonotic infection with Strongyloides myopotami, S. procyonis, Ancylostoma braziliensis, or A caninum.	• contact dermatitis; erythema annulare centrifugum; scabies; urticaria; anaphylaxis; drug reaction; Henoch-Schönlein purpura; eosinophilia; • Gastrointestinal conditions eosinophilic or bacterial gastroenteritis; malabsorption; malnutrition; upper and lower gastrointestinal bleeding; peptic ulcer disease; Diverticulitis Ileus Inflammatory Bowel Disease • Lung conditions: transient pulmonary eosinophilic syndrome; pneumonia; Acute Respiratory Distress Syndrome (ARDS) Asthma Chronic Obstructive Pulmonary Disease • Central nervous system associated conditions: meningitis; • Other conditions : sepsis and/or septic shock.

Approach To Treatment

All individuals found to have strongyloidiasis, even those who are asymptomatic, should be treated as they are at risk of overinfection. However, in infected pregnant patients, doctors may want to delay treatment of nematode disease until after the first trimester.

Strongyloidis species are the most difficult worms to eradicate. Treatment of early infections requires support with symptomatic therapy, as certain therapies are more effective once an intestinal infection is established.

Post-treatment stool examinations at 6 and 12 months after treatment are recommended to confirm strongyloidia eradication and rule out other parasitic infections. [Biggs BA et al.,2009]. A post-treatment/pre-treatment ratio of 0.6 or less indicates successful treatment. Patients with hyperinfection should have multiple follow-up stool tests from 2 weeks after treatment. [Krolewiecki A et al.,2019].

Empirical administration of corticosteroids to treat lung cause is problematic because it can lead to life-threatening hyperinfection. Therefore, nematode hyperinfection syndrome, usually caused by immunosuppression, should be considered in patients who have lived in endemic areas.[Robson D et al.,2009 ; CDC.,2018].Attempts to detect and eradicate are recommended to prevent this potentially fatal infection and its complications.

The goals of drug therapy for nematode disease are to eradicate infection, reduce morbidity, and prevent complications.

Several antiparasitic drugs are available if you have an infection. Thiabendazole was a treatment option for strongyloidiasis but was discontinued. Albendazole and mebendazole have been used in patients with strongy loidiasis with mixed results. Ivermectin has been shown to be more effective than albendazole.

Patients with hyperinfection and disseminated disease should be treated with ivermectin. Patients who cannot tolerate or absorb oral (PO) ivermectin may benefit from rectal (PR) or subcutaneous (SC) administration. [Henriquez-Camacho C et al.,2016; Fusco DN et al., 2010]. In these patients, ivermectin should be given daily until symptoms resolve and no larvae are detected for at least 2 weeks.

Public Health Implications

Epidemiological studies of the prevalence of S. stercoralis in the community show a prevalence similar to that of hookworms, with a stable prevalence peak at young ages even in adults. Some studies showed no sex differences, others found it to be more common in men, possibly representing differences in exposure [Becker SL et al.,2012; Krolewiecki, A Jet al.;2013].

The World Health Organization (WHO) guidelines provide a clear tiered approach for the community-based management of Strongyloidosis with anthelmintic therapy, with thresholds of 20% and 50% of the total prevalence, respectively require the use of 1 and 2 prophylactic chemotherapy interventions. [WHO., 2006].

Travelers to endemic areas should wear shoes when walking on beaches and other soil areas. Community building and education in endemic areas should include wastewater management, avoiding faecal-contaminated soil or use of faeces as fertilizer. Individuals with chances of exposure needs to wear protective clothing when handling sewage or contaminated soil. It is mandatory to wear shoes outdoors [WHO., 2006].

In conclusion, the planning and implementation of strategies to control strongyloidosis with the existing tools is of utmost public health importance.

Declarations

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Ethical Statement: This material is the authors' own original work, which has not been previously published elsewhere. All consent forms have been obtained by the Primary author and the patient consented to the publication of images and other clinical information. Due efforts are put forth to conceal identity of the patient but anonymity cannot be guaranteed.

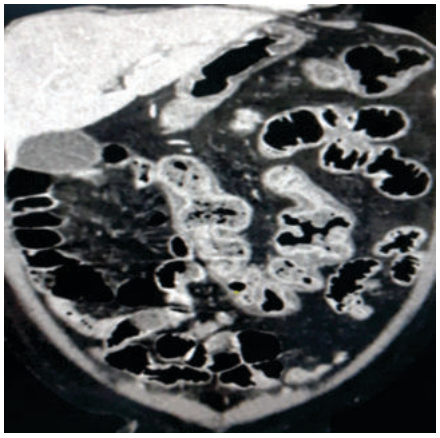

Figure 1 CECT Abdomen showed submucosal fat infiltration originating in the colon and extending into the stomach wall.

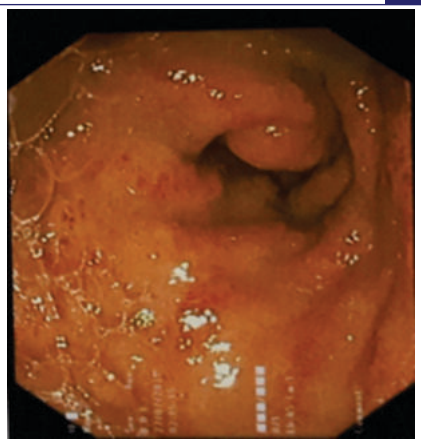

Figure 2 Upper GI Endoscopy revealed nodular duodenum with severe inflammation.

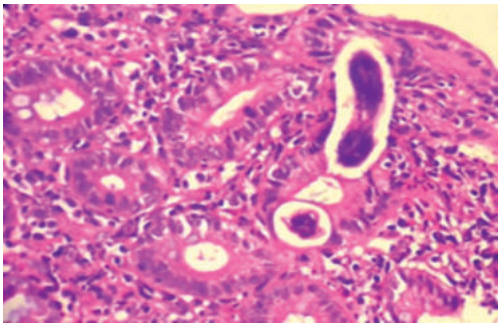

Figure 3 Duodenal biopsy showed severely inflamed duodenal mucosa with sections of parasites embedded in the crypts. The lamina propria showed eosinophilic infiltration.

REFERENCES

[1] Marcos LA, Terashima A, Dupont HL, Gotuzzo E. Strongyloides hyperinfection syndrome: an emerging global infectious disease. *Trans. R. Soc. Trop Med Hyg.* 2008;102:314–318.

[2] Keiser, P. B., & Nutman, T. B. (2004). Strongyloides stercoralis in the Immunocompromised Population. *Clinical microbiology reviews*, *17*(1), 208–217. https://doi.org/10.1128/CMR.17.1.208-217.2004

[3] Robson D, Welch E, Beeching NJ, Gill GV. Consequences of captivity: health effects of far East imprisonment in World War II. *QJM*. 2009 Feb. 102(2):87-96.

[4] Schad G. *Strongyloidiasis, a major infection of man.* Taylor and Francis; London: 1989. Morphology and life history of Strongyloides stercoralis.

[5] Schar F, Trostdorf U, Giardina F, Khieu V, Muth S, Marti H, Vounatsou P, Odermatt P. Strongyloides stercoralis: Global Distribution and Risk Factors. *PLoS Negl Trop Dis*. 2013;7:e2288.

[6] Bisoffi, Z., Buonfrate, D., Sequi, M., Mejia, R., Cimino, R. O., Krolewiecki, A. J., Albonico, M., Gobbo, M., Bonafini, S., Angheben, A., Requena-Mendez, A., Muñoz, J., & Nutman, T. B. (2014). Diagnostic accuracy of five serologic tests for Strongyloides stercoralis infection. *PLoS neglected tropical diseases*, *8*(1), e2640. https://doi.org/10.1371/journal.pntd.0002640

[7] Regnath, T., Hassler, D., Kimmig, P., & Braun, R. (2004). Zwergfadenwurm [Strongyloides]. *Deutsche medizinische Wochenschrift (1946)*, *129*(21), 1177–1178.

[8] Grove D. I. (1996). Human strongyloidiasis. *Advances in parasitology*, *38*, 251–309. https://doi.org/10.1016/s0065-308x(08)60036-6

[9] Biggs BA, Caruana S, Mihrshahi S, Jolley D, Leydon J, Chea L, et al. Management of chronic strongyloidiasis in immigrants and refugees: is serologic testing useful?. *Am J Trop Med Hyg*. 2009 May. 80 (5):788-91.

[10] Krolewiecki A, Nutman TB. Strongyloidiasis: A Neglected Tropical Disease. *Infect Dis Clin North Am*. 2019 Mar. 33 (1):135-151.

[11] Robson D, Beeching NJ, Gill GV. Strongyloides hyperinfection syndrome in British veterans. *Ann Trop Med Parasitol*. 2009 Mar. 103(2):145-8

[12] CDC. Parasites - Strongyloides: Resources for Health Professionals. Centers for Disease Control and Prevention. Available at https://www.cdc.gov/parasites/strongyloides/health_professionals/index.html#tx. December 31, 2018; Accessed: November 10, 2022

[13] Henriquez-Camacho C, Gotuzzo E, Echevarria J, White AC Jr, Terashima A, Samalvides F, et al. Ivermectin versus albendazole or thiabendazole for Strongyloides stercoralis infection. *Cochrane Database Syst Rev*. 2016 Jan 18. CD007745

[14] Fusco DN, Downs JA, Satlin MJ, Pahuja M, Ramos L, Barie PS, et al. Non-oral treatment with ivermectin for disseminated strongyloidiasis. *Am J Trop Med Hyg*. 2010 Oct. 83(4):879-83.

[15] Becker SL, Sieto B, Silue KD, Adjossan L, Kone S, et al. (2012) Diagnosis, clinical features, and self-reported morbidity of Strongyloides stercoralis and hookworm infection in a Co-endemic setting. *PLoS Negl Trop Dis* 5: e1292 doi:10.1371/journal.pntd.0001292.

[16] Krolewiecki, A. J., Lammie, P., Jacobson, J., Gabrielli, A. F., Levecke, B., Socias, E., Arias, L. M., Sosa, N., Abraham, D., Cimino, R., Echazú, A., Crudo, F., Vercruysse, J., & Albonico, M. (2013). A public health response against Strongyloides stercoralis: time to look at soil-transmitted helminthiasis in full. *PLoS neglected tropical diseases*, *7*(5), e2165. https://doi.org/10.1371/journal.pntd.0002165

[17] WHO (2006) Preventive chemotherapy in human Helminthiasis. Coordinated use of anthelminthic drugs in control interventions: a manual for health professionals and programme managers. Geneva: World Health Organization. 62 p.].