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CASE REPORT

Disseminated Tuberculosis with *Strongyloides stercoralis* Infestation

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Abstract:

Case History: We are presenting a case of seven year old male with disseminated tuberculosis and infection with *Strongyloides stercoralis (S.stercoralis*) The patient had severe hypoproteinemia and anasarca. *S.stercoralis* is a helminthic infection. Infection is acquired by walking bare foot on contaminated soil. After infection the filariform larvae invade the venous circulation and reach the intestine via respiratory system. Hyperinfection with this parasite leads to steatorrhea, oedema of duodenum, protein losing enteropathy, especially in immunocompromised individual. The patient had disseminated tuberculosis leading to decreased immunity which made the patient susceptible to hyperinfection with strongyloides. The patient responded dramatically to Ivermectin and anti tubercular treatment. Timely intervention with appropriate drugs may prove to be lifesaving in such condition.

Keywords: Nematode, Hyperinfection syndrome, Non resolving pneumonia

Introduction:

Gastrointestinal nematode infections affect 50% of the human population worldwide and cause great morbidity as well as hundreds and thousands of deaths [1]. *Stronglyoides stercoralis* infection is prevalent in tropical and sub tropical regions of the world. Conducive environment for transmission includes poor sanitation, crowded living conditions, particularly warm and moist soil [2]. Due to internal autoinfection, individuals may remain infected for decades. The immunity may be diminished especially when host cellular immune response is inadequate in immunosuppressive states which reduce the resistance of the body leading to extensive tissue invasion by worms [3].

Case Presentation:

Seven year old, male child had presented with complaints of distension of abdomen for 3 years. He had history of loose motions alternating with constipation for one year. Paternal grandfather was a case of pulmonary tuberculosis, who was treated appropriately five years ago. There was death of elder sibling at age of three years who had similar complaints.

There was no history of fever, vomiting or bleeding from any site. History of weight loss of 2 kg in three months was present. Anthropometric measurements of the child were - weight 13 kg, (which was below fifth percentile for age) height 115 cms and his mid arm circumference was 12 cms. He was not immunized. He was malnourished with pallor, angular cheilitis and oedema of both the feet.

Chest examination revealed left sided crepitations. Per abdominal examination revealed doughy feel. Liver was palpable 6 cm below costal margin and spleen 3 cm below costal margin. Abdominal girth was 47 cms. He developed frank anasarca after admission. central nervous system and cardiovascular system were unremarkable.

On investigation, his Haemoglobin was 9 gm%, TLC (Total Leucocyte Count) was 15,100 per cubic mm. Platelets (1.8 lakh per cubic millimetre) were adequate. Biochemical parameters were as shown in Table-1 .

Fig. 2: Showing Positive Mantoux Test

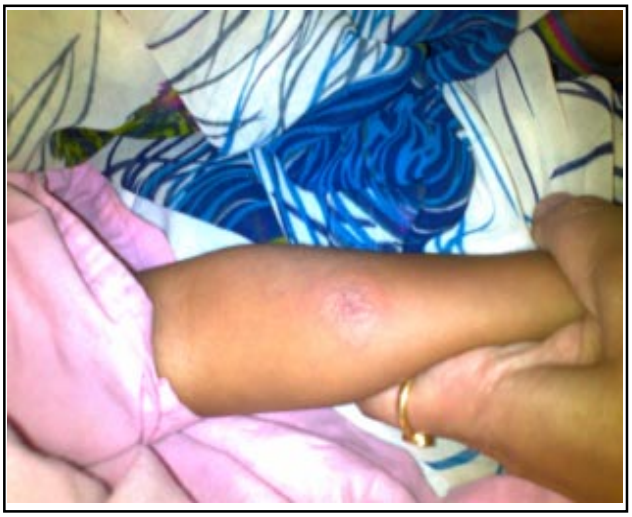
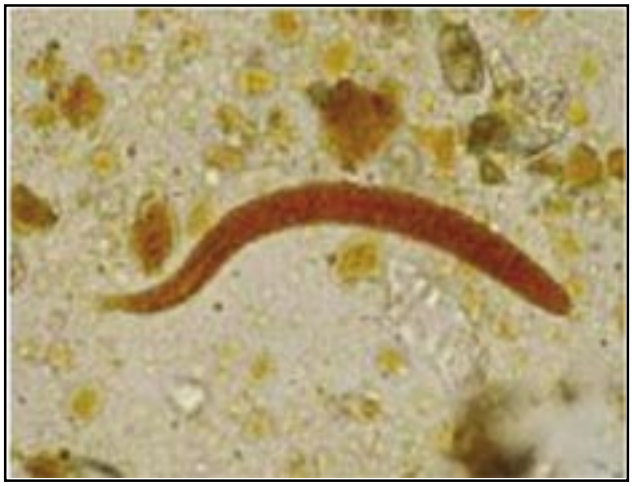


Table 1 -Chart Showing Levels of Serum Total Proteins, Albumin, Globulin, AG Ratio, Alanine Tranaminase, Bilirubin and INR and Day From Admission

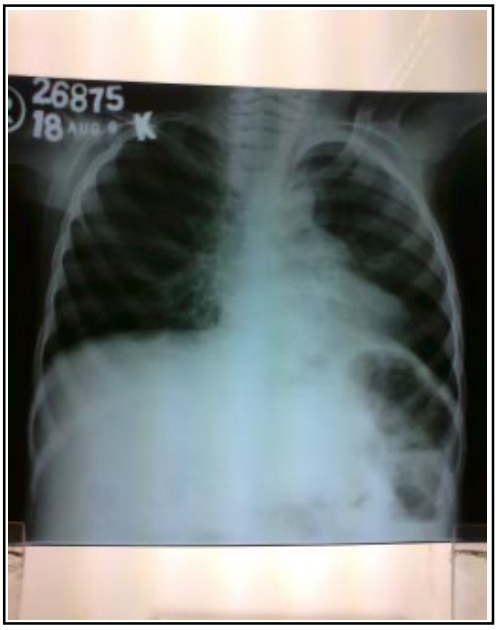
Day from Admission	Total Proteins (gm/dl)	Serum Albumin (gm/dl)	Serum Globulin (gm/dl)	A/G Ratio	ALT (IU/L)	Serum Total Bilirubin (mg/dl)	Serum Direct Bilirubin (mg/dl	PT/INR
Day 2	-	-	-	-	-	1.44	0.67	1.58
Day 7	3.77	2.53	1.24	1:2.0	54	0.77	0.34	-
Day 9	3.95	2.75	1.20	1:2.2	35	0.69	0.18	-

Fig. 1: Mount of Rhabitiform Larva of S stercoralis



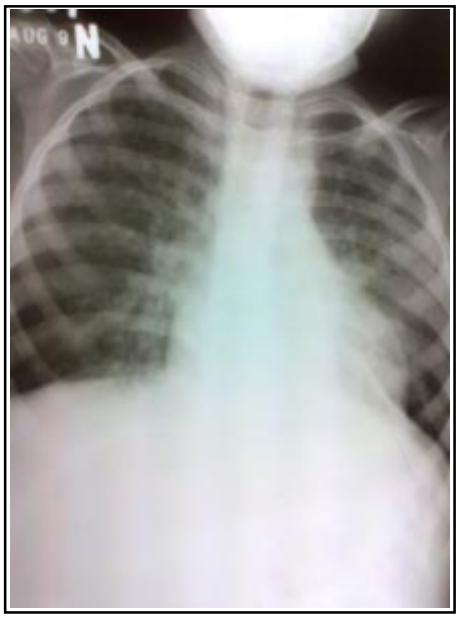
He had no eosinophilia but had low total serum proteins and serum albumin. Three consecutive stool samples were collected. One of them was positive for larvae of *S.stercoralis.* Wet mount of stool specimen showed larvae of *S.stercoralis* (Fig. 1). Larval load was high. Mantoux was positive- 13 x10 mm. (Fig. 2). Chest X ray showed non homogenous opacities in bilateral paracardiac region with silhouetting of left heart border .Chest X ray was repeated after 15 days of broad spectrum antibiotics (Fig. 3 a & b). Pneumonia showed no resolution. Ultrasonography revealed mild

Fig. 3 (a) -Chest X ray



(a) Chest X - Ray showing bilateral paracardiac non homogenous infiltrates and silhouetting of left heart border. (At admission)

Fig. 3 (b)-Chest X ray



(b) Chest X-Ray taken two weeks later showing persistence of bilateral paracardiac non homogenous infiltrates. (After antibiotics)

hepatomegaly with dilated small bowel loops and few subcenteric mesenteric lymph nodes. No free fluid was seen in abdomen. CT scan of chest revealed bilateral minimal, non tappable pleural effusion with collapse of basal segment of left lower lobe. CT Abdomen showed mild hepatomegaly, mildly distended oedematous jejunal loops and mild colonic oedema.

Infection of *S.stercoralis* was treated with oral Ivermectin in usual dosage of 200 micrograms/ kg/day given for 7 days. In view of the findings namely of chest X-ray showing non resolving pneumonia , features of intestinal obstruction, Mantoux positivity with a history of contact with tuberculosis, treatment with antitubercular drugs was started. Family members were treated for *S.stercoralis* infection. The patient was followed for six months and is doing well. After a period of six months the child was asymptomatic, was on treatment for tuberculosis. He gained weight of 1.5 kg, his appetite improved, there was no oedema. His Total Proteins were 5.2 gm% , Albumin was 3.2 gm% and Haemoglobin was 12.3 gm% as compared to Total Proteins of 3.77 gm%, Albumin of 2.53 gm% and Haemoglobin of 9 gm% at the time of admission.

Discussion:

It is estimated that 30 -100 million people are infected with *S. stercoralis* worldwide. The infection is usually asymptomatic; however eosinophilia may be the only sign. *S. stercoralis* have the ability to persist and replicate within the host for decades and it may lead to infections with high mortality especially in immunocompromised host [2]. Humans are

generally infected transcutaneously with filiariform larvae. The filariform larvae penetrate directly through the skin after coming in contact with the soil [2]. Nematodes reproduce in human host by parthenogenesis and release eggs. Rhabditiform larvae immediately emerge from ova and are passed in faeces, where they can be visualised by stool examination. Gastrointestinal tract involvement is characterised by indigestion, crampy abdominal pain, vomiting, diarrhoea, steatorrhea, protein losing enteropathy and weight loss. This child has had protein losing enteropathy which caused severe hypoalbuminemia. Patients with strongyloides infection when on steroids or in immunosuppressive states may develop massive strongyloidiasis (hyperinfective syndrome). The hyperinfection syndrome is characterized by an exaggeration of the clinical features developing in symptomatic immunocompromised individuals. Our patient has had disseminated tuberculosis, which must have been instrumental in lowering the immunity of the child. In tuberculosis multiple organs can get affected leading to hepatomegaly, splenomegaly, lymphadenitis and lesions in bones, joints or kidneys. Multiple organs can be affected as massive number of larvae disseminate throughout the body. They also invade the bowel flora. The most important symptoms of gastrointestinal involvement in disseminated tuberculosis are pain in abdomen, abdominal distension, chronic diarrhea, anorexia and weight loss. It may be noted that tuberculosis of abdomen is a paucibacillary disease and microbiological proof may not be always possible. Characteristic clinical findings in a malnourished child with prolonged symptoms are sufficient to start treatment in endemic areas [3].

Eosinophilia is a prominent feature of immunocompetant persons, this sign may be absent in immunocompromised persons. Eosinophils may drop to normal when parasites are established in the intestine. In our case there has been no peripheral eiosinophilia. Absence of eosinophilia cannot exclude the diagnosis of *S. stercoralis.* Diagnosis of strongylodosis is made by examining the feces or duodenal aspirates for characteristic larvae [4].

Infection with *S.stercoralis* usually leads to cutaneous, gastrointestinal, or pulmonary symptoms. Definitive diagnosis of *S.stercoralis* is made in this case on the basis of detection of larvae in the stools. *S.stercoralis* is a chronic relapsing illness of mild to moderate severity characterized by gastrointestinal complaints. Differential diagnosis considered in our case has been: - giardiasis, hook worm disease, tropical sprue, malabsorption syndrome. Stool examination for larvae is an effective method of diagnosing the parasite [5].

Improved human waste disposal services are considered to be the main requirement to reduce the high prevalence of this disease [6]. Unlike other intestinal nematodes, auto infection is possible in the human host and clinical symptoms can occur many decades after infection [7]. If infection occurs when patients are immunocompromised, treatment is difficult. S stercoralis hyperinfection can be life threatening [8]. Patients with strongyloides infection when on steroids or in

immunosuppressive states may develop massive strongyloidiasis (hyperinfective syndrome). Filariform larvae may act as vehicles of microbial infection leading to gram negative bacteremia. [2] Broad spectrum antibiotics are given in case of superadded gram negative infection. Infection of S.stecoralis is treated with oral Ivermectin in dosage of 200 micrograms/kg/day given for 7 days. In the case presented, the immunocompromised state may have aggravated the features of strongylodosis manifesting as hyperinfection syndrome. Thus, we have here a vicious cycle of parasitic infection, malabsorption, malnutrition, immunocompromised state, hyperinfection by *S.stercoralis*, again giving rise to malabsorption and malnutrition.

The manifestations of disseminated tuberculosis are varied. They depend on the quantity of bacilli that disseminate. Lesions usually localize in lungs, liver and spleen. This form of tuberculosis is most common in malnourished and immune-suppressed patients. The diagnosis of disseminated tuberculosis can be difficult and a high index of suspicion by clinician is required. The most important clue is usually a history of exposure to a person with infectious tuberculosis, which has been apparent in our case. The pathologic events in the initial tuberculosis infection seem to depend on the balance among the mycobacterial antigen load, CMI which enhances intracellular killing and tissue hypersensitivity, which promotes extracellular killing. When the degree of tissue sensitivity is low as is often the case in infants or immunocompromised individuals, the reaction is diffuse and the infection is not well contained, leading to dissemination and local tissue destruction. Disseminated tuberculosis occurs if the number of bacilli is large and host cellular immune response is inadequate. In country like India, where tuberculosis is very common and highly endemic, the possibility and diagnosis of tuberculosis should always be considered especially in Mantoux positive child. It is not often possible to find mycobacterium in sputum in children but there was the presence of non resolving infiltration in chest X-ray, pleural effusion and abdominal lymph nodes, all these favours the diagnosis of tuberculosis and hence anti-tubercular treatment has been started, to which the patient has responded dramatically.

Conclusion:

To the best of our knowledge, the association of disseminated tuberculosis *with Stronglyoides stercoralis* infestation has not been mentioned in literature before. The possibility of hyperinfective state, produced by parasitic infection should always kept in mind, while dealing with the case of immunocompromised child, so that crucial time is not lost in treating the infection. Our patient has responded dramatically to Ivermectin and anti tubercular treatment. In case of abdominal tuberculosis, hypoalbuminemia is common. Other causes leading to hypoproteinemia like worm infestation, namely *S.stercoralis* infection should be kept in mind. Advanced tests like ELISA, Western blot may be needed to confirm the diagnosis if there is a high index of suspicion. Timely intervention

with appropriate drugs may prove to be lifesaving in such condition.

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