

Case Study

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## **Strongyloides hyper Infection in an Immunocompetent Adult: A Case Report and Short Review**

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*Strongyloides stercoralis* is a soil transmitted helminth and one among the under recognised tropical parasitic diseases. It is undoubtedly known that it causes hyperinfection and disseminated disease in people with any form of compromise in their immunity. On the other hand, here we report an adult male who is not immunocompromised but still tends to have hyperinfection syndrome.

### **Introduction**

Strongyloides, an ovo-viviparous intestinal nematode contributes to 30 -100 million infected people worldwide (WHO, 2016). It is unique in having a free living cycle, parasitic life cycle, ability to cause autoinfection and parthenogenesis. The filariform larva which is the infective stage penetrates the intact skin and reaches the lungs via cutaneous blood vessels. It then migrates via the trachea, pharynx and reaches small intestine after swallowing. There it develops into adult female worms and lay eggs containing larvae which hatch immediately liberating

rhabditiform larvae which are either passed out in the faeces or develop into filariform larvae within intestine leading to internal autoinfection or in the perianal/perineal skin leading to external autoinfection. The larvae which are passed out in the faeces have the potential to develop directly into infective larvae or into free living forms which further produce infective larvae. These alternative phases are said to be mediated by the anterior chemosensory neurons (Garcia, 2006).

The clinical features of the disease vary ranging from asymptomatic phase or mildly symptomatic with nonspecific symptoms in immunocompetent to hyperinfection and disseminated strongyloidiasis due to autoinfection in immunocompromised individuals. However, here we report hyperinfection in an immunocompetent adult. The laboratory diagnosis includes stool microscopy, concentration methods like Baermann, culture methods like Harada-Mori and nutrient agar plate culture, examination of duodenal aspirates and duodenal biopsy. Accidentally larvae are detected in sputum microscopy. Also available is the serological test ELISA which detects IgG antibodies to filariform larvae.

### **Case report**

A 45 year old man presented with fever, non-productive cough, weight loss of 4 kgs and altered bowel habits for past 2 months. On general examination, he was moderately built, and nourished, not anaemic. He was a farmer by occupation. His basic investigations showed haemoglobin 10.2g/L and no eosinophilia. Blood tests for HIV and HBsAg was found to be non-reactive and negative. He was not a known diabetic. Blood culture was also negative. Chest x ray findings showed focal interstitial infiltrates. Stool microscopy was done which showed *Strongyloides* larvae predominantly of rhabditiform stage. Simultaneously we did a nutrient agar plate culture for *Strongyloides* larva. Briefly to describe, we placed approximately 2g of stool sample on the centre of agar plate and sealed it in order to prevent accidental laboratory acquired infection. These plates were held at room temperature for 48 hours. Later we observed the tracks created by the bacteria which were carried by the larvae following which they were examined under dissection microscope. At the end of the tracks larvae were

evidenced. With the help of a hot forceps, a hole was made in the centre of the plate and 10 % formalin was added onto the surface of the agar. After half an hour, a drop of the fluid was pipetted and examined as a wet mount which demonstrated killed larvae, adult and eggs. For better morphology we added a drop of methylene blue to the wet mount which clearly delineated the internal morphologies clearly. We observed adult worm fully loaded with eggs (Fig. 1), rhabditiform larvae with double bulb oesophagus, filariform larvae with slit in the tail and slightly spherical eggs containing larvae (Fig.2 & 3). The patient was treated with albendazole 400mg twice daily for a week and his stool microscopy was found to be negative after two weeks.

### **Results and Discussion**

Strongyloidiasis is a worldwide parasitic infection affecting tropical and sub-tropical regions more commonly. This parasite has several unique features like autoinfection (both internal and external), parthenogenesis, free living and parasitic phases. It is well known to cause hyperinfection and disseminated disease in immunocompromised people. Nonetheless in this case we did not observe any evidence of immunosuppression or prior steroid therapy, but still he presented with hyperinfection. Similarly, there are few cases where hyperinfection has been reported in immunocompetent individuals (Table 1).

The presentation in those cases varied like gastrointestinal discomfort, respiratory illness, chronic diarrhoea and malabsorption, fever, loss of appetite, loss of weight and pyrexia of unknown origin (Mayayo *et al.*, 2005; S A *et al.*, 2004; Dalela, 2012; Girija *et al.*, 2012; AnandRao *et al.*, 2014). Also reported in few cases is acute abdominal pain, abdominal sepsis, acute gastroenteritis leading to acute renal failure and shock(7,10,17).

**Table.1** Clinical characteristics and outcome of case reports of *Strongyloides* hyperinfection in immunocompetent individuals

Reference	Year	Patient details	Treatment	Outcome
Husni RN <i>et al.</i> ,(3)	1996	69 yr old male from Ohio had eosinophilia and features of disseminated strongyloidiasis	Thiabendazole	Cure
Dinleyici EC <i>et al.</i> ,(4)	2003	12 yr old boy from Turkey presenting with acute abdominal pain found to have <i>Strongyloides</i> hyperinfection with amoebiasis and giardiasis	albendazole, 400 mg/kg for 3 days and metronidazole 50 mg/kg/day for 14 days	Cure
Mayayo E <i>et al.</i> ,(5)	2005	79 year old man, who had suffered gastrointestinal discomfort for years, and presented because of respiratory illness. Chest X-ray mimicked a mass close to mediastinum.	thiabendazole (25 mg/kg/ twice a day)	Died
Atul S <i>et al.</i> ,(6)	2005	55 yr old male from Chandigarh presented with chronic diarrhoea and malabsorption	NA	NA
Escota and Chua <i>et al.</i> ,(7)	2006	52-year old female from Manila with <i>Strongyloides</i> hyperinfection, who presented with abdominal sepsis. Also had chronic GI symptoms and weight loss	1-week course of albendazole&piperacillin-tazobactam for 10 days.	Cure
Sridhara S <i>et al.</i> ,(8)	2008	45 yr male African Pancolitis, DM 2	NA	NA
Marathe A <i>et al.</i> ,(9)	2008	63 yr old man from Baroda, presented with on and off diarrhoea, had Vit. B deficiency and eosinophilia	Ivermectin	Cure
GauravDalela <i>et al.</i> ,(10)	2012	29 yr female from Chattisgarh, presented with features of shock and had eosinophilia. Also had loss of appetite and loss of weight	Albendazole400mg BD X 3 days, metronidazole 400mg TDS X 7days	Cure

Tiwari S <i>et al.</i> ,(11)	2012	31 yr old presented with diarrhoea and weight loss	Albendazole	Cure
Girija S <i>et al.</i> ,(12)	2012	70 yr male presented with cough with expectoration, breathlessness on and off for the past 2 years and vague abdominal discomfort for 6 months	albendazole 400 mg bd for six days, Ivermectin 12 mg OD	Cure
Xorius D <i>et al.</i> ,(13)	2012	70 yr female presented with devastating diarrhoea and loss of weight for 6 months duration	2 cycles of albendazole 400 mg/day for 7 days	Cure
Neumann I <i>et al.</i> ,(14)	2012	36 yr old Hispanic man with Fever of unknown origin	albendazole 400 mg BD X 3 days and ivermectin 3 mg /day X 5 days.	Cure
Priyadarshini Biswal <i>et al.</i> ,(15)	2013	A 60 year old female presented with weakness, loss of appetite, altered bowel habits, abdominal pain, weight loss, breathlessness, pedal oedema and abdominal distension. Her stool as well as ascitic fluid showed Strongyloides larvae	thiabendazole for 2 weeks	Cure
Marques L <i>et al.</i> ,(16)	2013	42 yr old man from Portugal presented with chronic diarrhoea and weight loss for 3 months	Oral albendazole 400 mg BD X7 days	Cure
Jayawant AC <i>et al.</i> ,(17)	2014	24 yr old with acute gastroenteritis leading to hypovolemic shock and acute renal failure. Also had weight loss.	Anti-helminthic treatment	Died
Rajkumari AR <i>et al.</i> ,(18)	2014	35yr female from Telangana presented with diarrhoea, vomiting, abdominal pain, fever, loss of appetite and weight	Albendazole 400mg BD X 3 days, metronidazole 400 mg TDS X 7days	Cure

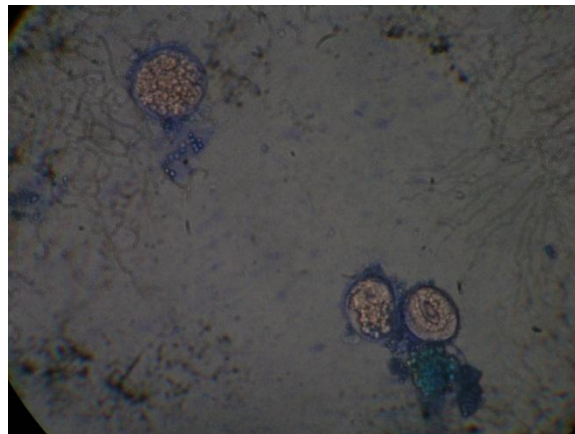
**Fig.1** Adult female *S.stercoralis* worm containing eggs



**Fig.2** Image showing adult worm, filariform and rhabditiform larvae and eggs



**Fig.3** *S.stercoralis* egg containing coiled larvae



Some of those cases had Vitamin B deficiency and eosinophilia (Marathe *et al.*, 2008). Although eosinophilia is a common finding in helminthic infections it is not constantly seen in hyperinfection and disseminated strongyloidiasis and the same is seen in our case also whose peripheral smear did not show eosinophilia.

In a case report by Mayayo *et al.*, the Chest X-ray revealed a mass mimicking tumour, which was proved false only after the cytology fluid showed several filariform larvae. Strongyloides co-infection with amoebiasis and giardiasis was also reported in a child (Dinleyici *et al.*, 2003). Disseminated strongyloidiasis and pancolitis were also reported in individuals who showed no evidence of immunosuppression.

Regarding treatment for hyperinfection syndrome, there is no general agreement for the best treatment. In the above mentioned immunocompetent cases, the treatment included thiabendazole or albendazole alone or with metronidazole or Ivermectin. Though thiabendazole as well as albendazole are equally effective, albendazole has been preferred in many cases due to its better tolerability.

The efficacy of treatment is monitored by the follow up stool sample initiated after 2 weeks and then being confirmed at 3 months. Though successful cure was reported in all cases, mortality was noted in two individuals who presented with respiratory illness and hypovolemic shock due to acute gastroenteritis. All these findings clearly state that strongyloides hyperinfection can occur commonly in immunocompetent also and a high index of suspicion is needed to diagnose it early in order to initiate early treatment and thereby prevent mortality.

**Conflicts of interest:** Nil

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