Case Study

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

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A B S T R A C T

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 larva with double bulb oesophagus, filariform larva 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).
| Reference               | Year  | Patient details                                                                                      | Treatment                                                                                      | Outcome   |
|-------------------------|-------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------|
| Husni RN et al.,(3)     | 1996  | 69 yr old male from Ohio had eosinophilia and features of disseminated strongyloidiasis          | Thiabendazole                                                                                  | Cure      |
| Dinleyici EC et al.,(4) | 2003  | 12 yr old boy from Turkey presenting with acute abdominal pain found to have Strongyloides hyperinfection with amoebiasis and giardiasis | albendazole, 400 mg/kg for 3 days and metronidazole 50 mg/kg/day for 14 days                  | Cure      |
| Mayayo E et al.,(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 et al.,(6)       | 2005  | 55 yr old male from Chandigarh presented with chronic diarrhoea and malabsorption                | NA                                                                                              | NA        |
| Escota and Chua et al.,(7)| 2006  | 52-year old female from Manila with Strongyloides 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 et al.,(8)   | 2008  | 45 yr male African Pancolitis, DM 2                                                                 | NA                                                                                              | NA        |
| Marathe A et al.,(9)    | 2008  | 63 yr old man from Baroda, presented with on and off diarrhoea, had Vit. B deficiency and eosinophilia | Ivermectin                                                                                  | Cure      |
| Gaurav Dalela et al.,(10)| 2012  | 29 yr female from Chattisgarh, presented with features of shock and had eosinophilia. Also had loss of appetite and loss of weight | Albendazole 400mg BD X 3 days, metronidazole 400mg TDS X 7days                               | Cure      |

*Table 1* Clinical characteristics and outcome of case reports of Strongyloides hyperinfection in immunocompetent individuals
| Author(s) | Year | Description | Treatment | Outcome |
|-----------|------|-------------|-----------|---------|
| Tiwari S et al. | 2012 | 31 yr old presented with diarrhoea and weight loss | Albendazole | Cure |
| Girija S et al. | 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 et al. | 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 et al. | 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 et al. | 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 et al. | 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 et al. | 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 et al. | 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 strongyloideshyperinfection 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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