

Co – Infection Of Strongyloidesstercoralis And Cytomegalovirus In an Immunosuppressed Individual

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Abstract

Background: Human strongyloidiasis is caused by *Strongyloidesstercoralis*. Strongyloidiasis is a recognised cause of morbidity and mortality in immunocompromised individuals.

Case Report: We report a case of a 48-year-old male co-infected with *S.stercoralis* and Cytomegalovirus, excreting moderate larval parasitic forms in the stool and positive for CMV IgG. The patient recovered after receiving Ivermectin and Albendazole along with supportive medications and probiotics.

Conclusion: Early diagnosis of parasitic and viral infections in immunocompromised individuals especially renal transplant patients helps in timely intervention and successful treatment.

Key words: Strongyloidosis, CMV, Transplant, Immunosuppression.

INTRODUCTION:

Strongyloidesstercoralis is one of the intestinal nematodes infecting humans. Major tropical and sub-tropical countries cover approximately 30-100 million Strongyloidiasis infected individuals worldwide, but according to Bisoffi et al prevalence of infection in 370 million people seems reasonable since data available dates back to 1989 and 1996 (Bisoffi et al, Genta RM1989, Jorgensen T1996). Usually the Strongyloidiasis infection is asymptomatic to mild in immunocompetent individuals. However, the first case of fatal *Strongyloidesstercoralis* hyper infection with immune suppression was reported in 1966 by Cruz et al. Here in this case report, we present *Strongyloidesstercoralis* with Cytomegalovirus infection in an immunocompromised individual.

CASE REPORT

A 48-year-old male patient presented to the tertiary care centre with complaints of passage of loose stools, vomiting and fever with mild abdominal pain for two days. He had undergone a renal transplant in 2011 from a deceased donor. He gave history of consumption of food from road side vendor few days before the start of his symptoms. He had no complaints of oliguria, burning micturition, backache, cough, chest pain, or rashes. He was a known case of systemic Hypertension and type II Diabetes mellitus on regular medications. As a post-transplant recipient, he was also taking Mycophenolate, Mofetil, Everolimus, Tacrolimus and Prednisolone treatment.

On examination, he had pallor, no icterus or oedema. His BP was 100/70mmHg, PR – 88/min and RR – 22/min. He was admitted in the intensive care unit and further investigations were done. His blood investigations showed

Haemoglobin – 11gm%, TC- 14,400 cells/cu mm, Eosinophils – 0.6, BUN- 19, Creatinine- 1.5 mg/dl. There was no abnormality detected in Chest X ray. Urine Culture grew $> 10^5$ CFU of Escherichia coli. Stool sent for routine investigations was yellowish, watery with presence of mucus macroscopically. Wet mount of the specimen showed moderate number of Strongyloidesstercoralis larva (Fig 1 & 2). Stool culture grew normal microbial flora of intestine. Sputum was negative for larva of Strongyloidesstercoralis and other acid fast organisms when subjected to modified acid fast stain. Serological tests were not performed due to its non availability in our lab. Investigations were also done to rule out cytomegalovirus (CMV) infection. ELISA for CMV IgG was Positive, IgM negative. Immunofluorescence Assay for CMV pp65 antigen was negative but CMV qPCR viral load showed 15, 83, 575 copies/ml of urine.

Fig 1: Strongyloidesstercoralis larvae in Low power field



Fig: 2 Strongyloidesstercoralis in 40X magnification



The patient was treated with Ivermectin 12mg stat and Albendazole 400mg stat followed for two days with Valganciclovir, Metronidazole, Probiotics and other supportive measures apart from his post transplant medications.

The patient showed better prognosis with no faecal excretions of larvae following which he was discharged from the hospital.

DISCUSSION:

Strongyloidiasis is a disease caused by the intestinal nematode belonging to the genus *Strongyloides*. Though there are more than 40 species of the worm belonging to this genus that affect other live stocks, *Strongyloides stercoralis* is the primary agent that causes infection in humans. Infestation with the worm begins when the filariform larva penetrates the intact skin (Chokkalingam et al in 2013, Litchenberger) on contact with contaminated soil. Infection is further maintained in the host for life by a unique feature known as autoinfection; in which the worm never reaches the soil, but remains in the host (Kassalik et al in 2011, Liu, L et al 1993, Marcos et al in 2008, Roxby A. C., et al in 2009, Thompson et al. 2004). This is made possible by dirty hands and fingernails or food contaminated with stool (Kassalik et al in 2011). Also, autoinfection occurs more commonly in people with suppressed cell mediated immunity (Srinivasa, H 2013). In our case history the patient gave a history of consumption of food from a road side vendor. It is possible that the food wasn't prepared hygienically. The patient is a recipient of transplant and we do not have a history of screening for parasites in the donor as well as in the patient. Donor derived *Strongyloides* infection though rare is not unreported (Hoy et al in 1981, Kim et al in 2016). We do not know if his infection was present prior to transplantation or acquired from the deceased donor. In addition the patient was on immunosuppressant. It has been reported that defects in cell mediated immunity and corticosteroid use are major risk factors for increase in worm burden leading to hyperinfection (Fardet in 2007, Marcos et al in 2008, Snyderman et al in 2009, Vadlamudi et al in 2006). Though the infection is asymptomatic to mild in immunocompetent individuals, it turns out to be a fatal fulminant hyperinfection when the host immunity is compromised in conditions summarized as "Defects in Cell – mediated immunity" (Paul B et al in 2004). In addition hyperinfection in the immune compromised individuals reduces the immune surveillance resulting in escalation of normal life cycle of the parasite with increase in larval numbers (Roxby A.C et al 2009). The clinical presentation of hyperinfection syndrome is similar to the clinical findings of the infection in an immunocompetent individual (Kassalik et al in 2011, Ganesh et al in 2011, Genta RM in 1989) with onset of symptoms being either acute or chronic (Litchenberger). Diagnosis of hyperinfection is very difficult and requires high level of suspicion (Kassalik et al in 2011, Pirisi, M et al 2006, Schaeffer et al 2004). The diagnosis of hyperinfection and dissemination is usually made by examining stool and other sterile body fluids for the presence of larvae (Qu et al in 2016, Segarra-Newnham in 2007, Jayaprakash B et al in 2009). In our case history was diagnosed only from the stool sample. Examination of other sterile body fluids was not warranted since the patient did not have any symptoms of dissemination. Consecutive sputum sample sent for examination was also negative. Further *Strongyloides stercoralis* larva identified in stool specimen was differentiated from larvae of *Ascaris* which may be rarely present in the stool.

Usually, hyper infection syndrome is associated with significant morbidity and mortality that can be avoided by early diagnosis and treatment (Marcos et al 2008). If untreated, the mortality rate of disseminated disease and renal transplant approaches 100% and 50% respectively (Roxby et al 2009). Apart from delay in diagnosis and treatment the increase in mortality is related to the accompanying sepsis with *Strongyloidiasis*. These larvae act as piggy bag

migrating the intestinal microbial to the circulation causing translocation in blood and other tissues including meninges, kidneys and peritoneum. Rarely *Strongyloides stercoralis* has been associated with bacteraemia, and the commonly reported translocated organisms are *Escherichia coli* and *Streptococcus bovis* (Khan et al in 2014). Our patient just had urinary tract infection with *Escherichia coli* with no systemic features that rules out bacteraemia and sepsis.

Eosinophilia is another common finding with any parasitic infection, but in hyperinfection syndrome it is an unreliable factor. Nearly 75% of chronic Strongyloidiasis are reported to have peripheral eosinophilia (Elzeinet al in 2007),but in disseminated infection it has been reported in only 12/73 (16.4%) cases (Buonfrate D et al 2013). Similar to article published by Elzeinetal(2007), our patient was also under corticosteroid therapy and presented with no peripheral eosinophilia. This cannot reliably exclude underlying Strongyloides infection. Hence laboratory diagnosis of Strongyloidiasis is the only mandate for the confirmation of the underlying infection.

Further in our case the patient was diagnosed with viral infection. Although not many reports have been published in a transplant patient having coinfection with a virus and a parasite, the relationship between viral and parasitic infection in a transplant patient is directly linked to the immunosuppression. Co infection of Strongyloidiasis and HTLV – 1 induces increased production of interferon – gamma and decreases the productions of molecules like IL-4, IL-5, IL-13 & IgE which take part in immune surveillance against helminths (Carvalho E et al 2004). However, in our case history the patient had cytomegalovirus infection, which is one of the commonest viral infections in a renal transplant individual (Cukuranovic et al in 2004). CMV has been reported to target different subsets of antigen presenting cells thereby leading to short lives immunity in all individuals(Varani S. et al in 2009).

Serological tests were not performed due to its non-availability in our lab. Nevertheless *Strongyloides stercoralis* infection was diagnosed by stool wet mount though it has low sensitivity when compared with serological diagnosis (Sato et al in 1995) and the patient was successfully treated. Also, the Infectious Disease Society of America, The American Society of Transplantation and Centre for Disease Control recommend pre-transplantation screening for all patients slated to receive transplantation in endemic region using serology and stool examination, thereby increasing the sensitivity in identifying the parasite and for its prompt treatment (CDC 2000).

To our knowledge this is the first report of *Strongyloides stercoralis* hyperinfection with co-existing Cytomegaloviral infection in a transplant patient to be reported from India.

Conflicts of Interests: The authors declare that there are no competing interests

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