Case Report

Multiorgan failure due to strongyloides infection in liver transplant recipient: A case report and literature review

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Abstract
Strongyloidiasis is caused by an intestinal nematode Strongyloides stercoralis which is widely distributed in tropical and subtropical countries. In immunocompetent individuals, Strongyloides stercoralis infection usually does not produce any symptoms or causes gastrointestinal, cardiopulmonary, or skin symptoms. However, in some patients especially immunosuppressive (e.g post-transplant, taking exogenous corticosteroids), its infection associated with severe and life-threatening disease like hyperinfection syndrome and disseminated tissue infestation. The limitation of diagnostic test make it challenging to diagnose strongyloidiasis. Therefore, it is important to suspect infection of Strongyloides stercoralis. We describe a case of Strongyloides infection with a fatal outcome in liver transplant recipient.

Keywords: Strongyloides stercoralis, liver, liver transplnatation, acute respiratory distress syndrome

1. Introduction
One of the most common problems caused by immunosuppressive treatments used after solid organ transplantation is infections (1). Strongyloidiasis is a known complication of solid organ transplantation and it may cause severe parasitic infection which is lead to sepsisem, multorgan failure and death (2). Strongyloidiasis is caused by infection with Strongyloides stercoralis which is an intestinal nematode and is widely found in tropical and subtropical countries (2, 3). Humans are the final hosts in the parasite cycle which has autoinfection which is rare and characterstic feature in its life cycle (2, 4).

Human infection occurs by intact skin contact with filariiform larvae and infection has also been induced by drinking water contaminated with the filariiform larvae (2, 3). After contact with the skin, the larvae enter the venous system and can be found in the skin, gastrointestinal tract and lungs due their life cycle. However, in some patient, the larvae are found various tissue such as heart, brain, muscle, etc. The larval proliferation in tissue may leads to systemic sepsis, multi-organ failure and death (5).

Its infestation in human is usually asymptomatic or causes gastrointestinal, cardiopulmonary or skin symptoms in immunocompetent individuals. Immunosuppressed patients (e.g. taking exogenous corticosteroids or immunosuppressive drugs, solid organ transplantation) are at risk for life-threatening complication like hyperinfection syndrome and disseminated tissue infestation (2, 4). Mortality rate can be approaches upto 50% in hyperinfection syndrome and upto 70% in disseminated disease (6, 7).

In this article, we present a case of severe strongyloidiasis occurring in patient five years after liver transplantation and that cause death due to Acute Respiratory Distress Syndrome (ARDS) and Multiple Organ Dysfunction Syndrome (MODS).

2. Case Report
A 45-year-old male patient having a history of liver transplantation due to chronic hepatitis B, was followed up tacrolimus monotherapy on the 4th year after transplantation without any problem. Acute hepatitis type transaminases (AST: 600 IU/L, ALT: 1300 IU/L, ALP:450 IU/L, GGT: 48 IU/L, bilirubin: 1.97 mg/dl) were found to be high in blood test performed during the control examinations of the patient; he was hospitalized considering the pre-diagnoses of recurrent hepatitis B, toxic hepatitis, de-novo autoimmune hepatitis. He did not use any new medication. HBV-DNA and HCV-RNA results were negative. On the laboratory tests after detection positive antinuclear antibody (ANA, 1/100) which is an autoimmune marker, liver biopsy was performed. The result of liver biopsy was reported as de-novo autoimmune hepatitis. Prednisolon 60 mg/day, mycophenolate mofetil 2x1000 mg, tacrolimus 2x1.5 mg treatments were started after the result of the liver biopsy.

Approximately 6 months after the new immunosuppressive

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therapy, he was hospitalized due to nausea, vomiting, diarrhea, loss of appetite, bloody sputum and deterioration in the general condition. On initial physical examination, he was conscious, co-operative and orientated. Mucous membranes were dry and pale. In respiratory examination, respiratory sounds were bilaterally coarse and there were rales in places. Blood pressure was 90/60 mmHg, heart rate was 110 bpm, respiratory rate was 22/minute. PA chest radiography showed an increase in the cardiothoracic index, centrally located infiltration in both lungs, increased opacity and occasional reticular densities (Fig. 1). In blood test hemoglobin was 7.9 gr/dl, leukocyte 650 /mm³ and platelet 50.000 /mm³. Owing to the findings on chest computer tomography examination including atelectasis area in the lower lobes of both lung, pleural irregularity and thickening, levofloxacin treatment was given.

The upper gastrointestinal endoscopy was performed due to anemia and vomiting, observing the fragile, spontaneous bleeding areas and granular mucosal appearance in duodenum; biopsies were taken from these areas. Strongyloides were detected in duodenal biopsy (Fig. 2) and oral ivermectin treatment was initiated. Direct microscopic stool examination for diarrhea and their culture was unremarkable. No growth was detected in the tracheal aspirate culture taken due to ongoing bloody sputum. On the second day of ivermectin treatment, the patient’s clinical condition gradually deteriorated, respiratory distress increased and ARDS developed. The patient, not responded despite all supportive treatment, died due to multiorgan’s failure.

3. Discussion

Strongyloidiasis is usually an asymptomatic or mildly symptomatic disease in immunocompetent individuals (8). Chronic infection lasts for many years, and is usually asymptomatic. Sometimes causes gastrointestinal, cardiopulmonary or skin symptoms (9). Rapid replication and spread of filiform larvae are observed in some patients whose immune system is compromised due to exogenous steroid use and organ transplant. Strongyloides hyperinfection syndrome and disseminated disease may develop in these patients and cause acute severe illness and high mortality (10). Strongyloides stercoralis hyperinfection syndrome can develop many months or years after transplantation. However severe disseminated disease tends to occur within the first three month (11).

Table 1. Previously reported cases of strongyloidiosis in liver transplantation recipients

<table>
<thead>
<tr>
<th>Age/ gender</th>
<th>Cause of transplantation</th>
<th>Time from transplantation (months)</th>
<th>Immunosuppressive treatment</th>
<th>Demographic risk factor</th>
<th>Initial symptoms/ findings</th>
<th>Treatment for strongyloidiasis</th>
<th>Complications Of sepsis and/or Bacteremia</th>
<th>Outcome</th>
<th>Cause of death</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>59 / Female</td>
<td>Non-alcoholic steatohepatitis with cirrhosis</td>
<td>4</td>
<td>Induction: Alimbru mab, methylprednisolone Maintenance: tacrolimus and prednisone</td>
<td>Fast donor from Puerto Rico Second donor’s serologic test was negative</td>
<td>Nausea, poor appetite, weight loss, and constipation</td>
<td>Ivermectin and albendazole</td>
<td>Bacteremia</td>
<td>Coma</td>
<td>Alive</td>
<td>(1)</td>
</tr>
<tr>
<td>43 / Male</td>
<td>Hepatitis C infections and hepatocellular carcinoma</td>
<td>12</td>
<td>Tacrolimus and high dose corticosteroids</td>
<td>-</td>
<td>Elevation of liver enzymes</td>
<td>Thiabendazole and ivermectin</td>
<td>Septicemia</td>
<td>Death</td>
<td>ARDS</td>
<td>(2)</td>
</tr>
<tr>
<td>61 / Male</td>
<td>Alcoholic cirrhosis</td>
<td>7</td>
<td>Prednisone, Mycophenolate and tacrolimus</td>
<td>-</td>
<td>Progressive early satiety, bloating, weight loss, and fatigue</td>
<td>Ivermectin and albendazole</td>
<td>Bacteremia</td>
<td>Alive</td>
<td>-</td>
<td>(3)</td>
</tr>
<tr>
<td>67 / Male</td>
<td>Cholangiocarcinoma</td>
<td>2,5</td>
<td>Tacrolimus, micofenolic acid and prednisone</td>
<td>Donor from Ecuador</td>
<td>Fever, asthenia, anorexia, diarrhea, dyspnea, cough, eosinophilia</td>
<td>Ivermectin and albendazole</td>
<td>Bacteremia</td>
<td>Alive</td>
<td>-</td>
<td>(15)</td>
</tr>
<tr>
<td>58 / Male</td>
<td>Hepatitis C / history of alcohol abuse</td>
<td>-</td>
<td>Induction: Basiliximab Maintenance: Mycophenolate,</td>
<td>Donor from Dominican Republic</td>
<td>Asymptomatic</td>
<td>Ivermectin and albendazole</td>
<td>None</td>
<td>Alive</td>
<td>-</td>
<td>(16)</td>
</tr>
</tbody>
</table>
The clinical symptoms of the disease are variable. Gastrointestinal symptoms are the most common and usually non-specific symptoms (such as abdominal pain, nausea, vomiting, diarrhea and bleeding) (12). Lung findings include cough, haemoptysis, wheezing and sometimes very severe lung collapse (13). In the present case, while the patient firstly admitted with gastrointestinal symptoms and bloody sputum, and then progressed to multi-organ failure and ARDS.

Filiform larvae can be detected in many secretions of the body in hyperinfection syndrome and disseminated disease. It may be found in stool, sputum, surgical drainage, and in bronchoalveolar lavage, pleural, and peritoneal fluid (14). In addition, as in our patient, larvae can be detected in biopsies taken from lesions detected in endoscopic findings (gastritis, duodenitis, aphthous ulcer, etc.). The limitation of diagnostic test makes it challenging to diagnose strongyloidiasis and a delayed diagnosis may lead to severe illness especially in immunosupressed individuals. Therefore, it is important to suspect infection of Strongyloides stercoralis.

Epidemiological risk stratification should be determined for Strongyloides hyperinfection syndrome and disseminated infection in patients undergoing solid organ transplantation. If there is a history of living or visiting places where the parasite is endemic in immunosuppressed patients, it should be kept in mind that there is a risk of Strongyloides infection. When a prompt diagnosis is not possible, Strongyloides hyperinfection syndrome and disseminated syndrome should be considered and due to its risk of fatal outcome, an urgent empirical preventive treatment planning should be done.

Opportunistic infections in transplant recipients have high mortality and it requires a multidisiplinary approach. Here, we present a rare case of strongyloides infection with a fatal outcome. Therefore, it is important to suspect strongyloides infections due to severe disease and high mortality risk in immunosuppressed patients.

Informed consent: None.

Conflict of interest: The authors declare no conflict of interest.
References


