Case Report ISSN (O):2395-2822; ISSN (P):2395-2814

Hyperinfection Syndrome Case report and review of Literature.

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Received: March 2018
Accepted: March 2018

ABSTRACT

Hyperinfection syndrome is a fulminant gram negative septic shock particularly occurring in immunocompromised patients and is caused by the nematode helminth, Strongyloides stercoralis. Hereby we are addressing this case for the physicians in the endemic areas that they should be aware of the bizarre manifestations of the disease that can mimic other diseases leading to misdiagnosis and medical errors.

Keywords: acute respiratory failure; disseminated strongyloides; Gram-negative sepsis; Strongyloides stercoralis.

INTRODUCTION

Hyperinfection syndrome is caused by the nematode helminth, Strongyloides stercoralis. Strongyloidiasis may have varied manifestations from asymptomatic disease to a life threatening infection called as hyperinfection syndrome which carries a mortality of almost 61- 83%.[1,2] Hyperinfection and disseminated disease occur during amplification of the autoinfective life cycle Hyperinfection syndrome presents as a fulminant gram negative septic shock usually in immunocompromised patients more commonly in patients who are on long term steroids and who is chronically infected.[3] Classically, the syndrome presents in a chronically infected person after immunosuppressive therapy is initiated for an underlying condition.Other risk factors for disseminated Strongyloides include immunosuppressive therapy, transplantation, hematologic malignant disease, human immunodeficiency virus, malnutrition and other t cell mediated disorders. High clinical suspicion is required to diagnose this syndrome.[4]

This case illustrates about hyperinfection syndrome with strongyloides and importance of clinical suspicion of strongyloides in a case of severe gram negative septic shock or ARDS in a patient who is immunocompromised and is on steroids. The review also highlights the varied presentation of various clinical manifestations of hyperinfection and the treatment options.

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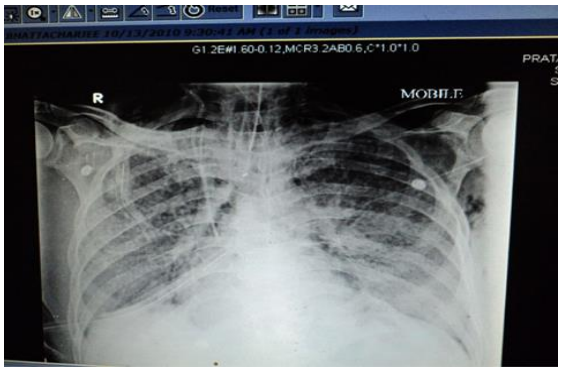
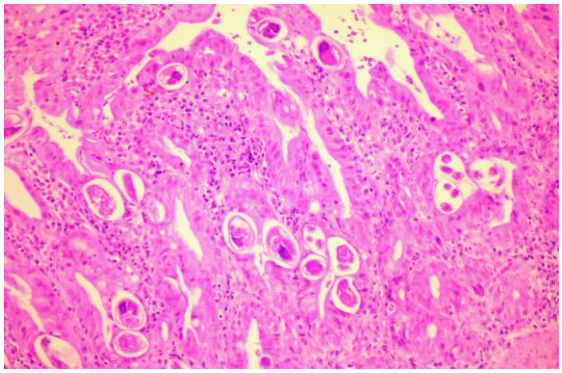
CASE REPORT

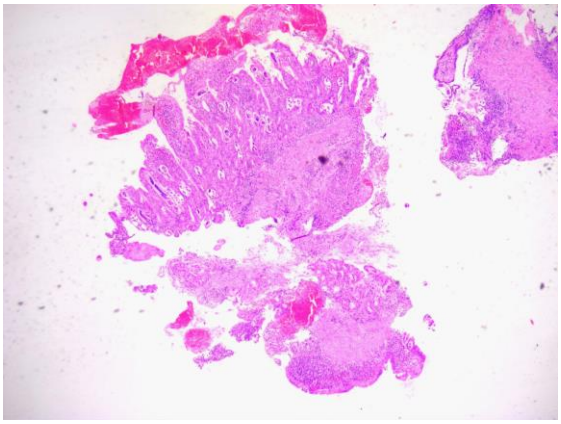
We report a case 6 months prior to the present admission ,A 54 year male patient coming from assam, north east india who had come for evaluation of anemia and was diagnosed to have autoimmune hemolytic anemia on Coombs test ++++ and after detailed investigations, including a bone marrow and ruling out all the causes of anaemia. He was started on prednisilone 60mg per day with monthly tapering doses by 10 grafter 2 months of prednisolone he developed a oral thrush and so his prednisilone was tapered to 25 mg per day in his local place at Assam and was treated with fluconazole.3 months prior to this admission he started with weight loss, loss of appetite, loose motions off and on and progressive generalized weakness.1 month prior to this admission he is admitted at Shillong in Assam with complaints of nausea,off and on greenish coloured vomiting ,pain in abdomen,loss of weight by 10 kg.His investigations done then were Hb of 8.1gm%,white cell count of 8300 N76% and a platelet count of 3.05 lakhs. His Serum. creatinine was 0.4mg%.His Serum.Bilirubin was1.2 mg% with a SGPT of 32 IU and his Total.proteins were 3.3 with a S, Albumin of 1.6 .He was treated symptomatically and with Ceftriaxone and he came for further work up at our hospital. He came to our hospital for haemetemesis and for his above complaints of three months duration. On admission he was conscious, afebrile with a pulse of 100/min,Blood pressure of 90/60 mmHG ,a

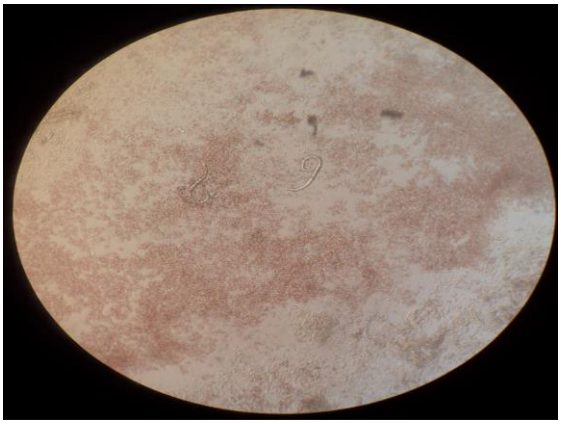
respiratory rate of 20/min. His CBC showed a Hb of 8.1gm%, WBC of 8600 N80%and platelets of 2.67lakhs.His Total proteins were 4.5 gm% with a albumin of 2.2gm%.His Serum. creatinine was 0.8mg%.He was subjected for a Upper GIScopy which showed, Oesophagus and Stomach to be normal, Duodenum Second part showed nodularity, bleeding and unhealthy mucosa was reported as .? CMV? Lymphoma. Biopsywas taken and sent for histopathology examination. Meanwhile his Hb dropped to 4.6 gm% as he continued to have haemetemesis and malena and was transfused with 3 units of packed red cells. Less than 24hrs of OGDScopy patient had hyperpyrexia with a temperature of 105 and further became heamodynamically unstable requiring multiple inotropes, had to be ventilated for desaturation.2 sets of blood cultures were drawn and he was started on Meropenem and Vancomycin. His xray chest done showed an ARDS pattern.





There was no obvious focus to explain his deterioration and since his xray showed ARDS like pattern with a background of history of steroid ingestion patient was subjected for a bronchoalveolar lavage . His investigations done then showed a Hb of 8.2gm%.a White cell count of 19090N91% and a platelet count of 1.39 lakhs. His Coombs test was ++++.His Procalcitonin >10.He progressively deteriorated with increasing inotropes, and remained severly hypoxic with 100 Fio2 .He became anuric was initiated on dialysis. Same day of Bronchoscopy a call from the microbiology department and demonstrated live larvae of stongyloides in the BAL sample.He was initiated on subcutaneous ivermectin 12mg but died the next day. His blood cultures sent grew E.coli ESBL. This patient died due to a severe gram negative septic shock due to hyperinfection syndrome in a patient who was on long term steroid therapy. His duodenal biopsy showed larvae of strongyloides.





DISCUSSION

Strongyloides the parasite is seen usually in the tropics and subtropics infecting about 100 million people in about 70 countries .It is endemic in Southern, Eastern, and Central Europe, Islands of the Caribbean, Latin America, Sub-Saharan Africa and Southeast Asia. It is very important that physicians should be aware of the endemic areas with strongyloides as failure to diagnose carries a high morbidity and mortality.[1] Hyperinfection syndrome is not exactly defined, but the hallmark is an increase in the number of larvae in the stool and/or sputum along with manifestations confined to respiratory and gastrointestinal systems along with peritoneum.[5] In Strongyloides hyperinfection syndrome clinical suspicion and diagnosis is often delayed upto a weeks time after hospital admission.[6] .In cases of hyperinfection the burden of larvae is so high that it can be seen easily in wet mounts of sputum or bronchoalveolar lavage fluid samples as in our case. In a person who has been chronically infected with strongyloides an immunosuppresed state causes enormous

multiplication and migration of infective larvae and is fatal.In presence of an immunosuppresed state there is a trigger and augmentation in the life cycle of the parasite. The triggering event in our patient goinig into gram negative septic shock after upper OGD scopy was, larvae present in the duodenum proliferated dramatically in the duodenum and migrated through the bowel wall, and then travelled through the venous system to the lungs and back to the small bowel along with the translocaton of bacteria causing severe gram negative septic shock.[3,7,8] The common organisms causing septic shock in hyperinfection are Streptococcus bovis Escherichia coli, Streptococcus fecalis, Klebsiella pneumoniae or Enterobacter sp.[3]

The manifestations of hyperinfection syndrome are divided, based on the system of origin, into intestinal and extraintestinal disease mainly involving the respiratory tract. The intestinal manifestations may present due to local larvae causing severe cramping abdominal pain, watery diarrhea, or malabsorption causing weight loss, nausea and vomiting and .occasionally gastrointestinal bleeding due to intestinal erosions. Subacute intestinal obstruction can also be caused by strongyloidiasis and our patient had this symptom with bilious colour intermittent vomiting. Infact our patient had all the minor as well severe intestinal manifestations of strongyloidosis.[9]

The extraintestinal manifestations can present as Asthma-like symptoms such as cough and wheezing and it would be advisable in an endemic area to suspect hyperinfection syndrome in a patient who is on steroids or is immunocompromised. It can present as pneumonia and pulmonary hemorrhage with diffuse bilateral infiltrates on the chest x ray. Meningitis, Pericarditis, Myocarditis are rare manifestations. Gram negative Sepsis with ARDS due to autoinfection and gut translocation has already been described earlier.[10,11] Patients receiving chronic steroids have an increased susceptibility to many different types of infections. The risk of infection is related to the dose of steroid and the duration of therapy. Although pyogenic bacteria are the most common pathogens, chronic steroid use increases the risk of infection with intracellular pathogens such as Listeria, many fungi, the herpes viruses, and certain parasites. clinicians should consider both common and unusual opportunistic infections in patients receiving chronic steroids.[12]

There is strong association of strongyloides and steroids and Siddiqu i et al., have demonstrated the presence of steroid receptor on Strongyloides stercoralis, which could also play a role in the pathogenesis of hyperinfection syndrome and more systemic disseminated infection associated with corticosteroids.[13] Corticosteroids, endogenous as well as exogenous, especially the exogenously administered have dual effect in causing hyperinfection syndrome. It causes increase in ecdysteroid like substances which act as molting signals which causes an increase in the filariform larvae and on other hand steroids cause alteration in the mast cell function causing altered immunity and these dual together causes strongyloides hyperinfection syndrome.[13,14]

Diagnosis: Due to the asymptomatic nature of the disease in its chronic stage diagnosis is difficult. Eosinophilia is a important laboratory finding in a patient with strongyloides but sometimes in hyperinfection you may have normal eosinophil count as in our case.[15]

Microscopic examination of the stool and sputum may demonstrate larvae, Repeated stool samples require to be examined due to fluctuations in the excretion of larvae.[16]

Enzyme-Linked Immuno-Sorbent Assay (ELISA) and Gelatin Particle Indirect Agglutination (GPIA) are antibody tests with a sensitivities of 74.1% and 98.2% in a study by Huaman et al and with a specificity of 100%.[17]

Treatment: The drug of choice for Strongyloides hyperinfection syndrome is Ivermectin 200micrograms /kg daily till larvae are not seen at any site and repeat dose after 2weeks.Intravenous and subcutaneous Ivermectin has been used in the same dose though it is not FDA approved for parenteral therapy. Alternative is albendazole 400mg twice a day or thiabendazole 25mg/kg twice a day till larvae are cleared and repeat dose after 2 weeks. Combination theray with Ivermectin and Albendazole can be tried in severe cases.[18,19]

Since these studies reported a daily dose of 200 g/kg/day, up to 14 consecutive days in the patient.[20] (Ivermectin is now recognized as the drug of choice because it showed comparable and better rates of larval clearance than thiabendazole and albendazole, respectively, and fewer and comparable side effects than thiabendazole and albendazole, respectively.[21]

CONCLUSION

Strongyloidiasis is a nematode infection which can present as a chronic asymptomatic to mildly symptomatic with gastrointestinal symtoms and at times can mimic as hypereactive airway disease to fatal complications of hyperinfection syndrome and disseminated infection along with a host of other potential complications like gram-negative bacteremia and meningitis. Strongyloides is endemic in tropical and subtropical areas and it is very important for the clinician to know endemicity of the disease as it can present in a very severe form with a fatal outcome especially in people who are on steroids and immunocompromised states.(22) Diagnosis in both immune-intact and immunosuppressed individuals is usually by detection of larvae in sputum and stool samples and multiple stool samples are required due to the

fluctuations in excretion of larvae in stools.(23) Due to the asymptomatic nature of intestinal strongyloidiasis, and the risk for hyperinfection, screening of the population in endemic areas especially before considering immunosuppressive therapy is important. Physicians in the endemic areas should be aware of the bizarre manifestations of the disease that can mimic other diseases leading to misdiagnosis and medical errors.

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How to cite this article: Nagvekar V, Rachel, Ramasubramanian V, Thirunarayanma, Senthur N, Ghafur. Hyperinfection Syndrome Case report and review of Literature. Ann. Int. Med. Den. Res. 2018; 4(3): ME36-ME39.

Source of Support: Nil, **Conflict of Interest:** None declared