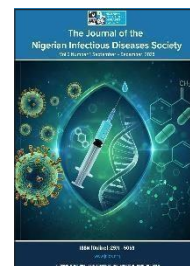




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Case Series

Geo-helminthic infection and nexus of Malignancy in adults: A Case Series

Abubakar MS^{1*}, Abdullahi AD¹, Dansanda B¹, Sidi D¹, Waheed A¹, Auta BJ², Iliyasu G¹, Hamza M¹, Nashabaru I¹, Habib AG¹

1. Department of Internal Medicine, Aminu Kano Teaching Hospital, Kano State

2. Department of Medical Microbiology, Aminu Kano Teaching Hospital, Kano State

*Corresponding author:

muhdsa88@gmail.com

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ABSTRACT

Geo-helminths are those groups of intestinal parasites belonging to the phylum Nematoda transmitted primarily through contaminated soil.¹ WHO classifies them as a neglected tropical disease. Generally, not a fatal disease unless in immunocompromised disease but have a high morbidity and untoward nutritional and cognitive consequences in children.² There are four (4) Parasites under Geo-helminths: *Ascaris Lumbricoides*, Hookworm (*Ancylostoma duodenale*, *Nectator Americanus*), *Trichuris trichura* and *Strongyloides stercoralis*. *Ascaris lumbricoides* is the commonest and most important of the human nematodes. The first case was a 31-yr old grocery seller who had appendectomy done 5 weeks earlier now presenting cough difficulty breathing, right hypochondria pain and jaundice. Patient cough out an ascaris and CT scan showed hepatocellular carcinoma. The second case was a patient with Hodgkins's lymphoma who has failed first line treatment. Admitted with passage of watery loose stool, cough, abdominal pain and progressive worsening of clinical condition. Sputum analysis and stool reveal *strongyloides rhabditiform* larvae.

Keywords: Geo-helminths, Nexus, Malignancy, Neglected Tropical Disease (NTDs), hyperinfestation

INTRODUCTION

Geo-helminths are those group of intestinal parasites belonging to the phylum Nematoda that are transmitted primarily through contaminated soil.¹ They are classified by WHO as a neglected tropical disease. Generally, not a fatal disease unless in immunocompromised disease but have a high morbidity and untoward nutritional and cognitive consequences in children.² There are four (4) Parasites under Geo-helminths *Ascaris Lumbricoides*, Hookworm (*Ancylostoma duodenale*, *Nectator Americanus*), *Trichuris trichura* and *Strongyloides stercoralis*. *Ascaris lumbricoides* is the commonest and most important of the human nematodes.³ The major drivers of persistent endemicity mostly is Africa importantly Sub-saharan Africa and Asia are Poor sanitation, Poor Hygiene, Poverty, inadequate water supply amongst many. WHO have advocated preventive Chemotherapy along with the other public health measures to curtail the Complications of the STHs.⁴ The major determinants of success of therapy is the WHO model of the Eggs reduction rate (ERR), which is the amount of eggs decreases per gram of stool after therapy. This is an objective assessment of the intervention to reduce the spread of the Parasites.⁵

One in Four (1/4) individuals are infected according to WHO and those highly affected are the school aged children. The role of mass chemotherapy as a form of school deworming program is vital to achieving the Sufficient Egg reduction ratio (ERR).⁵ Treatment of *Ascaris* is by using benzimidazoles: Albendazole, mebendazole. Albendazole in particular have expressed a cure rate of ~100%.⁶ However response of *Trichuris* to albendazole is becoming a major concern and need to newer agents is desirable.³

The role of immunosuppression in the transmission and systemic manifestation of parasitic diseases is well known with Strongyloidiasis with Hyper infestation syndrome (SHS).

These is to elucidate the findings of systemic Ascariasis in a patient with Hepatocellular carcinoma (HCC).

Infection by some Helminths infection especially *ascaris* are associated with impaired cytokine response to some viral infections.⁷

Summary of Cases:

1. A 31-year-old Grocery seller in Lagos, an indigene of Madobi LGA of Kano state presented to Accident and Emergency of AKTH from a private facility with 5 weeks history of Progressive worsening colicky abdominal pain initially at the right iliac fossa, which necessitated appendectomy 3 weeks before presentation.

He appeared in pain, icteric, tachypnoeic with tender hepatomegaly and the patient coughed out a long, whitish-milky roundworm measuring about 25 cm which was identified as *Ascaris* (figure 1). A Triphasic CT scan concluded Hepatocellular carcinoma.

2. A 22-year-old undergraduate was diagnosed with Hodgkin's Lymphoma in the past year. He is resistant to the first-line treatment; ABVD and has defaulted twice on the second-line agents currently on; (Cyclophosphamide, Vinblastine, Doxorubicin, and prednisolone). Presented with cough, shortness of breath, passage of loose watery stool, and abdominal pain. Sputum analysis reveals Strongyloidiasis (figure 2).

CASE 1

Case report: Systemic Ascariasis in a patient with Hepatocellular carcinoma: a case report.

Case Report

A 31-year-old Grocery seller in Lagos, an indigene of Madobi LGA of Kano state who presented to Accident and Emergency of AKTH from a private facility with 5 weeks history of Progressive worsening colicky abdominal pain initially at the right iliac fossa, which necessitated appendectomy with transient relief then later localized to the right hypochondrial and epigastric region. He also has lower back pain. The is associated history of high-grade intermittent fever with chills and rigor and productive cough of yellowish sputum with pleuritic chest pain. He noted jaundice a day prior to presentation.

On physical examination patient is in painful distress, preserved habitus, icteric, a febrile-37.1, no pedal edema.

Pulse is 112 bpm, regular, normal volume. BP=110/70mmhg, Heart sounds is S1, S2 only with no murmur, respiratory rate is 30 cpm, with widespread coarse crepitations and Oxygen saturation of 88% while breathing ambient air. Abdominal examination revealed healed gridiron incision with marked tenderness over the right hypochondrium and epigastric region with guarding and rigidity, precluding organs assessment, no rebound tenderness, no peritoneal strength tenderness (PST-ve). Patient was conscious, oriented in time, place, and person with no differential limb weakness, no asterixis.

Laboratory evaluation done. Hg=15.1 g/dL(PCV=42.5%), WBC=11.2 X 10³/UL Eosinophils= 6 %. ALT=130, AST= 150, GGT=108, ALP=66, Total protein=67, Albumin= 29, Total bilirubin=148. D. bilirubin=108.0.

Serology- HbsAg- positive, Anti-HCV- NEGATIVE, RVS= Negative. Urea, creatinine, and other blood chemistry parameters are normal.

Abdominal ultrasonography reveals hepatic mass suspicious of malignancy and acalculous cholecystitis, no visible paraaortic lymphadenopathy. Plain chest radiography reveals diffuse inhomogeneous opacity of the lung parenchyma.

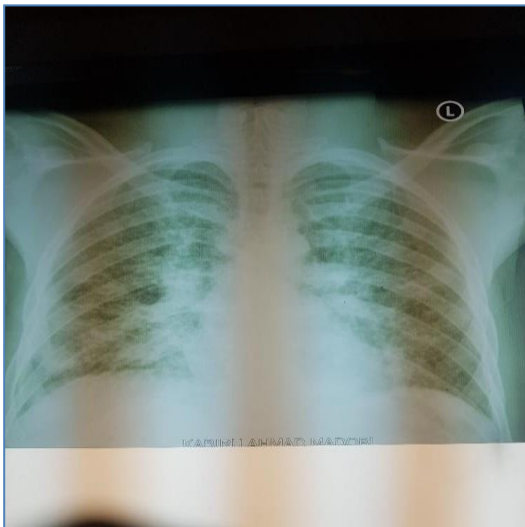
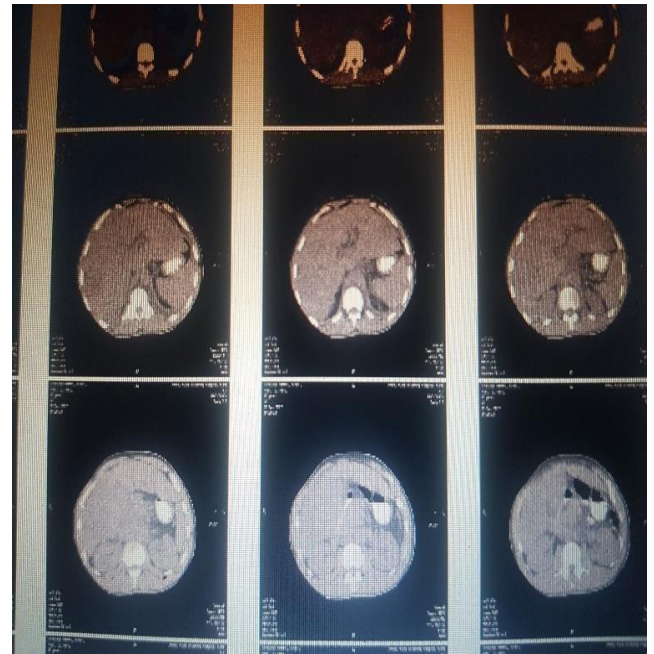
On the 3rd day of admission patient coughed out a live long roundish, milky colored worm, measuring about 25 cm by 5mm. *Ascaris lumbricoides* was suspected and was visibly corroborated by the Infectious disease unit.

A triphasic CT scan of the abdomen reveals a normal sized liver with irregular outline. However, there are multiple irregularly shaped non-enhancing hypodense masses within the liver parenchyma with poor demarcation from the normal parenchyma. The largest seen in segment VII. Mesenteric fat stranding is noted also. Lung window showed widespread reticulonodular densities involving both lung fields. Bilateral pleural hypodense collection is also noted.

Patient was unable to tolerate upper GI Endoscopy. He was subsequently returned to the medical ward for continuous care until he is stable to withstand the procedure.

His condition later worsens and was desaturating. He was placed on oxygen and preparation was made to transferred to ICU. He later had a cardiac arrest and all efforts to resuscitate proved abortive.

IV Ceftriazone, and Tabs albendazole was given. Intravenous fluid was also given together with analgesic. 100% oxygen was also given via the face mask and oxygen saturation was 92%.



CASE 2

Strongyloidiasis Hyper infestation Syndrome in a patient with Hodgkins Lymphoma

A 22-year-old undergraduate who was diagnosed with Hodgkin's Lymphoma the past year by the clinical hematology unit. He is resistant to the first line treatment; ABVD and has defaulted twice on the second line agents currently on; (Cyclophosphamide, Vinblastine, Doxorubicin, and prednisolone). He was admitted for the 7th course of the treatment with complains of two (2) months history of gradual onset dry cough which later became productive of whitish sputum, not blood stained, non-copious, no change with posture or early morning pool.

He has pleuritic chest pain and low-grade continuous fever. He was treated for smear positive Pulmonary tuberculosis 5 years ago at a peripheral DOTS Center and was declared cured after 6 months treatment with anti-Tb medication. No recent drenching night sweat or significant weight loss.

A week prior to admission he developed passage of loose watery stool, non-mucoid, not bloody, associated with colicky abdominal and cramps. No tenesmus. No nocturnal anal itching, no passage of worms or thread-like tissue. No jaundice, no Abdominal swelling. He has 2 episodes of non-projectile vomiting.

No recurrent or recent transfusion. Had appendectomy done 3 years ago. He does not smoke or ingest alcoholic beverages. No convulsion, confusion, headache, differential limb weakness or irrational talk.

Physical Examination reveals a chronically ill young patient, in painful distress, febrile (37.6), mild pallor, anicteric, has inguinal lymphadenopathy, bilateral pedal edema with central venous access on the right.

Respiratory rate of 30 cpm, with trachea pushed to the right, stony dull percussion notes on the left hemithorax and absent breath sound, Oxygen saturation was 92% while breathing ambient air.

He has a pulse of 120 bpm, regular, BP= 90/60mmhg with 1st and 2nd heart sounds only.

Abdominal examination revealed moderate ascites but no organomegaly.

His neurological Examination was normal.

Sputum GeneXpert—MTB NOT DETECTED

Chest radiography- Revealed bilateral pleural effusion worse on the left. No isolate on aspirate gram stain or culture.

Sputum culture and Gram stain showed—Gram positive cocci in chain, no pathogen isolated.

Blood culture was BACTEC NEGATIVE

Abdominal ultrasonography reveals right iliac fossa likely due to matted lymph node with right non-obstructive urolithiasis.

Blood chemistry reveals hypocalcaemia refractory to treatment. Ca⁺ 1.80mmol/l, phosphate 1.20 mmol/l, serum uric acid 8.1 mg/dl, Albumin 2.1 mg/dl

Erythrocyte sedimentation rate (ESR) was 10 mm/hr

C-19 Antigen test was negative.

Patient was placed on adequate hydration, IV ceftriaxone, IV metronidazole, Tabs Itraconazole, Tabs Azithromycin.

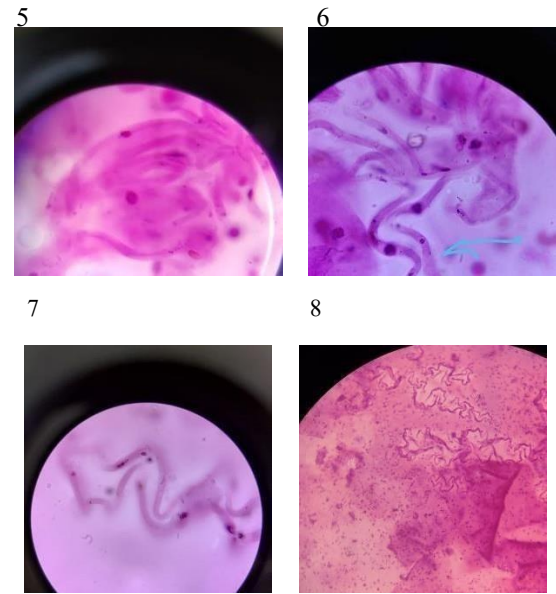
He was improving and responding to treatment.

A left sided thoracotomy tube was placed to drain the effusion. Repeat Chest radiography 2 days after showed minimal improvement. Pleural aspirate microscopy and gram stain showed no organism.

13 days into admission he developed another episode of diarrhea. Stool analysis revealed Strongyloidiasis. He was placed on Tabs mebendazole.

Stool samples send to microbiology for analysis and M/C/S. His condition did not improve despite been on optimal treatment.

He was transferred to ICU and died on day 23 of admission.



DISCUSSION

Ascaris infection is among the neglected tropical diseases. It is classified as nematode (roundworm). It is the most common roundworm causing diseases in humans. It has been a target for routine chemoprophylaxis with Albendazole and other benzimidazoles. It is commonly found in developing countries especially those low and poor resource setting, nevertheless cases can be found worldwide. An estimated 800 million- 1.2 billion people are infected worldwide.

Ascaris parasites are found in the intestine. They infect humans through ingestion of contaminated water or food by the excreta containing the ova/eggs of the parasites.

The most prevalent intestinal helminth infection in the world, ascariasis, is present everywhere but is more prevalent in tropical and subtropical regions with poor sanitation. The prevalence increases in younger age groups and in children aged 2 to 10 years. Ascariasis is thought to affect 500 million people globally, and in places with inadequate sanitation, it is a major cause of malnutrition. Ascariasis is thought to be the cause of 2,000 to 10,000 fatalities each year globally, the majority of which are youngsters who have bowel or biliary tract blockage.

The clinical presentation of ascariasis can vary from asymptomatic to one with severe disease requiring surgical intervention like the index patient who had appendectomy done earlier but with no resolution of symptoms. Severity of disease depends on the worm burden; heavy worm infestation produces a wide range of acute abdominal complications such as intestinal obstruction, intussusception, cholangiohepatitis, pancreatitis, and acute appendicitis. Intestinal ascariasis rarely causes volvulus and intestinal gangrene, perforation and peritonitis.⁵

In developing countries, environmental and personal hygiene is playing a great role in the increasing of intestinal helminth infection. In countries with limited resources and poor hygiene practices, there is a substantial overlap of intestinal helminthic and chronic infections like HIV, TB, and Malignancy. Intestinal helminths like *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworm cause malnutrition and induce a type-2 immune response that could worsen the severity and clinical outcomes of patients with cancer.⁶

The cure rate (CR) and Egg reduction ratio (ERR) have been used as the target for treatment especially when using Albendazole and mebendazole. Albendazole has been shown to be superior to mebendazole for treatment.⁸

Models from research have demonstrated that Helminthic infection can either be eliminated or remain stable based on the level of worm burden.⁹

Both cases have highlighted the occurrence of helminthic infection in patient with malignancy. Co-infection of such geo-helminthic infection can occur and can complicate treatment.⁴

In a retrospective study on cancer patients with diarrhea, the burden of parasitic infections was 16.5% with *Entamoeba histolytica/dispar*, *Giardia lamblia* and *Strongyloides stercoralis* as the commonest isolated. It was found out that most patients have hematopoietic malignancy.⁵

Other studies have highlighted the role of helminthic infection in Th2 upregulation and immunomodulatory response that may limit immune response.¹⁰

This is observed in multiple studies that intestinal parasite infections are higher in patients with malignancy and can even worsen the clinical status of the patients.

The call for anthelmintic chemoprophylaxis should be emphasized and treatment should not be delayed.

Declarations

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