

Recurrent Severe Anaemia Caused by Hookworm and Entamoeba Histolytica Infections in a Nigerian Man: A Case Report

Olopade B.O.¹, Wuraola F.O.², Anuforo A.C.¹, Adeniyi A.M.², Ibrahim A.O.¹, Olugbami A.M.², Akokhia A.O.¹

¹Department of Medical Microbiology and Parasitology, Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife

²Department of Surgery, Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife

ABSTRACT

Anaemia is a condition in which the number of red blood cells or the haemoglobin concentration within the red blood cells is lower than normal and this leads to symptoms such as fatigue, weakness, dizziness and shortness of breath, among others. The population groups most affected by anaemia are young children and women. Anaemia may be caused by several factors which include nutrient deficiencies, infections, chronic diseases, gynaecological and obstetric conditions, and inherited red blood cell disorders. We report a case of recurrent severe anaemia in a middle-aged Nigerian man caused by Hookworm and *Entamoeba histolytica* infections.

Keywords: Anaemia, Hookworm, *Entamoeba histolytica*

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INTRODUCTION

Hookworm infection (caused by the nematode parasites *Ancylostoma duodenale* and *Necator americanus*) and amoebiasis (infection caused by the protozoan, *Entamoeba histolytica*) remain major causes of morbidity and mortality in the developing world (Ahmed 2023). Prevalence of both infections is highest in the tropics and subtropics, where poor

hygiene, lack of access to potable water and unsanitary disposal of faeces predispose to infections with these parasites (Ahmed 2023).

Hookworm infection is acquired when filariform larvae of the parasite penetrate unbroken skin especially in those who walk barefooted in faecally contaminated soil (Ahmed 2023). Transmission of *Entamoeba histolytica* generally occurs by ingestion of infected water or food contaminated by the

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Address for Correspondence: Dr Bolatito Opeyemi Olopade
Department of Medical Microbiology/Parasitology, College of
Health Sciences, Obafemi Awolowo University, Ile-Ife
Email: bolopade@oauife.edu.ng

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infective stages, the cysts and presents with abdominal pain, watery or bloody diarrhoea (Kantor *et al.*,2018).

A study by Gyang *et al.*, 2019, showed that both infections are still prevalent in Nigeria especially among young children. Hookworm is a soil transmitted helminth and ranks high among the neglected tropical diseases (NTDs) in terms of morbidity; Hookworm infection is more commonly seen in young children and women of reproductive age and causes iron deficiency anaemia (Clement and Alene 2022). We hereby report the case of an adult man with recurrent severe anaemia caused by *Ancylostoma duodenale* and *Entamoeba histolytica*.

CASE PRESENTATION

A 48-year-old Yoruba man, tailor and peasant farmer who resides in Ede, Osun State presented at the general outpatient clinic of Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife with recurrent easy fatigability and dizziness of 9 months duration prior to presentation. He had multiple blood transfusions up to four times before admission at OAUTHC, no history of weight loss, no history of mass or swelling in any area of the body, no history of bleeding from any orifice, no history of vomiting blood or passage of blood in the stool. There was associated loss of appetite. On examination patient was found to be pale, weak, not jaundiced, not dehydrated, no pedal swelling, there was abdominal tenderness, no enlarged organs.

As a result of the symptoms patient presented with, he was referred to specialist clinics (Hematology, Gastroenterology, Surgery, Medical Microbiology and Parasitology) and investigations were commenced to unravel the cause of the recurrent anaemia. At the Hematology outpatient clinic, the following investigations were carried out: Full blood count (FBC) with the following results: Packed cell volume (PCV)- 24%, White blood cell count (WBC)- 5,100/cmm {Neutrophils 75%, Eosinophil 12%, Basophil 0.1%}, Platelet-421,000/cmm; Blood film appearance was normal and reticulocyte count was 5%. Patient was asked to do the stool for ova and parasite investigation and no parasite was seen. Bone marrow biopsy was also done which was reactive. The clotting profile was not deranged. Viral screening for Hepatitis B surface antigen (HBSag) was positive while retroviral and anti-HCV screenings were negative.

Patient was referred to the gastroenterology clinic on account of HBSag positivity and he had further investigations which were: Liver function test- Liver enzymes normal, total protein slightly reduced 56g/dL (58-80 g/dL) and faecal occult blood which was positive. The patient was referred to the surgical outpatient clinic on account of positive faecal occult blood and had the following procedures: Colonoscopy which revealed no mass and no area of bleeding however left sided

diverticulosis was seen. Upper gastrointestinal endoscopy was also done and this revealed worms in the duodenal mucosa as shown in Figure 1.

Patient at this point was severely anaemic with a packed cell volume (PCV) of 9% was weak and breathless {Normal PCV for adult males 38.35-48.6%} and needed resuscitation. Patient was admitted by the surgical team and had blood transfusion. In addition, the Medical Microbiology and Parasitology team was invited to review the patient.



Figure 1: Upper gastrointestinal endoscopy showing live worms in the duodenal mucosa with normal underlying mucosa

The Medical Microbiology and Parasitology team reviewed the patient and stool, urine and blood samples were obtained from the patient and sent to the laboratory for analysis. The stool samples were subjected to macroscopy with no significant findings. Direct saline and iodine mounts of the stool sample were examined, and no parasites were seen. The patient's stool sample was further concentrated using the formol-ether concentration method and this revealed eggs of *Ancylostoma duodenale* (Hookworm) and few cysts of *Entamoeba histolytica* as shown in Figures 2 and 3.



Figure 2: Egg of Hookworm (*Ancylostoma duodenale*) in saline wet mount under x40 magnification

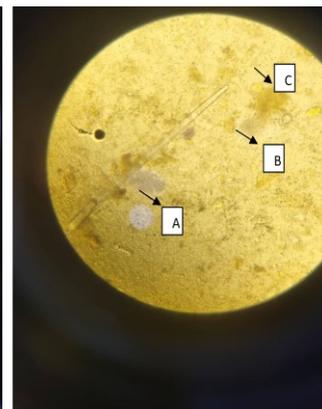


Figure 3: A and B - Eggs of Hookworm (*Ancylostoma duodenale*); C - Cyst of *Entamoeba histolytica* in iodine wet mount under x40 magnification.

The formol-ether concentration method offers more sensitivity in detection of intestinal parasitic infections. Examination of the urine and blood samples did not reveal any parasite.

The cause of the recurrent anaemia which was Hookworm and *Entamoeba histolytica* infection was eventually unravelled. The diagnosis was arrived at as a result of the following:

- History of recurrent easy fatiguability and dizziness, anaemia, presence of worms in the duodenal mucosa and presence of Hookworm eggs and *Entamoeba histolytica* cysts in the stool.
- Patient had supportive treatment by receiving 4 pints of blood. He was subsequently placed on ferrous sulphate tablets after the PCV improved remarkably.

He was also treated by the Microbiology team for Hookworm and *Entamoeba histolytica* infections by receiving standard regimens of Mebendazole tablets 100mg, 12 hourly for 3 days and Metronidazole tablets, 400 mg 12 hourly for 7 days at the infectious disease clinic. The patient's clinical condition improved. The FBC was repeated which revealed a PCV of 37%, total WBC of 8,800/cmm and platelet count of 434,000/cmm. He was discharged and has been attending clinics for follow up. There has been no recurrence of the symptoms. He was subsequently seen 2 weeks after treatment at the infectious disease clinic of the Medical Microbiology and Parasitology department and his stool sample was re-examined and no parasites were seen.

DISCUSSION

This case highlights the importance of considering parasitic infections as a cause of anaemia in older age groups, where other differential diagnoses may result in delay in initiation of treatment. Both infections have been reported in an infant in Lagos who also had recurrent anaemia for months (Akintan *et al.*, 2016). Hookworm infection was also reported as a cause of severe anaemia in a farmer in Pakistan (Tariq *et al.*, 2017). Occurrence of both parasites causing recurrent anaemia in adult males is rare. Hookworm infection results in anaemia as a result of chronic blood loss and iron from the intestinal mucosa at the site of parasite attachment while *Entamoeba histolytica* causes anaemia by chronic blood loss from parasite's direct damage leading to ulcerations in the intestinal lining.

In addition, while stool microscopy is a commonly used diagnostic modality for parasitic infection, intermittent shedding of parasites in stool can result in false negative results as seen in this case. This necessitates collection of more than one stool sample when evaluating patients (Vandenberg *et al.*, 2006).

Health education is an important aspect of management of parasitic infections. The focus of health education is on personal and environmental hygiene, counselling of patients not to walk barefooted and sanitary disposal of faeces. Preventive chemotherapy is also important particularly in endemic regions and this should not be limited to children but adults living in endemic areas should also benefit from this intervention. This patient was treated for both infections by receiving standard regimens of mebendazole and metronidazole and his clinical condition improved with recent investigations showing increased PCV levels and no recurrence of symptoms.

CONCLUSION

This case highlights the importance of considering parasitic infections as causes of anaemia in the older age group, where other differential diagnoses may result in delay in commencement of treatment of these infections which may further worsen patient's clinical condition. Parasitic infections should also be considered because more adults in urban and periurban areas are presently engaged in farming as a side work or hobby, and this can predispose to infection with intestinal parasites if personal and environmental hygiene are not adhered to.

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