

Case Report

PICA with microcytic hypochromic anaemia and hookworm infestation: A case report

BI Garba^{*1}, MS Aminu², SO Onazi³, B Edem¹, T Kolawole¹, S Aghadueki¹ and AO Adeniji¹

Department of Paediatrics, Yariman Bakura Specialist Hospital, Gusau. Zamfara State, Nigeria.

Department of Medicine, Yariman Bakura Specialist Hospital, Gusau. Zamfara State, Nigeria.

Department of Paediatrics, Federal Medical Centre, Gusau. Zamfara State, Nigeria.

*Correspondence Info:

Dr Bilquis Garba Ilah,

Department of Paediatrics,

Yariman Bakura Specialist Hospital,

Tudun Wada roundabout, PMB 1010, Gusau, Zamfara State, Nigeria.

E-mail: bgilah@yahoo.com

Abstract

Major clinical manifestations of hookworm infestation are consequences of chronic intestinal blood loss. Iron-deficiency anaemia may occur and patient may develop pica which is commonly seen in children. Laboratory findings of hookworm infestation with iron deficiency anaemia include hypochromic microcytic anaemia and eosinophilia.

B.A is a 7 year old boy residing at a village in Zamfara, North western Nigeria. He presented with a one month history of ingestion of stones and sand. He had normal neuro-developmental milestones and does not have any neuro-psychiatric disorder. He had mild generalised abdominal tenderness with multiple cystic swellings. On rectal examination, multiple stones were felt and evacuated which range between 1 and 3 cm.

Blood film showed moderate anisocytosis with few target cells, hypochromia and microcytosis. Stool microscopy showed trophozoite of *Entamoeba histolytica* and eggs of hook worm. Pus cells with numerous blood cells were seen. Abdominal x-ray showed multiple dense radio opacities of calcific densities in the lumen of large bowel from caecum to rectum.

He had enema and a total of 180 stones were passed within three days of admission. He was treated with Fersolate, Albendazole and Metronidazole and discharged after 8 days on admission when pica had stopped. He was asked to continue iron supplement for 3 months. Our case report is unique as stones passed out in stool were kept and counted. Enema may be needed for evacuation of larger stones. Children with pica should be evaluated for hookworm infestation and iron deficiency anaemia.

Keywords: children, pica, iron deficiency, anaemia, hookworm

1. Introduction

The major clinical manifestations of hookworm disease are the consequences of chronic intestinal blood loss. Iron-deficiency anaemia may occur and patient may develop pica.¹ Pica is commonly seen in children and it is the ingestion of non nutritive substances which may lead to life threatening conditions.² Important laboratory findings of hookworm infestation with iron deficiency anaemia include hypochromic microcytic anaemia and eosinophilia.³ We present a case report of a young boy with pica and iron microcytic hypochromic anaemia with hookworm infestation.

2. Case presentation

B.A is a 7 year old boy residing at a village in Zamfara State, north western Nigeria. He presented with a one month history of ingestion of stones and sand, loss of appetite and diarrhoea.

Associated passage of stones per rectum and at times have to insert his finger in the anus to evacuate stones that get impacted. There was mild generalised abdominal pain. Has lost some weight and had occasional low grade fever, but no whitening of the palms and sole of the feet noted. No history of abnormal behaviour or neuro psychiatric disorder. He had normal neuro-developmental milestones. He does not live in an area where illegal mining is done in the state.

Examination revealed a chronically ill looking, wasted and stunted child who had pallor with normal vital signs and normal looking nails. He had mild generalised abdominal tenderness with multiple ill defined abdominal masses. Rectal examination revealed multiple stones in the rectum, stones ranging between 1 and 3 cm with some faecal matter were evacuated.

A diagnosis of Iron deficiency anaemia with pica 2^o parasitic infestation (Hook worm) was made.

Stools were asked to be passed in potty and stones passed out to be kept.

The following investigations were done.

2.1 Full blood count: The table below shows haematological parameters that were suggestive of iron deficiency anaemia and parasitic infestation done before commencing treatment and 2 weeks after commencing treatment.

Parameter	Reference Range	Before Treatment	On Treatment
PCV (%)	33-45	21	23
RBC (X 10 ¹⁰ /L)	4.0-4.9	6.1	6.1
MCHC (g/dL)	31-37	22.9	23.4
MCV (fl)	77-95	51.7	53.1
MCH (pg)	25-33	11.9	12.4
Eosinophils (%)	1-3	7	3

PCV- packed cell volume, RBC- red blood cells, MCHC- mean corpuscular haemoglobin concentration, MCV- mean corpuscular volume, MCH- mean corpuscular haemoglobin.

Initial blood film showed moderate anisocytosis, microcytosis, hypochromic cells and few target cells. Repeat blood film after 2 weeks showed microcytosis, few target cells and few hypochromic cells.

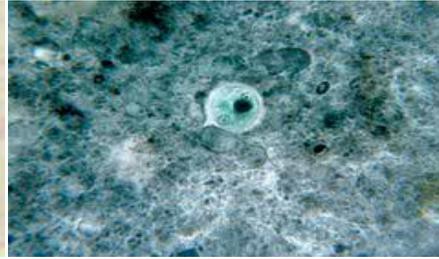
2.2 Stool microscopy, culture and sensitivity

Macroscopically, stool was watery, greenish, blood stained and mixed with sand. Microscopically, cyst of *Entamoeba histolytica* and eggs of hookworm were seen. There were pus cells and numerous red blood cells.

Figure 1: Egg of hookworm



Figure 2: Cyst of *E. histolytica*



2.3 Abdominal x-ray

Multiple dense radio opacities of calcific densities in the lumen of large bowel from caecum to rectum. Otherwise the bowel loops showed normal gas distribution and calibre.

Figure 3: Plain abdominal x ray (erect).



2.4 Abdominal ultra sound

Demonstrable bowel loops show slight mucosal thickness with hyper peristaltic activity. Other organs were all normal. By 4th day of admission he has stopped passing stones. A total of 180 stones were passed since admission.

Figure 4: potty containing some of the stones passed in stool.



2.5 Treatment and follow up

These results suggest Iron deficiency anaemia with pica secondary to hook worm infestation and amoebiasis. He had Enema (soap and water) and was placed on oral rehydration salt (ORS) per loose stool, elemental iron at 5mg/kg/ day i.e Tab Fersolate 200mg three times daily. Albendazole and Metronidazole were added for the treatment of hookworm and amoebiasis respectively.

He was discharged after 8 days on admission when pica had stopped; and asked to continue iron supplement for 3 months and to be seen at the clinic after one week with a repeat full blood count.

He came for follow up twice and subsequently was lost to follow up.

3. Discussion

Pica is most frequently seen in children and is the most common eating disorder in individuals with developmental disabilities.^{2,4,5} It is defined as the persistent ingestion of non nutritive substances for a period of at least one month at an age for which the behaviour is developmentally inappropriate (>24 month).^{4,6}

It is common and not pathologic in children aged 18 months to 2 years to be the ingesting and mouthing non nutritive substances.⁷ However, pica occurring after second year of life requires investigations.⁴

Such non nutritive substances include but not limited to clay, dirt, sand, stones, pebbles, hair, faeces, lead, laundry starch, plastic, pencil erasers, ice, fingernails, paper, paint, coal, chalk, wood, plaster, burnt matches etc.^{2,4,5} Our patient was found to be ingesting sand and stones.

The ingestion of bizarre or unusual substances have resulted in many potentially threatening toxicities such as gastrointestinal, including mechanical bowel problems, ulcerations, recurrent chest infections and anaemia.^{2,5,6} Our case report is that of a male child, pica has been found to be commoner in males than females.⁶

Exact aetiology of pica is unclear; however numerous hypotheses have been postulated ranging from psychosocial causes to purely bio-chemical origin. Cultural, socioeconomic, organic and psychodynamic factor have been implicated.^{4,5}

Pica is associated with lead poisoning in areas where the soil is contaminated; such as in lead mining and processing communities especially if done illegally. The relationship between pica and lead poisoning is more complex than just the ingestion of lead contaminated soil or paint flakes.⁸ A case of pica with tooth wear has been reported.⁹ Nutritional deficiency as aetiological hypotheses of pica are absent, deficiencies of iron, calcium, zinc and other nutrients (thiamine, niacin, vitamins B and C) have been implicated^{4,5} in some children with malnutrition.

Amongst these, iron deficiency anaemia^{9,10} has been significantly associated with pica. Whether the iron deficiency resulted in the eating of clay or the inhibition of iron absorption caused by the ingestion of clay produced the iron deficiency is not known.⁵ However, it is now believed that pica is an effect rather than a cause of iron deficiency¹⁰ and treatment with iron supplements led to cessation of pica in most children.⁵ Pica in our case reported stopped and blood parameters started to improve after commencement of treatment.

One of the most important causes of iron deficiency anaemia in the tropics is hookworm infestation. Hookworm infection in humans is caused by helminth nematode parasites *Necator americanus* and *Ancylostoma duodenale* and is transmitted through contact with contaminated soil. It affects an estimated 740 million cases in areas of rural poverty in the tropics and subtropics.¹¹ Eggs of hookworm were found in stools of our index case, however Entamoeba histolytica found may be a coincidental finding.

Prevalence and intensity of hookworm are found to be higher in males than in females, probably because males have greater exposure to infections. However, it has been shown that women and young children have the lowest iron stores and are therefore most vulnerable to chronic blood loss as the result of hookworm infection.^{1,12}

Infection with *A. duodenale* causes greater blood loss than infection with *N. americanus*, therefore the degree of iron-deficiency anaemia induced by hookworms depends on the species.¹

The major clinical manifestations of hookworm disease are the consequences of chronic intestinal blood loss. Iron-deficiency anaemia occurs and hypalbuminaemia develops when blood loss exceeds the intake and reserves of host iron and protein.¹ Anasarca from extensive plasma hypoproteinaemia may occur with the skin becoming waxy and acquiring a sickly yellowish colour (a feature of tropical chlorosis). In children, chronic hookworm disease retards physical growth¹³ in addition to pica. Other than hypochromic microcytic anaemia which was seen in our patient; the most prominent laboratory finding is eosinophilia which was also present in our patient's laboratory result. Eosinophilia tends to peak at five to nine weeks after the onset of infection, a period coinciding with the appearance of adult hookworms in the intestine.¹⁴ Treatment is by giving Benzimidazoles (Albendazole or Mebendazole).¹⁵

A case of pica and refractory anaemia has been reported by Von Garnier *et al.*¹⁶ Another case of pica with iron deficiency anaemia has been reported in a three year old by Howarth.⁸ A 14 year old in Turkey has been reported with pica and iron deficiency anaemia, he ingested pebbles and a kilogram of pebbles were removed under anaesthesia.¹⁷

4. Conclusion

Several case reports on pica have been reported but none has shown stones that were passed in stools nor the number of stones passed out. Enema may be needed to evacuate larger or impacted stones. Children with pica should be evaluated for hookworm infestation and iron deficiency, as appropriate treatment given would stop the pica.

Author's contribution

Garba BI and Aminu MS conceptualised the case report. Aghadueki S, Edem B, Adeniji AO and Kolawole T drafted the manuscript. Garba BI, Aminu MS and Onazi SO revised the manuscript critically. All authors gave final approval of the manuscript.

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