

## Hookworm Infestation In A 3- Month Old Female.

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### ABSTRACT

**Background:** Intestinal helminthiasis is a major cause of morbidity and mortality in infants and children particularly in the tropics and subtropics. This report highlights the possibility of hookworm infestation in infancy.

**Method:** A case report of hookworm infestation in a three-month old infant who was managed in the University of Port Harcourt Teaching Hospital, Port Harcourt in May 2001 for failure to thrive and recurrent severe anaemia.

**Result:** The patient was admitted in the children's emergency ward with passage of dark watery stools, fever, excessive crying and severe anemia and was transfused twice. Stool microscopy revealed numerous ova of hookworm and she was treated with albendazole. Three days after administration of anti-helminthic, stools became formed with normal colour and temperature was normal. She gained weight before discharge home.

**Conclusion:** Hookworm infestation should be suspected as a cause of severe anaemia in infants in communities with a high risk of infestation such as fishing port communities. To the best of my knowledge, symptomatic hookworm infestation in the first year of life has not been previously documented in Nigeria.

**KEY WORDS:** Hookworm infestation; Severe anaemia; 3-month old infant

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### INTRODUCTION

Intestinal helminthiasis is a major cause of morbidity and mortality in infants and children particularly in the tropics and subtropics<sup>1</sup>. This is related to poverty, poor environmental sanitation, shortage of clean drinking water, improper sewage disposal, poor personal hygiene and inadequate health education.

Epidemiological surveys of intestinal parasitic infections in poor peri-urban and urban

communities in developing countries show a global prevalence of 500-1000 million<sup>2</sup>. Children are usually more affected because they harbour significantly more worms on the average and experience more morbidity<sup>3</sup>. Various studies in Nigeria have shown a general prevalence of 20-60%<sup>2,5</sup>. Of the common parasites, human hookworm appears to be the most frequently encountered<sup>6</sup>. Infestation caused by *Necator americanus* and *Ancylostoma duodenale* is therefore still of public health relevance in Nigeria. In Nigeria, of the species of hookworm, *N americanus* is more prevalent<sup>7</sup>.

Factors which contribute to the morbidity in hookworm infestations include worm burden, diet, race and development of immunity<sup>8</sup>. Anaemia which is the major pathological manifestation of the infection, is influenced also by the host's iron balance. Blood loss varies with hookworm species and may be up to 0.03-0.3ml/ worm/day for *N americanus* and 0.15-0.26ml/worm/day for *A duodenale*<sup>9</sup>. Hookworm infection has not yet been reported in Nigeria infants of age less than one year<sup>10,11</sup>. This report on a three-month old infant is to sensitise all health providers of the possibility of hookworm infestation as a cause of severe anaemia needing blood transfusion.

### CASE REPORT

A 3-month old female was admitted in the University of Port Harcourt Teaching Hospital, Port Harcourt in May 2001 with a one month history of fever, diarrhoea, weight loss, two-week history of excessive crying and a five day history of cough and vomiting. Fever was high grade and intermittent. Stools were watery and dark with the bowel opening 4-6 times daily. There was associated anorexia.

Past medical history revealed that the child was previously admitted for in a private clinic one month prior to presentation for a similar illness. There she was treated with oral drugs (names unknown) and discharged after 3 days

of hospitalisation.

Pregnancy and birth history showed that mother did not receive antenatal care but delivered normally at home. The child cried at birth, birth weight was not recorded. Child had not been immunized. She received breast milk and water for 4 weeks and artificial milk was later added till the illness started.

Family and social history revealed that the child is the last of four children, two alive (male and female) of a monogamous family. First sibling (female) died at 14 months of age of a febrile illness with passage of dark watery stools. She was transfused in a private clinic but died three days later. Third sibling died at 29 months of pica. The family lives in a batcher in Bonny fishing port. Father is a fisherman and mother sells fish. Their source of drinking water is a well and the toilet facility is the bush.

On admission, the infant was very pale (paper white), febrile (37.8°C), anicteric with moderate dehydration. Weight was 4.2kg (70% of expected) and she was in no respiratory distress. Heart rate was 162/min with a haemic murmur. No abdominal organs were palpable and the chest was clear. There was generalized lymphadenopathy with oral thrush, cutaneous candidiasis over scalp, face and genitals. Urgent packed cell volume (PCV) was 15%. She was transfused with 110mls of sedimented cells, received intravenous ampicillin and gentamicin, Oral Rehydration Solution (ORS) and nystatin suspension. Complete blood count revealed neutrophilia with normal leucocyte count. Eosinophils were 3%. Genotype was AA, blood film for malaria parasite (MP) was negative.

Three days later a repeat PCV was 13%. Retroviral screening was negative for mother and child. Stool microscopy using direct wet preparation revealed numerous ova of hookworm. Repeat microscopy revealed same result. Child was retransfused with whole blood given slowly. She received 20mg (5mls) of albendazole and was commenced on iron therapy in form of a blood tonic. By the third day, stools were no longer dark, were getting formed and had reduced in frequency. She became fever free and gained 100g before discharge on

the eighth day. Mother was counselled to deworm other members of the family and to improve on personal and environmental hygiene. Child was seen in clinic one week later and was gaining weight. She was thereafter lost to follow-up.

## DISCUSSION

The preponderance of hookworm infestation in Nigeria has been documented over the years<sup>1,2-6</sup>. In Rivers State, a comparative study of helminthic infections in two rural communities, Bonny and Isiokpo showed that hookworm infestation ranked 2<sup>nd</sup> to ascariasis with incidences of 8.9% and 58.8% respectively<sup>10</sup>. Studies in Western Nigeria (Ondo) and Northern Nigeria showed incidences of 17% and 13.5% respectively<sup>4,5</sup>.

The prevalence of hookworm infestation in less than one year old infants has been reported to be zero percent<sup>10</sup>. To the best of our knowledge symptomatic hookworm infestation in the first year of life has not been previously documented in Nigeria.

In the life cycle of hookworm, adult worms live in the human small intestines. Eggs are then excreted in the faeces, hatch in the soil to rhabditiform larvae which are non-infective. These molt twice to form the filariform larvae which are the infective stage. Humans are infected when larvae penetrate the skin of the foot or rarely the buccal mucosa. They enter the skin through the hair follicles then to subcutaneous tissues and eventually to venules or lymphatics. By either route they reach the pulmonary capillaries, alveoli, bronchioles, alveoli and pass over the epiglottis to the oesophagus from where they mature in the small intestines, usually the jejunum. In the jejunum, they molt into the fourth stage larvae which has a buccal capsule that enables them attach to the intestinal mucosa. Within a week, an adult worm is formed and within two months of penetration of the skin, the female worms copulate and begin to lay eggs. The age of this infant therefore falls within that in which the life cycle of the hookworm ova ingested very early in life could have been completed.

Other routes of infection include, by direct

ingestion of soil (pica), fresh vegetables containing filariform larvae, drinking contaminated water and rarely from infected mother to child through breastmilk<sup>12</sup>.

The gastrointestinal symptoms of abdominal pain (a symptom in older children), anorexia and diarrhoea are known features of the intestinal phase of hookworm infestation<sup>8</sup>. Diarrhoea of hookworm infestation may be abrupt in onset lasting only a few days or may be chronic or recurring after an initial acute attack. Factors involved include exudation caused by inflammation, ulceration or cellular infiltration of the intestinal mucosa resulting from either parasitic invasion or host reaction to presence of the hookworm<sup>8</sup>. Diarrhoea may present with occult blood in the stool or frank melaena as was seen in this patient.

The severe anaemia noted in this patient requiring two blood transfusions is well known sequelae of chronic hookworm infestation. The severity of the anaemia is related to the worm load and the host's iron balance. Blood loss varies with hookworm species with *A duodenale* infection causing more blood loss than *N americanus*.

The weight loss and generalized candidiasis noted may be explained by the fact that the nutritional status of the child is affected through the deleterious effects of competition for nutrients, pathologic changes in the gut leading to malabsorption syndrome and poor utilisation of micro and macronutrients<sup>8</sup>. These contribute to an immune suppressed state and with superimposed infection may also account for the generalized lymphadenopathy. As was observed in the patient after treatment with albendazole, excellent controlled studies have shown improved anthropometric status in hookworm infected children treated with broad spectrum antihelminthics<sup>8</sup>.

Considering that hookworm infestation occurs by direct penetration of the skin, by drinking contaminated water or by soil pica, one can assume that this child may have been infected through any of the three means though there was no history of pica in this patient. The use of the bush as a toilet as in this case has been noted to be cause of high hookworm

infestation in some communities because the practice creates a local concentration of very viable infective stages<sup>10</sup>. The low socioeconomic class, lack of personal and community hygiene can also account for the child eating soil at such a tender age thus increasing the risk of hookworm infestation. A study done in Bonny shows high parasitic infection associated with the use of well water<sup>10</sup>.

Two of this infant's siblings presumably died of severe anaemia. The older sibling died after blood transfusion following severe anaemia and the younger after a positive history of pica indicating iron deficiency anaemia presumably from a similar exposure to hookworm infestation.

This report highlights the need to consider helminthic infections as an important contributor to childhood morbidity and mortality. It underscores the need for improved personal and community hygiene, improved water supply and public enlightenment on the mode of transmission of the disease. It suggests the need for periodic use of antihelminthics in children below six months of age and especially on infants living in highly endemic areas such as the fishing ports. Efforts should be made to provide antihelminthics to pre-school and school age children to help reduce the attendant morbidity and mortality. Improper sewage disposal should be discouraged. Introduction of helminthic control into the existing healthcare programme will serve as a good entry point for community participation in the Primary health care programmes.

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