

Infantile Hookworm Disease

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Hookworm infection is common but has rarely been reported in neonates or infants. Two cases of hookworm infestation in early infancy are described. The infants presented with malena, severe pallor, lethargy and failure to gain weight. Initial stool examination was non-contributory and diagnosis was made by upper gastrointestinal endoscopy.

Key words: Endoscopy, Hookworm, India Infant, Melena.

Hookworm infestation is common in tropical and subtropical countries. Approximately 7% of Indian population is estimated to be infested with hookworms and 2 million children under the age of 4 have hookworm infection(1). It usually occurs in children when they begin to crawl or walk barefoot and come in contact with contaminated soil. Infants are rarely exposed to this infection; description is available from a few case reports only(2-6). Two cases of hookworm infection in infants who presented with massive gastrointestinal bleeding are presented.

CASE REPORT

Case 1: A twelve weeks old, exclusively breast fed male infant, belonging to a poor, marginal family was admitted with complaints of passage of black tarry stools since the age of six weeks. The baby required five packed cell transfusions. There was no history of bleeding from any other site. There was no history of fever, jaundice or abdominal distension. His weight was 4.2kg (<3rd percentile, WHO standards) and length was 55 cm (<3rd percentile, WHO standards). The child was pale but

hemodynamically stable. Abdomen was soft, liver was 4 cm below costal margin and span was 6.5 cm. Rest of examination was normal.

Hemoglobin was 6.2g/dL; TLC was 58000 (eosinophilic leukocytosis / leukemoid reaction) with differential of N₂₂L₃₅E₄₂M₁; platelets were 194,000/mm³; peripheral smear showed normocytic normochromic RBCs; prothrombin time and liver enzymes were normal; bilirubin was 0.8 mg%; total protein was 6.3 g/dL; albumin and globulin ratio of 1:1 and CRP was negative. Grossly, two samples of the stool were black tarry and positive for occult blood but microscopy was normal. Meckel's scan and blood pool scan were non-contributory.

Upper gastrointestinal endoscopy showed pale mucosa with multiple erosions in the duodenum. There were multiple worms which were attached to the intestinal wall or moving freely in the lumen. A worm was extracted endoscopically and proved to be hookworm (*Ancylostoma duodenale*). Three more stool examinations were done later and one revealed hookworm ova. Mother's stool was also examined which showed ova of *Ascaris* and

Trichuris. The infant was treated with 200 mg of albendazole as single dose. The child passed worms the next day and the stool color changed to yellow. Clinically, the child improved. He was discharged after three days. On follow up after one week, hemoglobin was 9.2 g/dL and TLC was 9200/mm³ with a DLC of N₆₈L₂₂E₁₀.

Case 2: A eight months old exclusively breast-fed male infant was admitted with complaints of black tarry stools since 4 weeks of age. The infant had required 4 packed cells transfusion during last 6 months. There was no history of bleeding from any other site. There was no history of fever, jaundice, umbilical cord infection and abdominal distension. The infant was from a poor family. On examination, the baby was hemodynamically stable but severely pale. His weight was 5.8kg (<3rd percentile, WHO standards) and length was 62 cm (10th percentile, WHO standards). Abdomen was soft, liver was 2 cm below costal margin and span was 6 cm. Rest of systemic examination was normal.

Hemoglobin was 6.0g/dL; TLC was 14000 mm³ with differential of P₇₆L₂₂E₂; platelets: 343,000/mm³; peripheral smear showed normocytic normochromic RBCs; liver enzymes normal; serum bilirubin: 0.6 mg/dL; serum proteins: 8.2 g/dL; albumin to globulin ratio 1:1; prothrombin time was normal; CRP: negative. Grossly, stool was black tarry, positive for occult blood; microscopic examination did not show any ova or cyst; Meckel's and blood pool scan were non-contributory. UGI endoscopy showed multiple erosions in duodenal mucosa with multiple worms attached to the wall. They looked like hookworms but could not be removed for microscopic confirmation. Packed cells were given twice for severe anemia. Infant was treated with 200 mg single dose of albendazole. Next morning, infant passed thread like small worms in stool. Stool color changed to yellowish after 48 hrs. Clinically the child improved and was discharged after 96 hrs of therapy; however, the patient did not come for follow up.

DISCUSSION

Infantile hookworm disease is a distinct clinical entity which has only uncommonly been reported

particularly from China, Nigeria, Nepal and aboriginal communities of Australia(2-6). There are a few reports of hookworm infestations in infants from India; two of these reports are among infants coming from Nepal(3-5,7). Both of our cases were from North Bihar.

Hookworm infestation of humans usually occurs when the infective larvae (L3) enter the body either by penetrating the skin (*A. duodenale* or *N. americanus*) or by direct oral ingestion (*A. duodenale*). The larvae migrate to the circulation and reach the pulmonary alveoli from where they enter into the trachea. The L3 then reach the gut from the circulation after penetrating the pulmonary alveoli and traversing the trachea. Here they moult twice before maturing into adult worms. This is the prepotent/incubation period and is about 5-8 weeks in adults. This cycle is not clearly understood in infants. Several routes of hookworm infestation among infants are postulated but never confirmed. Infants who become symptomatic before the age of 5-8 weeks, are usually infected with *A. duodenale*, and might have acquired this infestation from the transplacental or the transmammary route(5,6). Hookworms might also be acquired from contaminated soil where the babies are usually put by their mothers while working in fields or from sandbags/wheat-stem bundles used as diapers made from contaminated soil. Occasionally infestations might be acquired through partially wet diapers which have been washed in larva-infested ponds or canals and dried on the grassland(6). However, the exact mechanism by which massive hookworm infestation occurs in small children is still unclear and needs investigation.

Although we cannot be certain of the route of infection in our babies, it does appear that the infants acquired this infection from their environment. Both our cases were from a low socioeconomic background with poor sanitary facilities. The mother of one of the infants (case 1) was also infested with other worms. Therefore, the possibility that they were in contact with contaminated soil or from contaminated hands of their mothers is high. We postulate that the period from entry of the hookworm to the start of symptoms could be shorter in these infants since the

distance L3 larvae has to traverse to reach the gut is much less in infants as compared to older children and adults.

The usual symptoms of infantile hookworm disease are bloody stools, melena, increasing pallor, anorexia, listlessness and edema(2-4,6). However the disease is uncommon and these children might be suspected to have other diagnosis. In both the cases an initial stool examination was done and found to be negative and hence we had suspected portal hypertension, Meckel's diverticulum or AV malformation as the cause for the gastrointestinal bleeding. We undertook upper GI endoscopy, Meckel's scan and blood pool scan to rule out these possibilities. Sensitivity of stool examination to pick up ova and cyst increases from 58.6% to 95% upon increase in number of stool examinations from one to three(8). Therefore, in retrospect, we feel that all such infants should be subjected to at least three stool examinations before proceeding to more invasive diagnostic tests.

In conclusion, young infants coming from low socioeconomic families, having poor environmental hygiene and sanitation and presenting with severe anemia and melena, should be suspected of having hookworm disease. The disease can be managed effectively through simple and well known intervention strategies.

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