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"A Rare Case Report Of Intestinal Hymenolepiasis And Ascariasis Double Infection In A Symptomatic Immuno-Competent Host From South India".

Dr. R. Someshwaran[1], SM. Nachammai[2], Dr. Anbu N. Aravazhi[3]

Corresponding author: *Dr. R. Someshwaran*

Department of Microbiology, Karpagam Faculty of Medical Sciences and Research, Coimbatore, Tamil Nadu 641032 India

Email: drsomeshwaran@gmail.com

Abstract:

A 30 year old immuno-competent female, a home maker by occupation, belonging to class III Modified Prasad's classification presented to medicine out-patient department with complaints of diarrhea 6-8 episodes per day, anal pruritus, lower abdominal pain, vomiting and nausea for about 10 days. Patient also complained of malaise and low grade fever on and off for the past two weeks. No other history of similar complaints in the family. On examination patient was afebrile and had moderate pallor. Routine laboratory blood investigations revealed profound eosinophilia and moderate anemia. Stool specimen was sent to Diagnostic Microbiology Laboratory for microscopic examination which revealed presence of helminthic co-infection namely Hymenolepis nana and Ascaris lumbricoides. Patient was de-wormed with specific anti-helminthic therapy and the patient improved symptomatically and was subsequently discharged. Follow up microscopic stool re-examination done at 10 days and 18 days after the treatment revealed no parasitic ova or cyst.

Key words: Geohelminthiasis - Hymenolepis nana - Ascaris lumbricoides - Polyparasitosis – Immunocompetent female – Anemia.

Introduction:

Geohelminths are multicellular, bilaterally symmetrical elongated, flat or round worm-like soil transmitted parasites. Geohelminths are broadly classified into Platyhelminths and Nemahelminths. *Platyhelminths* include a) flat tape like cestodes or tape worms and b) flat leaf-like trematodes or flukes whereas *Nemahelminths* includes elongated cylindrical nematodes (round worms). Geohelminthiasis[1] or Soil Transmitted Helminthic (STH) infections viz., *Ancylostoma duodenale, Necator americanus, Ascaris lumbricoides*[2] *and Trichuris trichiura* etc., still remains as the most common worm infestations concerning global health importance[3] harboring gastrointestinal tract[4] and are found ubiquitous in tropical and sub-tropical temperate zones posing significant public health problem[5, 6] to humans. Estimated prevalence of geo-helminthiasis is around 2 billion cases comprising 28.6% of the world's population[1]. Among them Ascariasis alone accounts for one billion cases worldwide. The developing countries contribute to about 10% of these parasitic infections[7]. The prevalence rate of intestinal helminthic infections in India is 12.5% but a higher incidence of up to 66% has been reported[8, 9], where individual parasitic incidence may vary among different geographical locations and also among high risk ethnic groups. Moderate loads of parasitic infection could cause delayed physical and impaired cognitive development especially in school age children[10, 11]. STH is the leading infectious cause for illness, absenteeism[12] and lost Disability Adjusted Life Years (DALY) [13, 14].

"Double and triple infections" or generally 'Polyparasitosis' are accidental infections but not so uncommon and they occur due to i) availability of the infective forms of different parasites in the same place and during the same time of exposure; ii) direct person to person feco-oral transmission; iii) through contaminated soil, water or food without involving intermediate host; iv) Parasitic symbiosis; v) Immunocompromised host; vi) Parasitic synergism. Complex etiology of these parasites and variation in distribution[15, 16] makes it very difficult to consolidate the 'cause and effect' indices where these STH infections has a negative impact over physical and mental agility of the patient[17] thwarting the efforts of a country to provide basic amenities of the community like free school education[18], mid-day meal program and other health related school programs[19, 20]. Feco-oral transmission of *Hymenolepis nana* and *Ascaris lumbricoides* by ingestion of

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fertilized eggs is the most common method of transmission. Infections are generally asymptomatic in low burden cases but in high burden cases the signs and symptoms may vary[18] viz., abdominal pain, nausea, vomiting, fever, weight loss, irritability, diarrhea, sleep disorders, pruritus etc. Estimated mortality worldwide due to STH is 1,35,000 deaths per year[13, 21]. The complications of ascariasis and hymenolepiasis hyper-infection[17] include biliary tract obstruction, intestinal obstruction, failure to thrive, protein energy malnutrition, cognitive impairment, iron deficiency anemia, eosinophilic pneumonitis, appendicitis, peritonitis and death especially in case of those untreated patients [22, 23]. Mortality due to polyparasitosis had reduced due to anti-helminthic self-medication[24, 25]. To reduce disease burden of STH, WHO recommends a feasible and cost effective control strategy of parasitic infections by single dose chemotherapy for ascariasis, trichuriasis and hook worm infestations especially targeting school age children[18].

CASE DESCRIPTION:

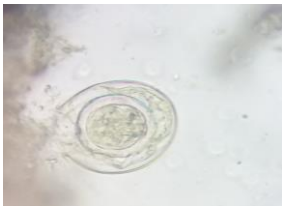
A 30 year old immuno-competent female presented to the medicine out-patient department with chief complaints of passing loose stools 6-8 episodes per day, anal pruritus, lower abdominal pain, vomiting and nausea for 5-6 days. Patient revealed history of easy fatigability, irritability, excessive tiredness and loss of appetite for past 10 days. Patient also complained of malaise, low grade fever on and off for the past two weeks. No history of joint pain. No history of contact with animals. No history of similar complaints among the family members. No history of consuming deworming pills in the last six months. On examination patient was afebrile, with mild-moderate pallor. Routine laboratory blood investigations revealed profound eosinophilia and moderate anemia. A working diagnosis of suspected helminthic infection with anemia was made and stool specimen was sent to diagnostic microbiology laboratory for examination.

Materials and methods:

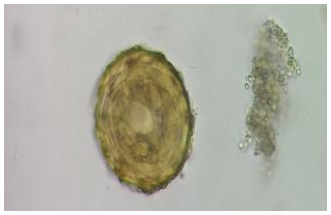
Institutional Human Ethics Committee (IHEC) clearance and patient's informed consent were obtained. Stool sample was collected in a sterile wide mouthed screw capped plastic container as per guidelines and was sent for microscopic and macroscopic examination to diagnostic microbiology laboratory, Karpagam Medical College Hospital affiliated to Karpagam Faculty of Medical Sciences & Research. Direct macroscopic examination revealed loose, yellowish brown, malodorous soft stool mixed with mucus. No evidence of admixed blood or worm segments seen. Stool microscopy by Saline wet mount and Iodine wet mount preparations revealed presence of two different parasitic morphologies. One type was roughly 40µm diameter size, oval, colorless eggs (non-bile stained) with outer and inner membranes, 4-5 polar filaments, hexacanth embryo with three pairs of hooklets (oncosphere) which was found to be *Hymenolepis nana*, a cestode and the other were 60µm diameter size, Oval to sub-spherical golden brown eggs (bile stained) with thick shell covered by albuminous coat and a large unsegmented ovum with crescentic area at each pole which was confirmed as fertilized egg of *Ascaris lumbricoides*, an intestinal nematode. Also colorless, spherical, 15-20µm pentanucleate to octanucleate cyst (5-8 nuclei) were present which was further identified as commensal cysts of *Entamoeba coli*. No evidence of trophozoites with ingested erythrocytes suggestive of *Entamoeba histolytica*.

Figure1: Stool microscopy for ova or cyst.

a) Saline wet mount preparation (40X objective): Oval non-bile stained egg of *Hymenolepis nana* and spherical bile stained fertilized egg of *Ascaris lumbricoides.*

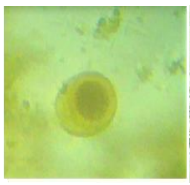


Hymenolepis nana (40µm)



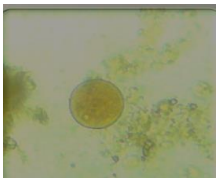
Ascaris lumbricoides (60µm)

b) Iodine wet mount preparation (40X objective): Eggs of *Hymenolepis nana* and fertilized egg of *Ascaris lumbricoides* seen. Multiple cysts of *Entamoeba coli* were seen.



Hymenolepis ana (40µm)

Ascaris lumbricoides (60µm)



Entamoeba coli (5-6µm)

Repeat stool re-examination for parasitic ova or cyst done 10 days and 18 days after the course of treatment which were negative for *Hymenolepis nana* and *Ascaris lumbricoides*.

Discussion:

In this patient, anemia (Serum Hemoglobin-8.1g/dL) and eosinophilia were the hallmark blood findings

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which could be explained due to complications[26, 27] of Hymenolepiasis and Ascariasis. The patient was treated with oral mebendazole 100mg bd for 3 days. Patient improved symptomatically and was discharged from the hospital. Mixed hymenolepiasis and ascariasis double infection are far more reported outside India[28]. Only a few published cases of mixed helminthic infections were reported worldwide. No reports of helminthic polyparasitosis were found in South India. Patients with intestinal parasitosis are carriers transmitting the disease infection to nearby contacts and also to the community. According to a recent study report, the prevalence rates of individual parasites like *Ascaris lumbricoides* and *Hymenolepis nana* among people living in high risk areas of South India were found to be 6.2% and 2.7% respectively[29].

Risk factors for STH infections[7, 8, 9, 18] at both individual and at community levels is an amalgamation of complex and multivariate Demographic, Biological, Social, Environmental, Climatic, and Behavioral factors viz., i) Over-crowding; ii) Illiteracy; iii) Unemployment iv) Poverty; v) Poor personal hygiene like hand hygiene, toilet hygiene and sex hygiene; vi) Regional customs and traditions; vii) Poor environmental sanitations; viii) Infected food handling expatriates; ix) Open air-defecation in drains, fields or streets; x) Consuming raw vegetables like tubers and greens; xi) Consuming undercooked consumables like vegetables and meat; xii) Unemployment, xiii) Lack of home or private toilet facility, xiv) Not washing hands after defecation, xv) Living in warm moist environment and also in shanty tribal , rural or urban area, xvi) History of contact with animals (cattle and pig rearing; household pets like cats and dogs; pests like rats and mice), xvii) Consuming organic food (those untreated with insecticides); xviii) Post-monsoon period (November to February) or rainy season; xix) Due to consumption of improperly preserved or cooked, contaminated road side fast food and junk foods ; xx) History of PICA, playing in the moist soil or mud. High Risk Groups (HRG) for Geo-helminthiasis are a) People living in tropical and temperate regions; b) Dwellers of "Kuccha house" with thatched roof and cow dung flooring or in Field huts; c) School age children; d) walking with bare foot in 'Fecal fields'; e) Habitual eaters of food that has fallen on the ground, f) Occupation – Farmers, Veterinarians, Food handlers working in hotels, bakeries, nursing homes and hospitals, g) Presence of untrimmed and or long contaminated nails, h) those who had not taken deworming tablet in last 6 months; i) Homosexuals, Male and Female sex workers[30, 31].

Even today soil transmitted intestinal helminthiasis is a highly prevalent but neglected disease claiming global public health importance[13]. STH is the most common cause for chronic infection in humans in developing countries[32]. High parasitic infestation mirrors severe shortage in health care and education, transport and chronic poverty[33]. Widespread use of anti-helminthic therapy had shown remarkable reduction in burden of STH infection in South India[34].Risk of developing drug resistance due to frequent anti-helminthic use leading to widespread drug resistance in nematodes[35]. Multiple parasitic infections are far more common than single or no infection[17]. Polyparasitism with nematodes is a common occurrence [24]. Polyparasitism significantly exacerbates morbidity. Moreover, 'Deworming' is an essential tool of school health programs to control STH infections[21]. Following repeated deworming once in 3-6 months, a rise in haemoglobin levels (0.1-2 g/dl) has been observed after 1 year in some studies[36, 37].

Conclusion:

A precise, feasible and cost-effective a) Diagnostic, b) Therapeutic and or c) Preventive strategy is mandatory as a stepping stone for prevention of disease progression and or its complications is the strict adherence to regular or periodic health screening by microscopic stool examination especially in endemic areas and among high risk groups which would be more helpful in the early diagnosis and appropriate management of intestinal helminthic infections[18]. Periodic treatment with anti-helminthic drugs for control of intestinal parasitic infection for the community is a highly effective and inexpensive tool but a more precise study emphasizing on the epidemiology of STH and its drug resistance before making large scale periodic treatment schedules on a global basis is a borne necessity[38]. Preventive measures to control STH are health education, periodic preventive or targeted chemotherapy, improving environmental sanitation and personal hygiene, quality nutrition, political will and terminating the chain of disease transmission. Reporting any case of polyparasitosis and other complicated parasitic infections is important in order to understand their clinical spectrum, enhance the knowledge on epidemiology, adherence to standard treatment protocols and to combat the drug resistance [18].

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