

Original article

Incidence of intestinal parasitic infections in children presenting with diarrhoea in outpatient and inpatient departments of a tertiary care academic hospital of India

Dr. Satyendu Saha, Nagaraju Vanaparathi

Name of the Institute/college: Department of Microbiology, N C Medical College, Panipat, Harayana, India.

Corresponding author: Dr. Satendu Saha

Abstract

Introduction The incidence of intestinal parasitic infections is extremely high in developing countries. Intestinal parasitic infections are more commonly seen in preschool and school going children. The present study was conducted in a tertiary care academic hospital with an aim to determine the prevalence of intestinal parasitic infections in paediatric population

Methods A total of 3 freshly voided stool samples were obtained in sterile wide mouth plastic containers from all the subjects enrolled in the study. Microscopic examination of stool samples was done using direct preparation (saline and iodine wet mount) and after formol ether concentration technique.

Results: Intestinal parasites were demonstrated in a total of 98 (25%) patients. *Entamoeba histolytica* followed by *Giardia intestinalis* and *Ascaris lumbricoides* were major intestinal parasites. Coccidian parasites were seen only in the stool samples obtained from HIV seropositive patients.

Conclusion: The survey of intestinal parasitic infections is very essential to understand the burden and aetiology of infections in particular area. Along with rapid diagnosis and appropriate treatment emphasis should be given on clean water supply, sanitation and health education.

Key words: Intestinal parasites, stool examinations, coccidian parasites, diarrhoea.

Introduction

The incidence of intestinal parasitic infections is extremely high in developing countries.⁽¹⁾ It is estimated that approximately 3.5 billion people are infected and some around 450 million are ill due to intestinal parasitic infections worldwide.⁽²⁾

Intestinal parasitic infections are more commonly seen in preschool and school going children.⁽³⁾

Giardia lamblia, *Entamoeba histolytica*, *Cryptosporidium parvum*, *Cyclospora cayetanensis* are common intestinal parasites reported from paediatric population. These parasites are ubiquitous in nature and demonstrate high resistance to chlorination and other antiseptics.⁽³⁾

Amoebiasis can result in dysentery and extraintestinal complications.⁽⁴⁾ Giardiasis is

associated with acute diarrhoea, steatorrhea and lactose intolerance.⁽⁴⁾

As intestinal parasitic infections mostly occur as mixed infections, they exacerbate concurrent immunosuppressed conditions of host like poor malnourishment and HIV.⁽³⁾ These infections significantly contribute to poor health and impairment of cognitive functions in children.⁽⁵⁾

The present study was conducted in a tertiary care academic hospital with an aim to determine the prevalence of intestinal parasitic infections in paediatric population.

Materials and methods

Study design and patients.

The present prospective cross sectional study was conducted for a period of three years (January 2014

to December 2016). The study population included children of both sexes presenting with diarrhoea. An episode of diarrhoea was defined as the passage of abnormal liquid or unformed stool at an increased frequency. ⁽⁶⁾ Diarrhoea was defined as “acute” if it is present for 2-4 weeks and “chronic” if it is present for > 4 weeks in duration. ⁽⁶⁾ Patient’s demographic information including age, sex, and area of residence was collected on enrolment. A total of 3 freshly voided stool samples were obtained in sterile wide mouth plastic containers from all the subjects enrolled in the study. The samples were immediately transported to Department of Microbiology for further parasitological study.

Stool examination.

Stool samples were macroscopically observed for consistency, colour, presence of mucus and blood, adult intestinal helminths and segment of tapeworm. Microscopic examination of stool samples was done using direct preparation (saline and iodine wet mount) and after formol ether concentration technique.

The wet mounts were observed under low power (10X) and high power (40X) for detection of trophozoites and cysts of intestinal protozoa and ova of helminths.

Modified Ziehl Neelsen staining was done on smears prepared from fresh stool samples after

methanol fixation.⁽⁵⁾ The smears were screened under low power (10X), high power (40X) and oil immersion (100X) objectives of light microscope for detecting oocysts of coccidian parasites like *Cryptosporidium*, *Cyclospora* and *Isospora*.

Results

During the study period a total of 392 children presented with diarrhoea. Out of these, 287 (73.2%) were from outpatient department (OPD), whereas a total of 105 (26.8%) were admitted to the paediatric ward. Overall, 212 (54.1%) patients were male and 180 (45.9%) were female. The mean age of the patients was 9.8 years. A total of 9 patients included in the study were HIV infected.

Intestinal parasites were demonstrated in a total of 98 (25%) patients. These included 73 (74.5%) out patients and 25 (25.5%) inpatients. The rate of intestinal parasitic infections was high in outpatients (25.4%) compared to those admitted to hospital. (23.8%).

In total 9 types of intestinal parasites were seen (Figure 1). *Entamoeba histolytica* followed by *Giardia intestinalis* and *Ascaris lumbricoides* were major intestinal parasites. A total of 6 coccidian parasites (4 *Cryptosporidium parvum* and 2 *Isospora belli*) were seen. Coccidian parasites were seen only in the stool samples obtained from HIV seropositive patients. In the present study no mixed infections were seen.

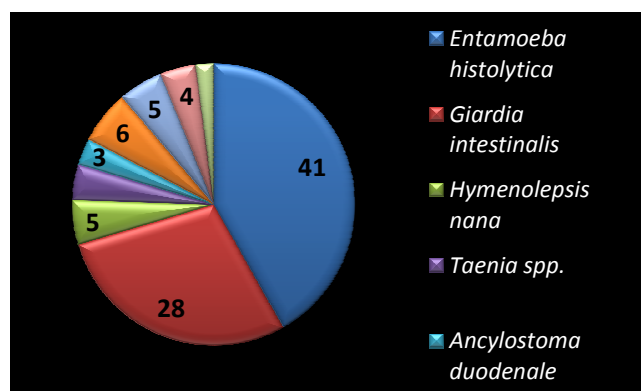


Figure 1: Intestinal parasites in childrens.

Discussion

Acute diarrhoeal diseases continue to be an important cause of morbidity and mortality in children, particularly in developing countries. Intestinal parasites are one of the important causes of diarrhoea. The prevalence of various types intestinal parasite differs as per geographic area and patient population studied. Therefore survey on the prevalence of intestinal parasitic infection is necessary to understand the burden and aetiology of infections in particular area.

In the present study the rate of intestinal parasitic infection in children was 73. 2%. The incidence of intestinal parasitic infections was common in OPD patients compared to IPD patients. Similar observation was noted by Mbae *et al* (2013).⁽³⁾

Entamoeba histolytica was the predominant intestinal parasite in this study. *E. histolytica* is an inhabitant of the intestinal lumen. This intestinal protozoa affects 10% of the world population, resulting in 100,000 deaths per year. It is the 3rd most common cause of parasitic diseases.⁽⁷⁾ Most of the infected with *E. histolytica* are asymptomatic, but about 10% may present with clinical symptoms such as frank dysentery and a liver, lung, or brain abscess.⁽⁸⁾ The trophozoites containing ingested erythrocytes were identified as *E. histolytica*, but the cysts of *E. histolytica* and *E. dispar* are morphologically similar and therefore can't be differentiated microscopically.⁽⁶⁾ The cysts were presumed to be that of *E. histolytica*, as *E. dispar* is non pathogenic and non invasive. Children in endemic areas suffering from fulminant invasive disease have higher mortality than adults.⁽³⁾

Giardia intestinalis was the second most common intestinal parasite. This intestinal flagellate is a common cause of endemic and epidemic diarrhoea

throughout the worldwide.⁽⁹⁾ It is particularly seen in waterborne outbreaks of diarrhoea in children in day care centres and in returned travellers. *Giardia intestinalis* is one of the first enteric parasite to infect with peak prevalence rates of 15 to 20% occurring in children less than 10 years old.⁽⁹⁾

Ascaris lumbricoides was seen in 6 cases. It is estimated that 25% of the world population are infected by *A. lumbricoides* and this causes up to a million cases of disease annually.⁽¹⁰⁾ In the present study, coccidian parasites were seen only in the stool samples obtained from HIV seropositive patients. These coccidian parasites usually cause a self-limiting illness in healthy individuals but in immunocompromised patients, they are known to cause life-threatening profuse watery diarrhoea.⁽⁶⁾

Cryptosporidium parvum was the predominant coccidian parasite. Infection due to this coccidian parasite appears greater in less developed nations, and perhaps is related to a relative lack of clean water and sanitary facilities, crowded households and sometimes animal reservoirs in close proximity to residences.⁽¹¹⁾ Children less than 2 years of age appear to have a high prevalence than adults. Nagamani *et al* (2001) observed *Cryptosporidium parvum* in 2.99% of children less than 5 years of age with diarrhoea.⁽¹²⁾

Conclusion

Intestinal parasites are important cause of diarrhoea. The methods employed for diagnosis of intestinal parasitic infections are usually simple and rapid compared to those used for bacterial, viral and fungal infections. The survey of intestinal parasitic infections is very essential to understand the burden and aetiology of infections in particular area. Along with rapid diagnosis and appropriate treatment emphasis should be given on clean water supply, sanitation and health education.

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