FREQUENCY OF GIARDIASIS IN ACUTE AND CHRONIC DIARRHOEAL CASES

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ABSTRACT

Objective: *To determine the frequency of giardiasis in patients suffering from acute and chronic diarrhoea.*

Material and Methods: *This descriptive study was carried out in the Department of Paediatrics, Postgraduate Medical Institute Hayatabad Medical Complex Peshawar, from Jul 2001 to Jan 2002. Stool samples from 150 patients, attending both the out patient department and admitted in unit for management, including both males and females, aged between 5 months and 12 years, with acute and chronic diarrhoea were scrutinized on three consecutive days.*

Results: *The prevalence of giardiasis was 20% (n=15/75) in acute diarrhea and 33.3 % (n=25/75) in chronic diarrhea. Among positive cases in acute giardiasis, 80% (n=12/15) belonged to 0.5-5 years age group and 20% (n=3/15) belonged to 6-12 years age group, while in chronic giardiasis, 72% (n=18/25) belonged to 6 months-5 years age group and 28% (n=7/25) belonged to 6-12 years age group.*

In giardiasis, patients presenting with acute diarrhoea stool, samples were positive in 80% (n=12/15) on first day, 13.3% (n=2/15) on second day and 6.6% (n=1/15)on third day. In patients presenting with chronic diarrhoea stool samples were positive in 76% (n=19/25)on first day, 16% (n=4/25)on second day and 8% (n=2/25) on third day.

Conclusion: *Giardiasis is still a common cause of acute and chronic diarrhoea. Fresh stool examination is the easiest and reliable method of diagnosing giardiasis.*

Key Words: *Giardiasis, Giardia Lamblia, Acute Diarrhea, Chronic Diarrhea.*

INTRODUCTION

Giardia Lamblia was first discovered in 1681 by Antonie Van Leeuwenhoek, who found the parasite in his own stools. For many years G. Lamblia was considered to be of doubtful pathogenicity. Clinical significance surfaced in the early 1970s[1].

Giardia is one of the most frequently isolated intestinal protozoa and is found worldwide in both developing and more developed countries[2], particularly in the regions with poor sanitation. Giardia lamblia occurs sporadically but is also the most frequently identified etiologic agent in outbreaks associated with the ingestion of surface water often due to ineffective filtration or pretreatment.[3] Other potential sources for cysts transmission are contaminated food[4], or by person to person contact, including homosexual males[5]. However contaminated drinking water is still the major source of infection.[2]

G. Lamblia is a flagellate, that alternates between trophozoite and cyst stages in its life cycle. The trophozoite is pear shaped, dorsally convex, 9.5 to 21 µm long, 15 µm wide, tear drop shaped dorsoventrally, spoon shaped sidewise, exhibit "falling leaf motility", divide by binary fission, convert into oval cysts, that can then survive into water for up to three months.[6]

The incubation period varies from 7 to 14 days. Clinical aspects of human infection with Giardia range from the asymptomatic carrier state to severe malabsorption. The acute stage may present with nausea, anorexia, low grade fever, explosive watery foul smelling diarrhea, marked

FREQUENCY OF PRESENTING SYMPTOMS IN POSITIVE CASES (n=15) IN ACUTE DIARRHOEA (n=75)

Symptoms	Number of Positive Patients (n=15)	Percentage
Diarrhoea	15	100%
Abdominal Distention	12	80%
Pain Abdomen	09	60%
Vomiting	04	26.6%

Table 1

FREQUENCY OF PRESENTING SYMPTOMS IN POSITIVE CASES (n=15) IN CHRONIC DIARRHOEA (n=75)

Symptoms	Number of Positive Patients (n=25)	Percentage
Diarrhoea	25	100%
Abdominal Distention	13	52%
Pain Abdomen	07	28%
Vomiting	02	8%

Table 2

abdominal distention and gurgling. Chronic infection may present with chronic diarrhea and failure to thrive[7]. Locally secreted IgA and T-cells has got protective functions.[8]

The diagnosis of giardiasis is established by documentation of trophozoites, cysts or giardia antigens in stool specimen or duodenal fluid. Stool should be examined within one hour of passage or should be preserved in vials containing polyvinyl alcohol or 10% formalin. In complicated cases diagnosis can be confirmed by duodenal aspirates, antigen detection tests or biopsy from duodeno-jajunal junction.[7] In asymptomatic infected person, histological studies usually shows no abnormality, however in symptomatic person findings may include blunting of microvilli leading to malabsorption[9]. Fluid can be obtained by endoscopy or more simply by duodenal string test called Entero-test. Polymerase chain reaction and gene probe based detection have been used in environmental monitoring. Using enzyme immunoassay (EIA) to detect serum anti G Lamblia IgG and IgM can differentiate between acute and chronic infection. [10, 11]

Incidence of prevalence is usually underestimated as the laboratories do not routinely analyze faecal samples for parasites. Many patients contacted their physicians several times without being diagnosed with giardiasis[10].

Metronidazole (5mg/kg three times a day for seven days), is the drug of choice for giardiasis[12]. Quinacrine 2mg/kg three times a day for seven days, Furazolidone 1.2 mg/kg three to four times a day for seven days, Tinidazole 30mg/kg as a single dose, are the other available treatment options. Some physicians also recommend Nitazoxanide.[13]

Because of the high frequency of giardiasis in developing countries and the important functional consequences, this study was conducted to know about the frequency of giardiasisis in acute and chronic diarrhoeal cases, presenting to our paediatric unit.

MATERIAL AND METHODS

This descriptive study was conducted in Department of Paediatrics, Postgraduate Medical Institute, Hayatabad Medical Complex Peshawar from Jul 2001 to Jan 2002. A total of 150 cases were evaluated for giardiasis.

INCLUSION CRITERIA:

Study included

1) Both males and females,
2) Aged between 6 months and 12 years
3) With acute and chronic diarrhoea

EXCLUSION CRITERIA:

Bloody diarrhea

Stool was examined on three consecutive days. Fresh stool samples were used. Physical characteristics of stool samples were examined. Microscopy was done in both saline and iodine preparations. Presence of vegetative / cystic form of Giardia Lamblia was detected. If a specimen could not be processed within one hour, then it was put in a preservative (polyvinyl alcohol or formalin 10%).

RESULTS

During study period 150 cases with acute and chronic diarrhea, seventy five patients from each group were scrutinized.

Among 75 patients suffering from acute diarrhea, 15 (20%) had giardiasis. In 15 positive cases, 12 (80%) were aged between 6 months to 5 years and 3 (20%) between 6 to 12 years. Stool specimens revealed positive results in 12 patients (80%) on day first, 2 (13.3%) on day second and one (6.6%) on day third.

Giardiasis presented in both acute and chronic state with diarrhoea, abdominal distention, pain abdomen and vomiting in different frequencies (Table 1 and 2).

In 75 patients with chronic diarrhea, 25 patients (33.3%) had giardiasis.Among 25 positive

cases, 18 (72%) were aged between 6 months to 5 years and 7 (28%) between 6 to 12 years. Stool samples showed positive results for giardia lamblia in 19 cases (76%) on day first, 4 (16%) on day second and 2 (8%) on day third.

Diarrhea and abdominal distension were the commonest presenting features in positive cases.

DISCUSSION

The organism is endemic and millions are infected worldwide[14], with the highest prevalence occurring in the tropics and subtropics. Specific areas include the Soviet Union, South East and South Asia, Tropical Africa, Mexico and Western South America. Giardia infects approximately 2% of the adults and 6 to 8% of the children in developed countries worldwide[15].

Host-related factors, parasite-related factors, and host-parasite interactions affect the outcome of infection, with social, environmental, and climactic factors influencing the prevalence of Giardia infection[2]. For the same reasons variable results were obtained in different regions. In Damascus (Syria) 14% children were infected with Giardia lamblia, while 8.1% were found infected with other sorts of intestinal parasites[16]. In Alexandria, (Egypt) children infected were 15.4%.[17] In all of the fore mentioned studies the infection rates were higher in the younger age group. The infection rates declined with age and children were asymptomatic. Rates were higher in children from the rural areas, from low income families, and it was higher in boys than girls.[2, 16, 17]

Giardiasis can manifest itself as acute or chronic disease, but is detected more commonly in chronic form. Our study also revealed that the incidence of giardiasis was higher in chronic (33.3%). Than in acute diarrhea (20%)

Studies in different areas of Pakistan indicated almost similar results. The prevalence of giardiasis among school going children was 23.4% by Iqbal in 1985[18], 17.53% by Nawaz and Nawaz in 1987 in Quetta[19], 20.5% by Khan et al, in 1987 in Abbottabad[20], 18.3% by Ahmad and Maqbool [5] in 1988 in Islamabad.

The prevalence of symptomatic infection was higher in younger children (6 months - 5 years) as compared to the older ones (6-12 years). The prevalence of giardiasis in acute diarrhea was 24% in 6 months - 5 years age group as compared to 12% in 6-12 years age group. Among the positive cases 80% belonged to 6 months - 5 years age group, while 20% belonged to 6-12 years age group. In chronic diarrhea, the overall prevalence was 33.3%. It was 36% in 6 months - 5 years age group, while it was 25% in 6-12 years age group. Among the positive cases 72% belonged to age group 6 months -5 years while it was 28% in age group 6-12 years.

A number of studies have shown high prevalence of giardiasis in younger age group. Ahmad and Maqbool had shown an overall prevalence of giardiasis as 18.3%. Children between 5 and 9 years had a higher prevalence (20.4%) as compared to those between 10 and 14 years (15%).[5]

Chunge-RN et al., have shown two age related prevalence peaks for giardiasis in children 60 months and below.[21] Furthermore there appeared to be a clear Giardia-diarrhea relationship in the age group of 19 to 24 months[19].Torres DM et al., have shown high prevalence of giardiasis in the age group corresponding to 1-4 years.[22]

Our recent study results are comparable to the studies, carried out four or five decades ago in developed countries, indicating Pakistan still needs a lot to limit the spread.

In U.S.A., Faust and Headlee.[23] revealed a prevalence of 12.4% in 1936 and reduced to10% in 1988, revealed by Hubbard et al[24]. This decrease in the prevalence of giardiasis in U.S.A reflects the effects of improved environmental and personal hygiene.

It is concluded that giardiasis is symptomatic more in younger children and as the age progresses, giardiasis becomes asymptomatic or carrier state is predominant. This may be due to the development of immunity against Giardia lamblia, following repeated infections in the early childhood.

Stool examination for three consecutive days is the easiest and reliable method of diagnosing giardiasis. Like most of internationally conducted studies[7] 80% of the infected individuals were detected on the day first, 13.3% on the day second and 6.6% on the day three. So for more reliable results, stool should be examined on three consecutive days, using fresh samples due to the intermittent nature of the passage of cysts.

CONCLUSION

Giardiasis is still a common cause of acute and chronic diarrhoea. The prevalence of symptomatic infection is higher in younger children as compared to older children. The prevalence of giardiasis is higher in chronic than in acute diarrhoea.

Three days fresh stool examination is the easiest and reliable method of diagnosing giardiasis.

REFERENCES

1. Brodsky RE, Spencer HC, Schultz M G. Giardiasis in American travelers to the Soviet Union. J Infect Dis 1974; 130: 319-22.
2. Nygård K, Schimmer B, Søbstad O. A large community outbreak of waterborne giardiasis-delayed detection in a non-endemic urban area. BMC Public Health 2006; 6: 141.
3. Trum HB. Giardiasis. The most common parasitic infection. Consu Res Mag 1993; 76: 8-9.
4. Dawson D. Food borne protozoan parasites. Int J Food Microbiol 2005; 103:207-27.
5. Ahmad S, Maqbool S. Giardiasis among school children of Islamabad. Pak J Med Res 1998; 27: 247-57.
6. Jones JE. Giardiasis, In : Balows A, Hausler WJ , Ohashi M. Turano ed. Laboratory diagnosis of infectious diseases. New York Springer-Verlag 1988; 872-882.
7. Giardiasis and balantiasis. Giardia Lamblia. In:Kliegman RM, Behrman R E,Jenson HB, Santon BF. Nelson textbook of Pediatrics. 18th ed. Philadelphia:Saunders:2008;1462-4.
8. Faubert G. Immune response to Giardia duodenalis. Clin Microbiol Rev 2000;13: 35-54.
9. Johnston SP, Ballard MM, Beach MJ, Causer L, Wilkins PP. Evaluation of three commercial assays for detection of Giardia and Cryptosporidium organisms in fecal specimens. J Clin Microbiol 2003;41: 623-6.
10. Nygard K, Blystad H. Giardiasis in Norway. MSIS-rapport (Communicable Disease Report, Norway). 2005; 33.
11. Faubert G. Immune response to Giardia duodenalis. Clin Microbiol Rev 2000;13:35-54.
12. Wright JM, Dunn LA, Upcroft P, Upcroft JA. Efficacy of antigiardial drugs. Expert Opin Drug Saf 2003;2:529-41.
13. Bailey JM, Erramouspe J. Nitazoxanide treatment for giardiasis and cryptosporidiosis in children. Ann Pharmacother. 2004;38: 634-40.
14. Thompson RC, Monis PT. Variation in Giardia: Implications for taxonomy and epidemiology. Adv Parasitol 2004;58:69-137.
15. Caccio SM, Thompson RC, McLauchlin J, Smith HV. Unravelling Cryptosporidium and Giardia epidemiology. Trends Parasitol. 2005;21:430-7.
16. Almerie MQ, Azzouz MS, Abdessamad MA, Mouchli MA, Sakbani MW, Alsibai MS, et al. Prevalence and risk factors for giardiasis among primary school children in Damascus, Syria. Saudi Med J 2008;29:234-40.
17. Sahn FF, Deghedi BM, Mahdy NH, El Sahn A. The impact of intestinal parasitic infections on the nutritional status of primary school children in Alexandria, Egypt. J Egypt Public Health Assoc 1997; 72:113-51.
18. Iqbal S. Incidence of intestinal parasitic infections in school children of Quetta. Fifth Pak Cong Zool 1985; 60:34-8.
19. Nawaz M, Nawaz Y. Observation of Giardiasis in primary school children in Quetta. Seventh Pak Cong Zool 1987; 89-90.
20. Khan SP, Rizwanullah, Khan JA. Prevalence of intestinal parasites in children and its effect on hemoglobin level. Pak J Med Res 1987; 26: 1514-4.
21. Chunge R N, Kanumba P N, Kalili N. Prevalence and frequency of Giardia lamblia in children aged 0 to 60 months with and without diarrhoea. East Afr Med J 1992; 69: 311-13.
22. Torrers DM, Chieffi P, Costa WA. Giardiasis in nurseries supported by the Sao. Paulo municipal preference (82/1983). Rev Inst Med Trop Sao-Paulo 1991;33: 137-42.
23. Faust EC, Headlee WH. Intestinal parasite infections of the Ambulatory White Clinic Population of New Orleans. Am J Trop Med 1936; 16: 25-38
24. Hubbard DW, Morga PM, Yaeger RG. Intestinal parasite survey of kindergarten children in New Orlearns. J Pediatr 1988; 112: 555-9.

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