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RESEARCH ARTICLE

Diagnosis of Giardia lamblia by Detection of Parasite- Anti-Giardia Antibodies in Children

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Abstract

BACKGROUND :
Giardiasis is a major diarrhea disease found throughout the world. The flagellate protozoan Giardia lamblia, its causative agent, is the most commonly identified parasite isolated worldwide.

OBJECTIVES:
This study was to measuring specific serum anti-Girdia(IgM and IgA) antibodies by ELISA assay.

SUBJECTS AND METHODS:
Blood samples were collected from Sixty four (64)children with gastrointestinal problems, at AL-Imamain AL-Kadimain medical city from 1st March 2014 to 30th June 2014 at pediatric out patients clinic, of both sexes, their age range from 7 months to 7 years, Addison healthy control include twenty seven(27) children (age matched). The serum sample was used for detection of human anti-Giardia lamblia IgM and IgA antibody by ELISA test.

RESULTS:
The study showed the mean age group was (3.18±0.28), but there is highly significant difference for B.W and Hb in the study groups(P=<0.001). males predominance among patients about (56.5%), while (43.8 %) were females. elevated levels of IgM antibodies 52(57.1%) total positive, that highly significant differences (p<0.001), also highly percentage borderline for IgA antibodies 40(44.0%) significant differences (P <0.002).

CONCLUSION:
There is higher serum IgM antibodies level in Giardiasis patients who have active disease. Serum IgA antibodies level is higher borderline which may play important role for protection.

INTRODUCTION

Giardia lamblia (synonymous Giardia duodenalis and Giardia intestinalis) is a flagellated protozoan parasite reproduces in the small intestine causing giardiasis. Symptoms include diarrhea, weight loss, bloating, gas, constipation, nausea, vomiting, rash, and fever. Pathogen with a very wide host range, including domestic and wild animal species, as well as human(1).

Giardia is recognized as a major causative agents of water borne parasitic diarrhea disease in both children and adults, the result of the relative resistance of Giardia lamblia cyst to chlorination, is one of the most common protozoa which is world-wide distribution(2). Infection is initiated when the cyst is ingested indirectly by contaminated food and water or directly by person to person; especially among preschool children by fecal-oral contamination with cyst(3). The majority of infections are asymptomatic leading to difficulties eradication and control of this parasite. Microscopic examination is common method to diagnose of fecal samples. Detection of G. lamblia is difficult, because intermittent excretion in the stool, short latent time in some patients, hiding by bile pigments, several samples may be needed for diagnosis and confirmation of giardiasis. Enzyme- linked immunosorbent assay(ELISA) is a rapid, sensitive, and economic method to confirm infection. Comparing with other diagnostic methods, sensitivity and specificity is very high (100%). For finding, anti-parasite antibodies could be used in a sandwich ELISA method, need pure antibody against parasite conjugated to a proper enzyme. By determining the levels of systemic and local antibodies(IgM and IgA) to G. lamblia in different populations, widely different immune responses in infected patients were recognized(4).

SUBJECTS AND METHODS:

This study done at AL-Imamain AL-Kadimain medical city from 1st March 2014 to 30th June 2014 at pediatric out patients clinic. The blood samples were collected from Sixty four (64)children with gastrointestinal problems, of both sexes, their age range from 7 months to 7 years, addsion healthy control include twenty seven(27) children. The serum sample was used for detection of human anti-Giardia lamblia IgM and IgA antibodies by Enzyme- linked immunosorbent assay(ELISA) test.

RESULTS:

For the sixty four(64) patients suspected Giardiasis, the age of rang from 7 months to 7 years suspected giardiasis. The mean showed no significant differences for age, but there is highly significant difference for B.W and Hb in the study groups(P=<0.001) table 1. No significant differences according age groups, and the high rate of infection with Giardia lamblia 45 (49.5%)were in children at age (3—7) years old, as shown in table 2. The prevalence rate of giardiasis among male significantly higher than among female (56.5%, 43.8 %) respectively, Figure 1. The results of this study showed that highly significant differences (p<0.001) elevated levels of IgM antibodies, also significant differences for IgA antibodies(p<0.002) with highly borderline (45.3%)tables 3-4.

Table 1: Descriptive statistics mean values of age, Body weight, and Hb in suspected Giardiasis patients and healthy controls.

Study groups		**Mean**	**SD**	**SE**	**P value**
Age (years)	Healthy	3.37	2.02	0.39	**0.698**
	Patients	3.18	2.28	0.28	
Body weight	Healthy	12.39	1.82	0.35	**<0.001**
	Patients	9.95	2.42	0.30	
Hb	Healthy	12.84	1.64	0.32	**<0.001**
	Patients	11.55	1.31	0.16	

Table 2: Descriptive statistics the frequency of age groups in study groups

			Study groups		**Total**
			Healthy	Patients	
Age groups	<1year	Count	5	18	23
		%	18.5%	28.1%	25.3%
	1-3 years	Count	8	15	23
		%	29.6%	23.4%	25.3%
	3-7 years	Count	14	31	45
		%	51.9%	48.4%	49.5%
Total		Count	27	64	91
		%	100.0%	100.0%	100.0%
P value			**0.559**		

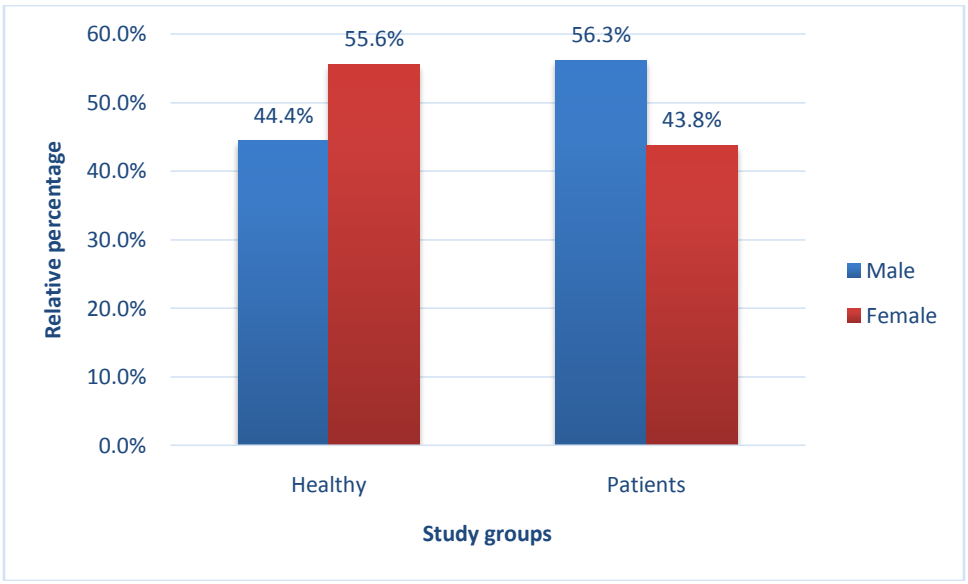

Figure 1: Gander type distribution in the study groups (patients and healthy controls)

Table 3: Descriptive statistics serum IgM antibodies level associated with Study groups

			Study groups		Total
			Healthy	Patients	
Serum IgM	Negative	Count	27	7	34
		%	100.0%	10.9%	37.4%
	Borderline	Count	0	5	5
		%	0.0%	7.8%	5.5%
	Positive	Count	0	52	52
		%	0.0%	81.3%	57.1%
Total		Count	27	64	91
		%	100.0%	100.0%	100.0%
P value			**<0.001**		

Table 4: Descriptive statistics of serum IgA antibodies level associated with study groups

			Study groups		Total
			Healthy	Patients	
Serum IgA	Negative	Count	16	20	36
		%	59.3%	31.3%	39.6%
	Borderline	Count	11	29	40
		%	40.7%	45.3%	44.0%
	Positive	Count	0	15	15
		%	0.0%	23.4%	16.5%
Total		Count	27	64	91
		%	100.0%	100.0%	100.0%
P value			**0.002**		

DISCUSSION:

This study included 64 patients divided into three age groups, the rang was (7 months -7 years), mean age of patients was 3.18±0.28, the result showed no significant difference, disagree with (5) which G.lamblia showed the highest rate of infection (17.7%) for this age groups among other parasites species. On the other hand, a lower rates of infection with this parasite for this age group were recorded by(6) in Dohuk city which were 6.05%, agree with this study. This difference is probably may be due to low number of samples of this age group. In this study the peak of incidence 49.5%, was at the age group 3-7 years which is consistent with other Iraqi studies reported by(5), and (7), this high rate of infection among this age could be related to a number of factors such, a low socioeconomic (poor families) area with poor health hygiene are excellent targets for oral fecal transmission, overcrowding, low education, children are fully independent in toilet use and are more involved in outdoor activities which might lead to Giardia transmission, but differ with another studies in Iraq that showed the high rate of infection with Giardia lamblia (93.3%) cases in children (1—2) years old (8). In the present study, result indicated there is slight predominance of males (56.5%) than female(43.8 %) according to gender of the patients, the higher rate of infections with intestinal parasites in males may be due to the more activities and as they were more in contact with environmental conditions than females this finding is similar to study in Iraq (9) in which male had higher rate of infection than female (24. 7% , 22.5%) respectively, in (8), the prevalence rate of giardiasis among male significantly higher than among female (55.1%) and (44.9%) respectively, but in other study noticed that the rate of infection for females was higher (19%) than in males (16%) report by (5). The results of this study showed that highly significant differences ($p<0.001$) elevated levels of IgM antibodies in sera patients from total 52 all were positive as showed in table:3, result indicated that parasite specific IgM may be elevated during acute G. lamblia infections, agreet with report by(10), but in this study parasite-specific IgM levels were not predictive of exposure to the organism, perhaps because the study was done several weeks after the peak of illness with subjects who had a spectrum of clinical manifestations. Based on our findings, that the levels of G. lamblia -specific IgM may be useful

to differentiate between recent and past infection. Agree with(11). In our results for table: 4, indicate significant differences ($p<0.002$) of level IgA antibodies in serum patients, because showed highly borderline 29. G. lamblia-specific IgA may be a better indicator of G.lamblia infection, because giardiasis is a non inflammatory enteric infection and IgA is the predominant immunoglobulin produced in the intestinal tract, may be useful in determining exposure to G.lamblia-contaminated water and illness from G. lamblia during waterborne outbreaks of diarrheal illness, this agree with(12), also immunoglobulin A (IgA) antibodies are presumed to be important for controlling Giardia infection, but direct evidence for this function is lacking.

CONCLUSION & RECOMMENDATION:

The mean showed no significant differences for age, but there is highly significant difference for B.W and Hb in the study groups The peak of incidence at the age group 3-7 years old. There is high serum IgM antibodies level in Giardiasis patients who have active disease. Serum IgA antibodies level is higher borderline of may play important role for protection. Advanced to use the ELISA serum technique in Iraq for Giardia diagnosis, because it is more sensitivity and specificity and recommend to study large number of samples for determent the real level of disease in Iraq.

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