



THE EXAMINATION OF LINK BETWEEN BLOOD LEVELS OF IGA, IGE, IGG, IGM, CRP AND GIARDIASIS IN CHILDREN

ÇOCUKLARDA GIARDİASİS İLE SERUM IGA, IGE, IGG, IGM, VE CRP DÜZEYLERİ ARASINDAKİ İLİŞKİNİN İNCELENMESİ

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Anahtar sözcükler: giardiasis, immunoglobulin, CRP, çocuk

SUMMARY

Giardiasis, an intestinal protozoan infection caused by Giardia lamblia, is common in Turkey, especially in children. This study was designed to determine the link between blood levels of immunoglobulins (Ig) of A, E, G, M and C-Reactive Protein (CRP) and giardiasis in children. A total of 31 children, aged between 2 and 15 years-old, whose stool samples were found to be positive for Giardia lamblia cysts and/or trophozoites by at least one method of saline-Lugol, formalin-ethyl acetate and trichrome staining, were enrolled in the study group (SG). The control group (CG) consisted of 50 age-matched healthy children. Blood levels of immunoglobulins and CRP were measured by ELISA and agglutination methods, respectively.

IgA levels were found to be within normal range in all cases of both groups, the IgE levels were found over normal range in (38.7%) of SG and in (16%) of CG ($p<0.05$). However in (38.7%) of SG and in (2%) of CG IgG levels were found under normal range ($p<0.05$). In (32.25%) of SG and in (6%) of CG, the IgM levels were found higher than normal range ($p<0.05$). CRP levels were found over normal range in (25.8%) of SG and (4%) of CG ($p<0.05$). These results revealed a correlation between giardiasis and both increase in serum IgE, IgM and CRP levels and decrease in serum IgG levels. Specific components of IgA should be assessed instead of total serum IgA.

ÖZET

Giardiasis, Giardia lamblia'nın neden olduğu Türkiye'de çocuklar arasında yaygın olan intestinal protozoal bir enfeksiyondür. Bu çalışmada çocuklarda immunoglobulin A, E, G, M ve C-reaktif protein (CRP) ile giardiasis arasındaki ilişkiyi belirleme amaçlanmıştır. Bu nedenle native-lugol, formol etil asetat ve trikrom çoklaştırma yöntemlerinden en az biriyle dışkılarında Giardia Lamblia kist ve/veya trofozoiti saptanan 2-15 yaşları arasında 31 çocuk hasta grubu olarak kabul edilmiştir (HG). Aynı yaş grubundan sağlıklı 50 çocuk kontrol grubu (KG) kabul edilmişlerdir. Kan immunoglobulin ve CRP düzeyleri sırası ile ELISA ve agglütinasyon yöntemleri ile ölçülmüştür.

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Her iki grupta IgA düzeyleri normal sınırlar içinde bulunmuştur. HG'da (%38.7) ve KG'da (%16) olgunun IgE düzeylerinin normalin üzerinde olduğu saptanmıştır ($p<0.05$). Buna karşın HG'da (%38.7) ve KG'da (%2) IgG düzeyinin normalin altında olduğu saptanmıştır ($p<0.05$). HG'da %32.25 ve KG'da (%6)'sının IgM düzeyinin yüksek olduğu görülmüştür ($p<0.05$). CRP düzeyinin HG'da (%25.8) ve KG'da ise (%4)'ünde normalin üstünde olduğu gözlenmiştir. ($p<0.05$). Sonuç olarak; giardiasis ile serum IgE, Ig M ve CRP artışının yanısıra IgG azalışının ilişkili olabileceği düşünüldükten, herhangi bir artış gözlenmeyen serum total IgA'nın yerine spesifik komponentlerinin araştırılması uygun olacaktır.

INTRODUCTION

Giardiasis is a protozoan infection, caused by *Giardia lamblia* affecting both gastrointestinal and hepatobiliary systems while it is seen especially in childhood (1,2). There are several studies on blood levels of variables which can be helpful in the diagnosis of parasitic infections in the last years (1). Blood levels of specific immunoglobulins (Ig) like IgG, is expected to be low in *G. lamblia* infection, as it is one of the causes of hypogammaglobulinemia. In fact levels of IgE, responsible for hypersensitivity, is increased in parasitic infections like in all allergic diseases. However blood levels of IgE is found to be low in protozoa infections, unlike the significant increased IgE blood levels showed in the final studies on helminthic infections (3,4,5). C-Reactive Protein (CRP) is an acute phase reactant in serum and its levels is elevated within hours, a short time after tissue destruction and bacterial, fungal and protozoal infections, through binding to blood polysaccharides (6). In this study; serological levels of IgA, IgE, IgG and IgM and CRP (one of the most significant tissue destruction indicator) were assessed and compared in patients with giardiasis and in control group without giardiasis.

MATERIAL-METHODS

A total of 31 children were enrolled in the study group (SG). These children were initially admitted to Outpatient Clinics of Department of Pediatrics of Celal Bayar University School of Medicine Hospital and referred to Parasitology Laboratory for routine O & P examination on three consecutive days. Their stool samples were examined by saline-Lugole staining, trichrome staining and formaline ethyl acetate concentration methods, were found to contain cysts and/or trophozoites of *G. lamblia* at

least in one examination. Routine physical and laboratory examinations of these children revealed no infection or disease, other than giardiasis. The control group (CG) were consisted of 50 healthy children in the same age group. Their stool samples were examined by the same methods for three consecutive days and found to contain no *G. lamblia* cysts or trophozoites. Blood samples of all children in the study were obtained and centrifuged at 3000 rpm for five minutes to obtain the sera. The serological levels of immunoglobulins and CRP were assessed by ELISA and agglutination methods respectively. Standard normal levels of IgA, IgG, IgE and IgM of this age group and CRP levels of over 0.80 mg/dl, were assumed to be positive for *G. lamblia* infection. The ranges of IgA, IgE, IgG and IgM were determined as 3-252 mg/dl, 10-100 IU/l, 140 – 1500 mg/dl and 15-250 mg/dl respectively. All the data gained from the study was determined with SPSS for Windows 6.1® (SPSS Inc., 1994) working under Microsoft Windows 98® computer environment. The differences between the values of quantitative variables were determined with Student's t – test. The differences under $p<0.05$ were presumed to be statistically significant.

RESULTS

Table 1, IgA levels were within normal range in both groups. IgE levels were found over normal range in 12 cases (38.7%) of SG and in 8 cases (16%) of CG ($p<0.05$). However, in 12 cases (38.7%) of SG and in only 1 case (2%) of CG IgG levels were found under normal range ($p<0.05$). In 10 cases (32.25%) of SG and in 3 cases (6%) of CG the IgM levels were found higher than normal range ($p<0.05$). CRP levels were found over normal range in 8 cases (25.8%) of SG and in 2 cases (4%) of CG ($p<0.05$).

Table 1. Immunoglobulin and CRP levels of study group (SG) and control group (CG)										
Groups	CRP (0.8 mg/dl)		IgA (3 – 252 mg/dl)		IgE (10 – 100 IU/l)		IgG (140 – 1500 mg/dl)		IgM (15 – 250 mg/dl)	
	SG	CG	SG	CG	SG	CG	SG	CG	SG	CG
	(n=31)	(n=50)	(n=31)	(n=50)	(n=31)	(n=50)	(n=31)	(n=50)	(n=31)	(n=50)
Low	-	1 (2%)	-	-	1 (3.2%)	2 (4%)	12 (38.7%)	1 (2%)	1 (3.2%)	1 (2%)
Normal	23 (74.2%)	47 (94%)	31 (100%)	50 (100%)	18 (58.1%)	40 (80%)	18 (58.1%)	48 (96%)	20 (64.55%)	46 (92%)
High	8 (25.8%)	2 (4%)	-	-	12 (38.7%)	8 (16%)	1 (3.2%)	1 (2%)	10 (32.25%)	3 (6%)

DISCUSSION

Although some studies indicate that serum immunoglobulins do not change in giardiasis, several studies showed decreased immunoglobulin G and M levels (7,5). According to some researchers, there is a correlation between the preceding achlorhidration and intestinal antibody insufficiency and the increase in the incidence of giardiasis among the hypoglobulinemia cases (1,2). The serum IgA levels were found in normal ranges in 15 cases of giardiasis, diagnosed with bile-tubage while the IgG levels stood over and IgM levels were under, normal ranges (8). Total IgM and IgA levels were elevated and IgG levels declined in a study among Egyptian children with giardiasis (9).

The mechanism of parasites having different efficiencies of starting out IgE synthesis hasn't yet been understood. Serum IgE levels depend on the parasite whether it is located in the host tissue or not (5). In 2 of the 14 cases with protozoan parasite infection, and in 8 of the 15 cases with helminth infection, the serum IgE levels were elevated in a study in İzmir, Turkey. Thus, it was convincing that helminth infections increase serum IgE levels more than protozoan infections do (10). In an other study in İzmir, cases with intestinal parasite infection had serum IgE level at 1318 IU/ml while the cases with intestinal parasite infection and allergic diseases had serum IgE level at 1924 IU/ml. However in the same study, in 24 cases (%32.85) with *G. lamblia* infection of the group with only intestinal parasite infection had no increase in serum IgE levels (11). There was significant increase of total serum IgE levels in 1233 cases with giardiasis, compared to the control group in a study in Cuba. Assessment of specific IgE levels in serum is more effective (12). Total serum IgE levels were elevated (<1199 IU/ml) in children with *G. lamblia* infection in Venezuela (13). Giardinin, a protein of *G. lamblia* was convicted to be the cause of the increased total serum IgE levels in the cases with *G. lamblia* infection in Cuba (14). The results of our study as IgA levels were in normal ranges in both SG and CG, IgE levels were over normal range ($p<0.05$) in 12 cases (38.75%) of SG and in 8 cases (16%) of CG. Serum IgG levels were under normal range in 12 cases (38.7%) of SG and in only one case (2%) of CG and IgM levels were increased in 10 cases (32.25%) of SG and in 3 cases (6%) of CG ($p<0.05$), were in correlation with the results of the studies mentioned above.

CRP as an effective acute phase reactant is synthesized in hepatocytes and increases significantly in infections. Against 9 of 67 cases with protozoan infection with increased CRP levels, none of the 30 cases with helminth infection had any increase in CRP levels in a study in İzmir. On the other hand, the possible link between *G. lamblia* infection and CRP levels is interesting because of the 64 cases with *G. lamblia* infection among the 67 cases with protozoan infections (6). In our study, CRP levels found over normal range in 8 cases (25.8%) of SG and in 2 cases (4%) of control group are in correlation with the results above ($p<0.05$).

In conclusion, there may be a correlation between giardiasis and elevation in the serum IgE, IgM and CRP and decrease in IgG levels. However, for further investigations specific components of IgA should be preferred to total serum IgA

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