

THE ASSOCIATION BETWEEN HUMAN GIARDIASIS AND ABO AND RHESUS BLOOD GROUPS

Lazim H. Al-Taie, *Kasim Sh. Al-Mayah, **Abdul-Jalil Thweni

Department of Microbiology, College of Medicine, University of Al-Nahrain. Baghdad-Iraq.

*Research Center, College of Medicine, University of Al-Nahrain. Baghdad-Iraq.

** University of Al-Esraa. Amman-Jordan

Abstract

Giardia lamblia is considered as one of most parasites that causes diarrhea in human. The present study aimed to investigate the relationship between giardiasis and ABO and Rhesus blood groups among local population. ABO and Rhesus blood groups were determined for 94 patients who gave positive result for *Giardia* infection. The ABO and Rhesus blood groups of these patients were compared with those of 196 non infected patients.

The frequency of ABO and Rhesus blood groups in infected patients does not differ significantly from those in non infected patients. ABO and Rhesus blood groups may not interfere with *Giardia* infection.

العلاقة بين الإصابة بطفيلي *Giardia lamblia* وفصائل الدم وعامل الريسس في

الإنسان

لازم حميد كايد، *قاسم شرهان المياح، **عبد الجليل ثويني

قسم الأحياء المجهرية، كلية الطب، جامعة النهرين. بغداد-العراق.

*وحدة الأبحاث الطبية، كلية الطب، جامعة النهرين. بغداد-العراق.

** جامعة الإسراء. عمان - الأردن.

الخلاصة

يعد طفيلي *Giardia lamblia* من أهم مسببات الإسهال في الإنسان. هدفت هذه الدراسة إلى استقصاء العلاقة بين الإصابة بهذا الطفيلي من جهة وفصائل الدم وعامل الريسس من جهة أخرى في السكان المحليين. حددت فصائل الدم وعامل الريسس في 94 مرضاً ممن أعطوا نتائج إيجابية للإصابة بطفيلي *G. lamblia* وقورنت هذه النتائج مع فصائل الدم وعامل الريسس لـ 196 مريضاً غير مصاب بالطفيلي. أشارت النتائج إلى إن تكرار فصائل الدم وعامل الريسس في المرضى المصابين بالطفيلي لا يختلف معنوياً عما هو عليه في أقرانهم غير المصابين مما يدل على إن فصائل الدم وعامل الريسس ليس لها تأثير في الإصابة بهذا الطفيلي.

Introduction

Giardia lamblia (Synonymous *Giardia intestinalis* or *Giardia duodenalis*) accounts for a considerable proportion of diarrheal illness world-wide [1], and infects more than 20 million people [2]. The disease becomes chronic in

approximately 15% of infected individuals [3]. Most recent report about intestinal parasites in Baghdad province revealed that 4.9% of the city population (of different ages) who have gastrointestinal complains are infected with this

parasite with highest prevalence among children below 10 years old [4].

It is well known that cell mediated and humeral immune response play a major role in protection of the body against the infection [5]. Furthermore, protein-calorie malnutrition has been associated with prolonged giardiasis in tropical countries [6] perhaps because of co-existing suppression of immune mechanism. Interestingly, some genetic factors may participate in this protection, since some studies with *Giardia muris* in mice shows the potential importance of these factors [5]. The role of blood group A as predisposing factor for *Giardia* infection is still a controversial issue. Many reports have showed a statistical significant surplus of blood group A and giardiasis patients [7, 8, 9, 10] whereas, other studies did not find such correlation [5, 11, 12]. This study was conducted to investigate this relationship among local population of Baghdad city.

Patients and Methods

Patients with different gastrointestinal complains attending outpatient clinic of Al-Karama Teaching Hospital (Baghdad) during the period from January 1999 to November 2000 were used for this study. Each patient was examined clinically, and a direct smear was made from a stool sample and examined microscopically. Ninety four patients (median age of 28, range = 1- 58 year) from either sex who gave positive result for *Giardia* infection (cyst and/or trophozoite) were chosen. ABO and Rhesus blood groups were determined by standard haemagglutination technique (ANTI-ABO monoclonal DiaMond Jordan slide and tubetest usein Vitro Diagnostic Kit).

The ABO and Rhesus blood groups of these patients were compared with those of 196 patients who attended the same hospital but without any gastrointestinal complain.

The Chi square was used to compare the frequency of ABO and Rhesus blood groups between infected and non infected population. Statistical probability of $p < 0.05$ was considered significant.

Results and Discussion

Table (1) Shows the frequency of ABO and Rhesus blood group among infected an non infected population. The frequency of ABO blood groups in patients with giardiasis does not differ significantly from population data. Twenty six patients were typed as blood group

A (expected 29), 27 as B blood group (expected 20), 9 as AB blood group (expected 6) and 32 as O blood group (expected 39). Also, there was no significant difference in the frequency of Rh-factor between infected and non infected population, as 75 patients were typed as Rh positive (expected 77).

Table 1: Frequency of ABO and Rhesus blood groups among infected and non infected population with *Giardia lamblia*

Blood group/ Rhesus factor	Infected		Non infected	
	No.	%	No.	%
A	26	27.7	64	32.7
B	27	28.7	36	18.4
AB	9	9.6	8	4.1
O	32	34.0	88	44.9
Rh ⁺	75	79.8	163	83.2

There is no doubt that genetic factors can play a major role in the protection of the body against some protozoal infection. This role of genetic factors is especially obvious in blood parasites; for example, Duffy blood group system confers resistance of RBCs to penetration by *Plasmodium vivax* [13], and the presence of significance linkage of symptomatic visceral leishmaniasis to a region of chromosome 22q12 (LOD score 3.5) in a genome [14]. This importance of genetic factor is not so distinct in intestinal protozoa.

The suggested explanation of the predilection of *Giardia lamblia* to infect group A population is the similarity between *Giardia* surface antigen and A antigen of RBC [15]. This explanation will no longer be valid when we know that *Giardia lamblia* has the ability to vary it's surface protein which is some kind of genetic variation [16].

Despite the absence of significance difference in frequency of ABO between infected and non infected populations in the present study, yet we can see an increase in number of AB and B groups and decrease in number of A and O groups. On the other hand, Giboda and Bernasovsky [17] in Slovakia reported a tendency towards an increased frequency of group B in *Giardia* infected gipsy children and towards group A of non-gipsy children, but the differences were not statistically significant.

These variations in results might indicated that there is no correlation between ABO and Rhesus blood groups and *Giardia lamblia* infection.

References

1. Taylor, D. N.; Houston, R. and Shlim, D. R. **1988**. Etiology of diarrhea among travelers and foreign residents in Nepal. *J. Am. Med. Assoc.*, **260**: 1234 – 1248.
2. Chou, S.; Li, E.; Shea-Donohue, T. and Singer, S. M. **2000**. Tumor necrosis factor α contributes to protection against *Giardia lamblia* in mice. *Parasit. Immun.*, **29**: 367 – 374.
3. Adam, R. D. **1991**. The biology of *Giardia* spp. *Microbiol. Rev.*, **55**: 706 – 732.
4. Al-Taie, L. K. **2009**. Prevalence of intestinal parasitic infections in Baghdad city. *J. Fac. Med. Baghdad*, **51**: 187. 191.
5. Roberts-Thomas, I. C.; Mitchel, G. F.; Andres, R. I.; Tait. B. D.; Kerlin, P.; Kerr-Grant, A. and Cavanagh, P. **1980**. Genetic studies in human and murine giardiasis. *Gut*, **21**: 397 – 401.
6. Mata, L. J.; Jimenez, F. and Cordon, M. **1972**. Gastrointestinal flora in children with protein-calorie malnutrition. *Am. J. Clin. Nutr*, **25**: 1118-1126.
7. David, T. J. and William, A. P. **2006**. Markell and Voge's Medical Parasitology, 9th ed. Saunders Elsevier, New York, 68 – 76.
8. Shafie, R.; Jahani, M. R.; Rezaeian, M.; Amini, M.; Metvayi, A. R.; Mirahmadi, H.; Ebrahimi-Daryani, N. and Keramati, M. R. **2009**. *Giardia lamblia* and *Helicobacter pylori* coinfection. *Iranian J. Publ. Health*, **38**: 127 – 130.
9. Barners, G. L. and Kay, R. **1977**. Blood group in giardiasis . *Lancet*, **1**: 808.
10. Zisman, M. 1977. Blood group A and giardiasis. *Lancet*, **2**: 1285.
11. Baqai, R. **1997**. Incidence, pathogenesis, and serodiagnosis of *Giardia lamblia* infection in Karachi, Pakistan. PhD thesis. University of Karachi.
12. Jokippi, L. and Jokippi, A. M. M. **1980**. Is predisposition to giardiasis associated with blood group? *Am. J. Trop. Med. Hyg.*, **29**:5-7.
13. Marcela, C. and Anatole, L. **1999**. Antigens in human blood. In: Hoffbrand, A. V.; Lewis, S. M. and Tuddenham, E. G. (eds.), *Post Graduate Hematology*. Fourth Edition. Butterworth Heinemann, Boston, USA. pp412-413.
14. Bucheton, B.; Abel, L. and El-Safi, S. **2003**. A major susceptibility locus on chromosome 22q12 plays a critical role in the control of kala-azar. *Am. J. Hum. Genet.* **73**:1050–1060.
15. Sotto, A.; Cabrora, S.; Castro, J.; Borbolla, E. Gonzalez, N. and Pomar, F. **1983**. Blood groups in recurrent giardiasis. *Lancet*, **322**: 1312 – 1313.
16. Nash, T. E. **1997**. Antigenic variation in *Giardia lamblia* and host immune response . *Phil. Trans. Roy. Soc. Lond. B.*, **352**: 1369 .1375.
17. Giboda, M. and Bernosovsky, I. **1983**. Giardiasis and ABO groups. *J. Hyg. Epidemiol. Microbiol. Immunol.*, **27**: 461 – 464.