

GIARDIALAMBLIA EFFECT ON SOME BIOCHEMICAL AND BLOOD PARAMETERS IN CHILDREN, DIYALA CITY/IRAQ.

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Abstract

Giardia lamblia is a pathogenic protozoan parasite of medical and evolutionary importance and its very important causative agent of diarrhea and other symptoms in human. The objective was to demonstrate the effect of Giardia lamblia infection on some biochemical parameters in infected children and who diagnosed with diarrhea in the children hospital and other hospitals in Diyala city, Iraq during the period 1 February to 30 October, 2019. (300) feces samples were examined for infants patients with diarrhea in (0-5) years, the examination of these samples demonstrated positive results with G. lamblia 108/200 (36%), the biochemical tests and hematological values of the patients demonstrated non-significant ($P < 0.05$) differences in Hb level, PCV and significant ($P < 0.05$) elevation in WBC count in the infected infants children to the control group, the biochemical study demonstrated decrease in the concentration of iron and ferritin level and catalase (CAT) with significant ($P < 0.05$) increase in Malondialdehyde (MDA) in patients compared to the control group.

Keywords: *Giardia lamblia; oxidative stress; blood parameters.*

Introduction

Diarrhea a production of stools of abnormally loose consistency happens if large and small intestine does not complete the process of absorption of electrolytes (calcium, sodium, potassium, etc.) and the water from contents that located in its lumen [1-2]. Diarrhea is a significant cause for morbidity in adults and children patients. the occurrence and mortality that resulting by diarrhea in underdeveloped countries is greatest especially in children [3-4].Diarrhea usually results by prolonged infection as parasites, frequent infection as *C. difficile* or non-infectious reasons as lack of lactase [5]. *Giardia lamblia* is a unicellular microorganism (flagellated parasite) [6]. It is believed to be one of the most causes of diarrhea in children [7-8] and adults [9]. Giardiasis disease is distinguished by diarrhea that appears watery, nausea with vomiting and lead to weight loss. These various symptoms appear after 6–15 days from infection [10], and the clinical effect is appear potent in (8-15 years) children. The treatment of Giardiasis is generally by using metronidazole drug or other nitroimidazoles drugs [11-12].The infection percent in infected children with asymptomatic has been approximately 8% to 30% in developing countries and 1-8% in industrialized countries [13-14]. So, the aim of current study is demonstrate the effect of *Giardia lamblia* infection on some biochemical parameters in children with diarrhea.

Materials & Methods

The blood sampling and infected children feces samples were collected from different hospitals: Children's Hospital, Azadi Teaching Hospital, Al-Jumhuri Hospital and Public Health Laboratory between 1 February to 30 October 2019. (300) samples of feces were examined for infant's patients with diarrhea in (0-5) years, the examination of these samples showed positive infection with *G. lamblia* 108/200 (36%). Also, 50 blood sampling from healthy children as control group.

Feces examination

The feces samples were examined under macroscopic to ensure that the samples do not have any other parasites; the microscopic diagnosis was followed by the method of formol-ethyl acetate concentration [15].

Measurements

Hematological parameters

Hb (mg/dl, PCV (%) and WBC counts ($\times 10^3$) were done by using Colter device (MODEL GFA-7000 CELL-DYN/Germany) according to procedure of Manufacture Company.

Iron and S. Ferritin levels

Iron levels (ug/dl) were obtained by utilizing Diagnostic kit (French company Biolabo). Ferritin levels (ng/ml) were measured the automated quantitative test by utilizing vidas machine using vidasbiomerieuxfrance.

MDA and catalase

MDA levels (mmol/l) were obtained according to colorimetric reaction by using thiobarbituric acid (TBA) [16]. Catalase levels (mmol/l) were obtained in this study according to procedure of Biovision-USA kits.

Statistical analysis

The data of this study were analyzed by utilizing program SPSS Version 21. The descriptive analyses to found the means, frequencies of data were performed on the blood variables. ANOVA analysis was done and a P-value of < 0.05 was used as statistical significant.

Results

Hematological parameters

The findings demonstrated non-significant change in concentration of hemoglobin in infected children with *G. lamblia*. Also there is non-significant ($P < 0.05$) difference in percentage of PCV in infected children with *G. lamblia* compared with control group. While, WBC count demonstrated significant ($P < 0.05$) increase in infected children with *G. lamblia* as shown in figure (1).

Iron and S. Ferritin levels

The findings demonstrated significant ($P < 0.05$) decrease in concentration of iron in infected children with *G. lamblia*. Also there is significant reduce in concentration of serum ferritin in infected children with *G. lamblia* as shown in figure (2).

MDA and catalase

The findings demonstrated significant ($P < 0.05$) increase in levels of MDA in infected children with *G. lamblia* compared with control group. While, there is significant ($P < 0.05$) decrease in levels of catalase in infected children with *G. lamblia* compared with control group as shown in figure (3).

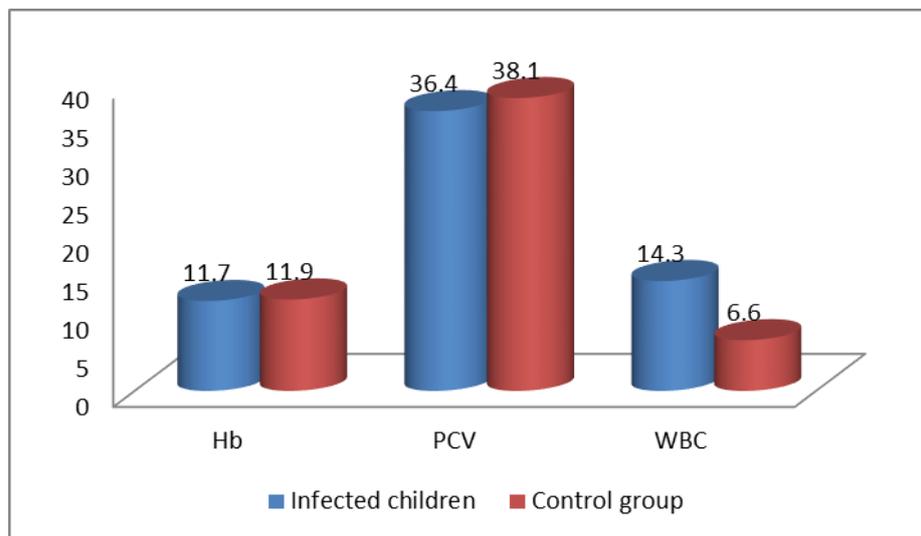


Figure (1): levels of Hb, PCV and WBC count in both groups

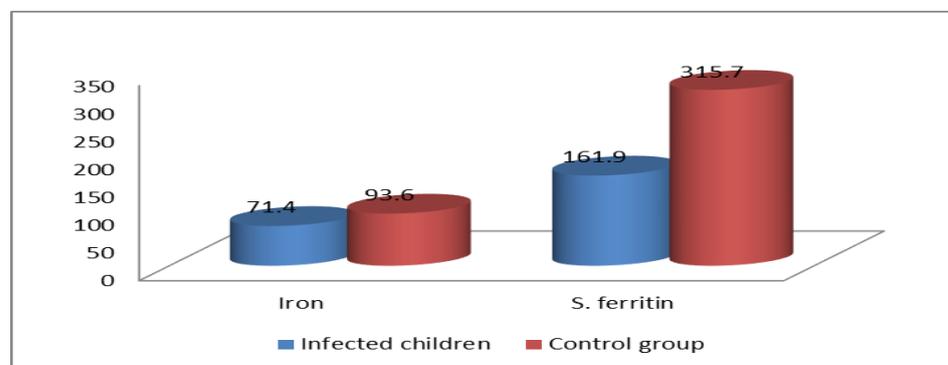


Figure (2): levels of iron and ferritin in both groups

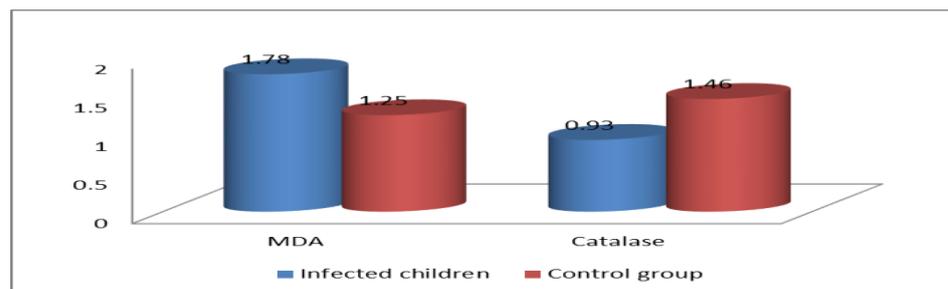


Figure (3): levels of MDA and catalase in both groups

Discussion

The current findings demonstrated non-significant change in the concentration of hemoglobin level, packed cell volume. Santos and Vituri [17] referred that no significant differences in the hemoglobin levels between giardiasis and control groups. While, eosinophil percent show very significant difference between giardiasis and control groups (0-18 years old) that is in agreement with present findings. Otherwise, the current findings demonstrated decrease in the concentration of iron and ferritin level in infected children compare with control group. Ertan et al [18], showed iron levels were $87.98 \pm 18.31 \mu\text{g/dL}$ in giardiasis group compared with $160.45 \pm 45.40 \mu\text{g/dL}$ control group. They suggest that the levels of iron reduced during giardiasis disease due to malabsorption. The present results show iron and ferritin significantly decrease in infected children. The reduce in iron level in an infected children may be due to *G. lamblia* pathogenicity dependent on correlation between concentration of iron and *G. lamblia* adhesion on columnar epithelial cell or resulting to malabsorption [19]. The present findings revealed an increase in MDA level and a decrease in catalase in infected children compared to control group, this finding is consistent with previous studies that have linked oxidative/ antioxidant agents to happening of various parasitic species, like a study of Abd AlWahab et al. [20], that was performed on 100 infected patients with different various parasites, including 9 people infected with the giardia parasite, through which they found that infection with giardia caused MDA levels increase and reduced in erythrocytes Superoxide dismutase levels compared with control group.

Reference

1. Schiller LR, Sellin JH. Diarrhea. In: Feldman M, Friedman L, Brandt LJ, eds. Sleisenger & Fordtran's Gastrointestinal and Liver Disease, 8th ed. Philadelphia, PA: WB Saunders Co., 2006:159- 186.
2. Camilleri M.; Joseph H. S. and Kim E. B. (2017). Pathophysiology, Evaluation, and Management of Chronic Watery Diarrhea. *J. Gastro.* 152(3): 515–532.
3. Aranda-Michel, J. and Ralph A. G. (1999). Acute Diarrhea: A Practical Review. *Am J Med.* 106:670 – 676.

4. Prado V, O’Ryan ML. Acute gastroenteritis in Latin America. *Infect Dis Clin of North Am.* 1994;8:77–106.
5. Feldman R. and Banatvala N. (1994). The frequency of culturing stools from adults with diarrhea in Great Britain. *Epidemiol Infect.* 113:41–44.
6. Adam, R.D. (2001). Biology of *Giardia lamblia*. *Am. Soc. Microbio. J.* 14(3): 447–475.
7. Majeed, H. M., Noomi, B. S., & AL-Samarraie, M. Q. (2020). DETECTION of SOME VIRULENCE FACTORS and ANTIBIOTIC SENSITIVITY TEST of *ENTEROCOCCUS FAECALIS* ISOLATED FROM SHEEP by MULTIPLEX PCR. *European Journal of Molecular & Clinical Medicine*, 7(9), 68-74.
8. Addy P.; Antepim G. and Frimpong EH. (2004); Prevalence of pathogenic *Escherichia coli* and parasites in infants with diarrhoea in Kumasi, Ghana. *E Afr Med J.* 81(7):353-357
9. Haider, S. S.; Sikandar K.S.; Aisha I.; Shahana U.K.; Shahzad M. and Haroon A. (2013). Giardiasis in focus: review. *Pak. J. Health Research*, 1(1): 17-25
10. Al-doury, S. M., Al-Nasrawi, M. A., & AL-Samarraie, M. Q. (2019). The molecular sequence of *Giardia lamblia* by using (tpiA) and (tpiB). *International Journal of Drug Delivery Technology*, 9(03), 374-377.
11. Buret, A. G. Mechanisms of epithelial dysfunction in giardiasis. *Gut* 56, 316–317 (2007).
12. Ortega, Y. R. and Adam, R. D. *Giardia*: overview and update. *Clin. Infect. Dis.* 25, 545–549 (1997).
13. Hooshyar H.; Rostamkhani P.; Arbabi M. and Delavari M. (2019). *Giardia lamblia* infection: review of current diagnostic strategies. *Gastroenterol Hepatol Bed Bench.* 12(1):3-12.
14. Smith HV. and Mank TG. (2011). Diagnosis of human Giardiasis. In: Lujan HD, Svard S, Eds. *Giardia a model organism*. New York: Springer-Verlag. Pp353-74.
15. Villacorta, I. and Peeters, J.E. (1991). Efficacy of halofuginone lactate against *Giardia* in calves. *Antimicrob Agents Chemother.* 35: 283–287.
16. Abdul kareem EA.; Abdul Monaim HM. and Rafah R.H. (2016). Biochemical and histological study of the effect of sterol extract from

- pistachio on the level of antioxidants in the liver tissue green. *J. Pur. Sci.*, 5(21): 82-87.
17. Santos, J. I. and Vituri, C. L. (1996). Some hematimetric findings in human *Giardia lamblia* infection. *Rev. Inst. Med. trop.* 38(2): 91-95.
 18. Mustafa, M.A & AL-Samarraie, M.Q . (2020) .SECONDARY MENOPAUSE and its RELATIONSHIP to HORMONAL LEVELS AMONG WOMEN at SALAH AL-DIN HOSPITAL . *European Journal of Molecular & Clinical Medicine* . Volume 7, Issue 09, PP 96-104.
 19. Mustafa, M.A., AL-Samarraie M.Q., Ahmed M. T. (2020). Molecular techniques of viral diagnosis, *Science Archives*, 1(3), 89-92
<http://dx.doi.org/10.47587/SA.2020.1303>
 20. Abd Al-Wahab SA, Mahdi JK, Mahdi N K (2009) Oxidative stress among patients with some different parasitic infections. *The Medical Journal of Basrah University*, 27(2):66-70.