

Study of some Biochemical parameter in patients infected with *Giardia lamblia*

Ali Hassan Abood

Faculty of sciences / university of Kufa, Iraq/ Department of biology

Abstract:

The study was designed to conducted sixty out patients and thirty healthy people to investigate the impact of *Giardia lamblia* infection on serum levels of lactoferrin, prostaglandin E2, iron and ferritin in patients infected with this intestinal parasite in compared with healthy group, Who've visited Al-Sadder medical city and Al-Hakeem Hospital in Al- Najaf province all through the duration from October 2016 until April 2017. The results displayed significant increase ($P < 0.05$) in levels of prostaglandin E2. While decrease in levels of lactoferrin, iron and ferritin in patients infected with *G. lamblia* in compared to control group.

Keywords: Giardiasis, lactoferrin, prostaglandin E2, iron, ferritin, Al-Najaf

INTRODUCTION

Giardia regularly is the most intestinal parasite worldwide. It may motive acute or chronic diarrhea, contributing to food status deficiency, or stay without symptoms (Carvalho-costa, 2007 and Ali, 2003). Giardiasis is an intestinal disease because of a microscopic parasite this is determined global, specially in regions with bad sanitation and risky water. *Giardia* infection is marked with the aid of stomach cramps, bloating, nausea and watery diarrhea. *Giardia* infections normally remedy within some weeks. however you could have intestinal problems long after the parasites are gone, it can present with excessive harm of the small intestine with subsequent consequences on nutrient absorption (Oberhuber *et al.*, 1997). several pills are usually powerful towards giardia parasites, however not anybody responds to them. Prevention is your nice protection. (John, 2007).

G. lamblia is satisfactory known as the organism chargeable for "Beaver Fever" or "Backpacker's Diarrhea" because of its proliferation in streams and rivers, *G. lamblia* can absolutely spoil the surface of the mucosal barrier. The destruction of the small gut's barrier reasons infection, discount of surface place for nutrient absorption, lactose and sucrose intolerance, and lack of ability to digest fats and oils. it could additionally result in the formation of deep wallet, in which mucus plugs shape, developing an environment that contains and protects pathogens. Another effect of this disease is death, wherein food actions through the small gut too speedy and consequently isn't completely digested. The undigested food dumps at once into the huge bowel, which creates protein putrefaction and a fertile surroundings in which yeast, fungus, and other unwanted microorganisms proliferate. (Wright, 2012).

The mediator PGE2 is formed through inflammatory process, and elevation levels of PGE2 intermediate several of the cardinal lineaments of inflammation, such as pain, edema, and fever (DeWitt, 1991). On the other hand, many studies advise that as well as to its pro inflammatory effects, PGE2 may additionally exert strong anti-inflammatory actions like PGE2 inhibition the formation of pro inflammatory cytokines and increase the formation of anti-inflammatory cytokines (Kambayashi, 1995; Stresemann, 1994). In addition PGE2 increase humoral and

Th2-type immune responses and suppression Th1-type immune responses (Harris, 2002). consequently, PGE2 is not simply regard as a proinflammatory molecule but also as immune responses modulator.

SPECIMEN PROCESSING

Newly voided stool samples were handled and analyzed microscopically utilizing X40 objective lens for detecting the intestinal parasites as depicted by Paniker (1989). Ten X40 objective target fields of the stool slide were analyzed before a smear was considered negative.

The Kits

The biomarkers in the current Study were estimated by Eliza Kits such as Human prostaglandin E2 (PGE2) ELISA/ Elabscience/ Bulgaria (catalogue number E-EL-0034), Human Lactoferrin ELISA/ Elabscience/ Bulgaria (catalogue number E-EH-0025), Ferritin ELISA/ Monobind/ USA (product Code: 2825-300) and spectro Kits such as Iron/ Biolabo/ France (02160Maizy France).

Statistical analysis

The results were analyzed statistically by utilizing Graph pad prism software packages for Windows (5.04, Graph pad software Inc. USA). The Information are exhibited as the mean \pm standard error (SE) and analyzed by one-way analyses of variance (one-way ANOVA), when the probability less than 0.05 (p -value < 0.05) the result was regard as statistically significant.

RESULTS

Serum Markers

The statistical analysis of data viewed a significant decrease ($P < 0.05$) in serum Lactoferrin, ferritin and iron concentration of patients with *G. lamblia* infection (14.83 ± 0.301), (124.873 ± 0.064) and (44.631 ± 0.083) respectively compared to the control group (20.34 ± 0.412), (326.312 ± 0.132) and (131.82 ± 0.710) respectively, while significant increase ($P < 0.05$) in serum Prostaglandin E2 concentration of patients with *G. lamblia* infection (46.092 ± 0.561) compared to the control group (15.731 ± 0.098), as seen in Figure (1), (2), (3) and (4).

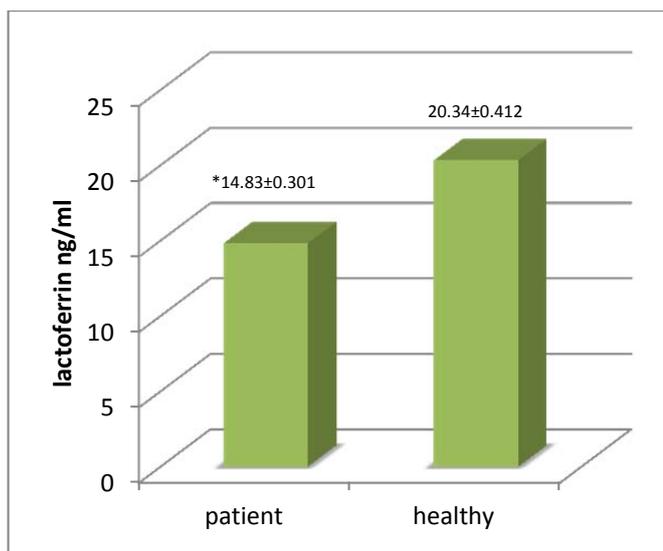


Figure 1: Serum Lactoferrin in Healthy Control Group and in Patients Suffering from *Giardia lamblia* Infection.

*Significant difference (P<0.05) between control group and patients.

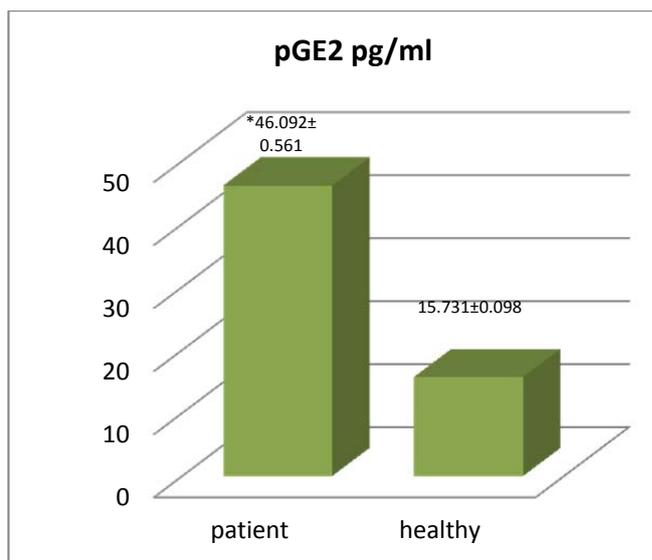


Figure 4: Serum prostagldin E2in Healthy Control Group and in Patients Suffering from *Giardia lamblia* Infection.

*Significant difference (P<0.05) between control group and patients

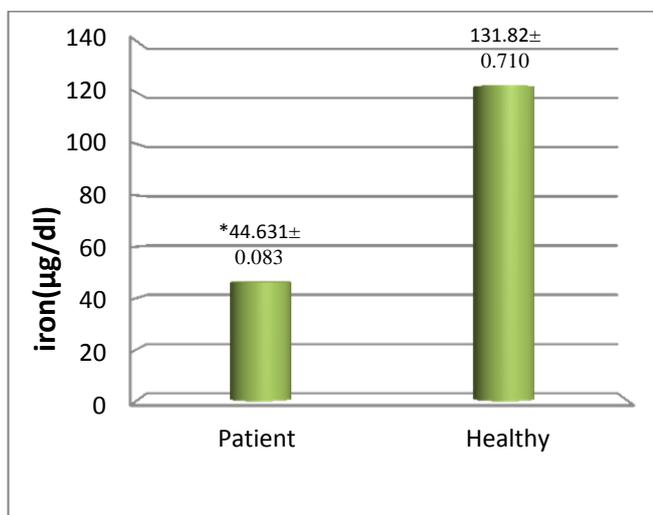


Figure 2: Comparison between Serum Iron in healthy Group and Patients Suffering from *Giardia lamblia* Infection.

*Significant difference (P<0.05) between control group and patients.

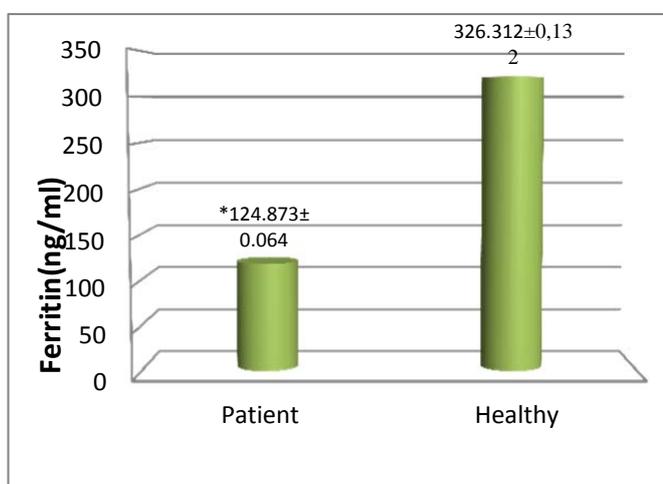


Figure 3: Serum Ferritin in Healthy Control Group and in Patients Suffering from *Giardia lamblia* Infection.

*Significant difference (P<0.05) between control group and patients.

DISCUSSION

The result showed a significant decrease in the level of Lactoferrin, iron and ferritin in serum of individual suffering from *G. lamblia* infection compared to control group, this due to significant effect of giardiasis on iron malabsorption as it infects the duodenum. The main site of iron absorption another possible reason for this significant change may be due to the possible high load of parasites in the intestine (Monajemzadeh and Monajemzadeh, 2008). The result of study agrees with the study of (Ertan *et al.*, 2002; Abou-shady *et al.*, 2011) who showed decreased in both iron absorption and iron levels in children suffering from giardiasis in two middle east countries (Turkey and Egypt) respectively due to malabsorption of the iron these conclusion were also suggested in a rat model (Cheeramakara *et al.*, 2004).

Sackey (2001) show over on quarter 26.4% of the children were identified as having iron deficiency anemia also Aini *et al* (2007) showed through his study among children from endemic areas of intestinal parasitic infection that the population was found to have iron deficiency and appeared to be the dominant cause of anemia.

In the El-sahn (2003) study, parasite infections were insignificantly associated with anemia which was found in only 12.3% of girls infected with *G. lamblia* and in the De morais (1996) study malabsorption of iron was reported in the children with symptomatic giardiasis, however asymptomatic giardiasis did not affect the intestinal absorption of iron but Dauquah *et al* (2014), showed in endemic setting there was no evidence that giardia infection impair iron status. The decrease in serum level of Lactoferrin and ferritin in patients infected with giardiasis compared with control group may be due to depletion in iron stores in body as result of chronic giardia infection where the mean concentration of Lactoferrin and ferritin reflects the iron body stores. This result corresponds with study of Veenemans *et al.* (2011) that showed decrease in

ferritin level in patient with *G. lamblia* compared with control group.

Also Botero-Garces *et al.*, (2009) showed that level of ferritin and iron in both human and animals are significantly decreased in giardiasis infection. Study achieved by Olivares *et al.* (2004) showed decrease level of ferritin and iron in individual infected with *G. lamblia* as consequence of harm to the small intestine mucosa. In other intestinal parasitic infection showed decrease in ferritin level in children infected with *E. histolytica* Al- warid *et al.* (2013). Also Le *et al.* (2007) who showed that ferritin was in it is lower level in children infected with some intestinal parasites such as *Ascaris* and *Trichuris*. Adebara *et al.* (2011) showed decrease level of ferritin in children with intestinal helminthiasis due to exhausted iron store.

Also the study revealed a significant increase in the serum level of prostaglandin E2 in patients infected with *G. lamblia* compared to control group, this result may be due to that PGE2 is a potent immunomodulator, with both stimulatory and inhibitory effects (Celentano *et al.*, 1995) or might be prostaglandins may add to the pathogenesis of secretory diarrhea by changing chloride take-up and fluid secretion, they may likewise up manage mucin creation from epithelial cells, which can shield the host intestinal mucosa from being infected with *Cryptosporidium parvum* by meddling with adhesion of the parasite. (Maunder *et al.*, 1992). this outcome concurs with study of Dausgchies. & Joachim (2000), were uncovered that PGE2 formed by other helminthes and protozoan parasites, which is incited by cytokines as inflammatory mediators (Harris *et al.*, 2002).

REFERENCE

- [1] Baldursson, S., Karanis, P., 2011. Waterborne transmission of protozoan parasites: Review of worldwide outbreaks – an update 2004–2010. *Water Res.* 45, 6603– 6614
- [2] Celentano, A.M., Gorelik, G., Solana, M.E., Sterin Borda, L., Borda, E., Gonzalez Cappa, S.M., 1995. PGE2 involvement in experimental infection with *Trypanosoma cruzi* subpopulations. *Prostaglandins* 49, 141–153.
- [3] Dausgchies, A., and A. Joachim. 2000. Eicosanoids in parasites and parasitic infections. *Adv. Parasitol.* 46:181.
- [4] DeWitt, D. L. 1991. Prostaglandin endoperoxide synthase: regulation of enzyme expression. *Biochim. Biophys Acta* 1083: 121–134.
- [5] Faustini, A., Marinacci, C., Fabrizi, E., Marangi, M., Recchia, O., Pica, R., Giustini, F., LaMarca, A., Nacci, A., Panichi, G., Perucci, C.A., 2006. The impact of Catholic Jubilee in 2000 on infectious diseases. A case–control study of giardiasis, Rome, Italy 2000–2001. *Epidemiol. Infect.* 134, 649–658.
- [6] Harris, S. G., J. Padilla, L. Koumas, D. Ray, and R. P. Phipps. 2002. Prostaglandins as modulators of immunity. *Trends Immunol.* 23: 144–150.
- [7] Kambayashi, T., C. O. Jacob, D. Zhou, N. Mazurek, M. Fong, and G. Strassmann. 1995. Cyclic nucleotide phosphodiesterase type IV participates in the regulation of IL-10 and in the subsequent inhibition of TNF- α and IL-6 release by endotoxin- stimulated macrophages. *J. Immunol.* 155: 4909–4916.
- [8] Kourenti, C., Karanis, P., Smith, H., 2007. Waterborne transmission of protozoan parasites: A worldwide review of outbreaks and lesson learnt. *J. Water Health* 92, 361–365.
- [9] Maunder S, Das KM. Immunocytochemical localization of vasoactive intestinal peptide and substance P in the colon from normal subjects and patients with inflammatory bowel disease. *Am J Gastroenterol* 1992;87(2):176–181. [PubMed: 1370872].
- [10] Naelah, A.A., Mohammed, A.K.M., Rohela, M., Lim, Y.A.L., 2011. Factors associated with high prevalence of intestinal protozoan infections among patients in Sana'a City, Yemen. *PLoS One* 6, e22044.
- [11] Pickering LK (1985). Problems in diagnosing and managing giardiasis. *Pediatr Infect Dis* 4:S6–S10.
- [12] Prado, M.S., Strina, A., Barreto, M.L., Oliveira-Assis, A.M., Paz, L.M., Cairncross, S., 2003. Risk factors for infection with *Giardia duodenalis* in pre-school children in the city of Salvador. Brazil. *Epidemiol. Infect.* 131, 899–906.
- [13] Rodríguez OL, Hagel I, González Y, Roque ME, Vasquez N, López E, Di Prisco MC (2004). Secretory IgA antibody responses in Venezuelan children infected with *Giardia duodenalis*. *J Trop Pediatr* 50:68–72.
- [14] Strassmann, G., V. Patil-Koota, F. Finkelman, M. Fong, and T. Kambayashi. 1994. Evidence for the involvement of interleukin 10 in the differential deactivation of murine peritoneal macrophages by prostaglandin E2. *J. Exp. Med.* 180:2365–2370.
- [15] Wolfe MS (1984). Symptomatology, diagnosis and treatment. In: Erlandsen SL, Meyer EA (eds) *Giardia and giardiasis. Biology, pathogenesis and epidemiology.* Plenum, New York, pp 147–161.