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The Association Between Ferritin Concentration Within the Blood and Anti-Tissue Transglutaminase (tTG IgA) in Individuals with Celiac Disease

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Abstract: Celiac disease (CD) is a major public health concern across the world. because to the related comorbidities. The purpose of this study was to research the relationship among serum ferritin and anti-tissue transglutaminase (tTG IgA) in celiac disease patients. The research was conducted in Iraq-Muthanna over the course of one year from 2022 to 2023. The study included (50) (CD) patients and (50) healthy peoples (control). Patients with chronic disease were excluded. Blood was drawn from (patients and healthy) and tested for ferritin and (tTG IgA). the results showed serum ferritin revealed a negatively correlation with anti-tissue transglutaminase (tTG IgA) (Pearson's regression equal to 0.54) in patients with celiac disease . Finally, we can have been concluded from our study the iron storage is represented by ferritin is negatively correlated in patient with celiac disease and anti-tissue transglutaminase (tTG IgA).

Keywords: CD, Ferritin, tTG IgA, transglutaminase, Celiac

Introduction

A vulnerable person who has a lifelong sensitivity to gluten is said to have celiac disease (CD), an immune-mediated enteropathy (1). thought to as a childhood malabsorption syndrome, it is now understood to be a widespread disorder that can affect people of any age (2). A persistent immune-mediated inflammation of the small intestine known as celiac disease (CD) affects people who are genetically prone to it (3). Recent research has revealed a relationship between tTG titers and histological duodenal changes (4). Patients with CD had low levels of serum ferritin (5). The enzyme tissue transglutaminase previously identified as the main cause of CD (tTG) (6). They made a test called ELISA to check for antibodies in the blood that can help diagnose CD. They used a special type of tTG that is made from human genes (7). The main reason why people with celiac disease have low iron levels is because their body has trouble absorbing iron, this often leads to a type of anemia called iron deficiency anemia, which is commonly seen in people with celiac disease (8). Serum ferritin may be a sharp, stage reactant and a degree of press saves within the body (9). Ferritin is a way to measure both inflammation and the amount of iron in our bodies (10). Ferritin is important during the body's response to immediate threats by storing iron inside a protective covering made of ferritin protein (11). Tissue transglutaminase (tTG) antibody has been

used as a critical and specific ELISA based test in celiac disease. (12)

Material and Methods

The research was carried out over the course of one year from 2022 to 2023. The research comprised of 50 celiac disease patients who were being treated as outpatients. The study included (12 to 18 year-old) of celiac disease patients with Patients with chronic disease were excluded. using the immunoenzymatic technique enzyme-linked immune sorbet assay (ELISA).

(Human AccuBind Ferritin ELISA Kit) was accomplished according to the manufacturing company (Monobind Inc, USA). An ELISA test of Anti- tissue-transglutaminase (tTg) IgA antibody is based on the double antibodies technique, according to the instructions of manufacturing company (Aeskulisa). The data was tested for correlation between variables using the SPSS program, study p-value, and Pearson's regression.

Experimental design:

divided into two groups and as follows:

1- G1 : Fifty healthy peoples (12 to 18 year-old) (control).

2- G2 : Fifty celiac illness patients (12 to 18 year-old). Patients with persistent illness were avoided.

Statistical analysis:

Data is expressed as (mean $\pm$ SEM) and was analyzed statistically by two way ANOVA procedures. A variation was considered significant at ($p < 0.05$). The association between the various studied parameters was described using the correlation coefficient (r) test.

Result:

As indicated in figure (1): fifty patients voluntaries were enrolled during the study period suggestive of CD. Higher grade of injury was associated with increasing anti-tissue transglutaminase (tTg) IgA antibody (16.427 ± 0.2), and there is a significant decrease of the concentration of the serum ferritin in the CD patients (5.648 ± 0.1). When compared with a control group.

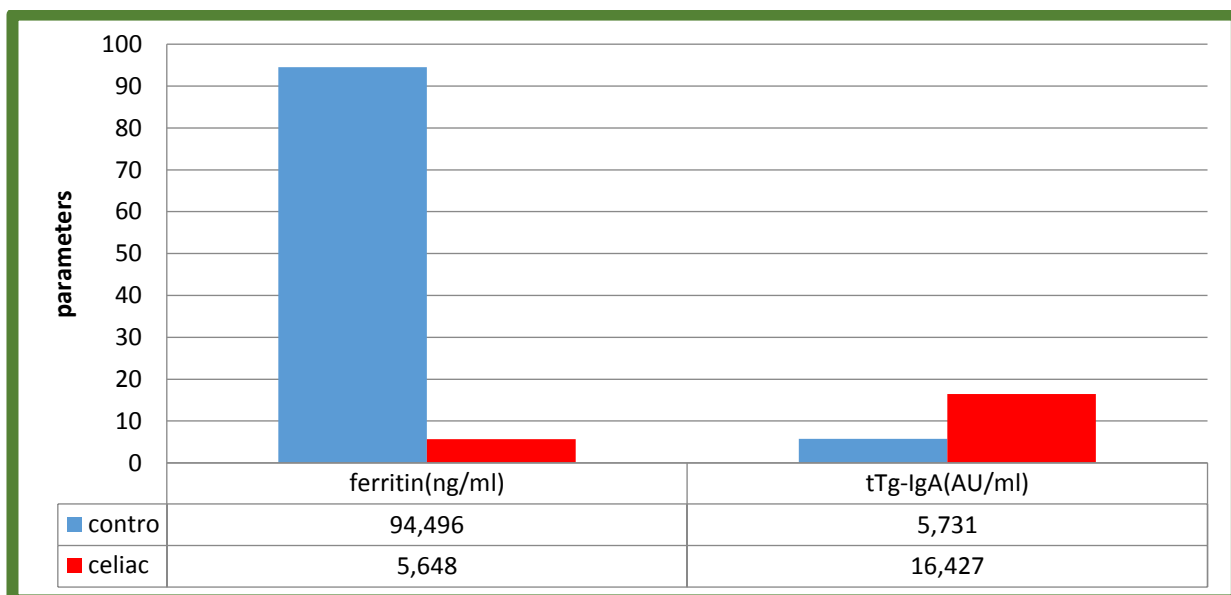


Figure (1): Measuring ferritin and tTg IgA concentration in celiac patients and the control group.

As indicated in table (1) and figure (2) :The correlation coefficient test (r) was used to describe how the different studied parameters are related to each other. The test showed the following results, there was found to be a strong correlation between (tTg) IgA antibody and the concentration of the serum ferritin in the CD patients ($r = 0.549$, $p = 0.001$).

Table (1) : Correlation plot showing a strong negative relationship ($r = 0.549$, $p = 0.001$) between ferritin and tTg-IgA concentration.

		<u>freten</u>	<u>tTG-IgA</u>
<u>ferritin</u>	Pearson Correlation	1	0.549**
	Sig. (2-tailed)		.000
	N	50	50
<u>tTG-IgA</u>	Pearson correlation	.549**	1
	Sig. (2-tailed)	.000	
	N	50	50
**. Correlation is significant at the 0.01 level (2-tailed).			

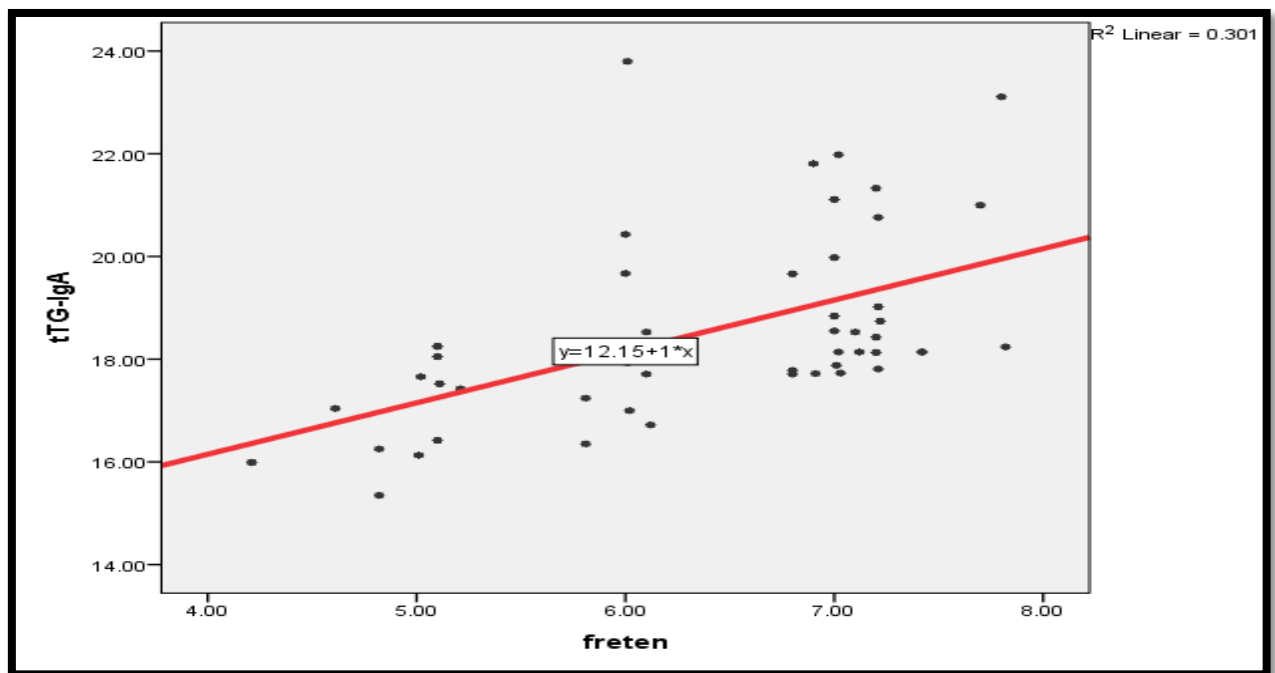


Figure (2): Correlation plot showing a strong negative relationship ($r = 0.549$, $p = 0.001$) between ferritin and tTg IgA concentration.

Discussion:

The amount of iron in the body is related to the levels of ferritin in the blood, and this can increase the chances of getting certain diseases (13). Iron deficiency explains why individuals with celiac disease cannot absorb iron into their bloodstream. Our findings agree with another study that found a connection between not having enough iron and having celiac disease (14). In another study, 11% of patients were found to have anemia, while 70% had low levels of ferritin (15). Since micronutrient insufficiencies because of irregular regulatory proteins that play a crucial role in press retention at the organize of the enterocyte, these results are consistent with the opinions of the researcher (16). Through different studies documented elevated or altered elevated serum anti-tissue transglutaminase, was found between CD patients and controls in our study, these results

are consistent with the opinions of the researcher (17) as indicated by his research levels of serum human tissue transglutaminase antibodies (anti-tTG) were significantly higher in patients than in controls, this research agrees with the previous study done by (18), which found that the level of anti-tTG antibodies increased after patients with controlled CD were given gluten. This research has shown that people with persistently high anti-tTG antibody levels are most likely to have problems with low serum ferritin, which can result in iron deficiency. which agree with the findings of the researchers (19). Our study showed that there was a correlation between (tTg-IgA) antibody and the concentration of the serum ferritin in the CD patients, serum ferritin and was significantly lower in CD patients than in healthy controls, our study found a negatively associated with anti (tTG-IgA) antibodies, having high levels of anti-tTG antibodies for a long time is strongly linked to having low ferritin levels. which agree with the findings of the researchers (17;19).

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