Nat.Volatiles&Essent.Oils,2021;8(5):8815-8819

Evaluation the effect of Toxoplasma gondii to the levels of pancreatic hormones in Women patients in Samarra city

[1] Sura Jamal Khalaf., [2] Abdullah Hussein Abdullah Al-Jubouri

[1,2] Department of Life Sciences, College of Education for Pure Sciences, University of Tikrit, Iraq.

Abstract

The current study included the collection of 100 samples from patients with diabetes and 50 samples from healthy women without diabetes, their ages ranged between (>20-50) years, and the Enzyme-Linked Immunosorbent Assay (ELISA) method was used. Where the results for the C-Peptid test showed that there was no significant difference between the two groups (Toxo-diabetes, which amounted to (0.953, 1.005), while the group (Toxo + diabetes) showed a significant difference, which amounted to (1.484) compared to the control (0.866), while the Preptin test for the group (Toxo) did not show a significant difference with the control group, reaching (84.11), while the two groups (diabetes - Toxo + diabetes) differed significantly with the control, reaching (100.73-100.31), respectively.The results of a test for Glucagon were that the three groups (Toxo - diabetes - Toxo) + diabetes) did not show a significant difference with the control group, which amounted to (212.8 - 199.6 - 186.3) respectively, as for the insulin test, the groups differed significantly and amounted to (22.32 - 22.78 - 36.52), respectively, with the control, which amounted to (15.99)..

Keywords*:* Type 2 diabetes mellitus , Pregnent women , Toxoplasma gondii , risk factor , Seroprevalence ELISA.

Introduction

Toxoplasma gondii is a parasitic protozoan that can infect many hosts of warm-blooded animals, including humans, causing the disease called toxoplasmosis, which is an obligatory endocellular parasit. (Remington et al 2000). In the tissues and sporozoites in the egg sacs shed by cats (Evering 2006) Diabetes is defined as a metabolic disorder resulting from several known reasons, including the lack of pancreatic insulin secretion, the presence of insulin resistance in the blood, and the poor response of cells to insulin (Holt 2010)]. The World Health Organization divides diabetes into three main types: type 1 diabetes, type 2 diabetes, gestational diabetes, and each type has causes and places of spread in the world, but all types of diabetes are similar and are caused by the insufficient production of the hormone insulin by the beta cells in the body. pancreas; And it occurs after infection with the parasite Toxoplasma gondii, its spread to many host organs [Harker 2015], including the pancreas. Studies have confirmed that infection of the pancreas in humans and animals causes Pancreatitis [Parenti 1996] It is not certain that infection of the pancreas with Toxoplasma leads to diabetes [Shin 2009], but some studies have shown that Chronic cases of toxoplasmosis may increase the risk of developing type 2 diabetes [Majidiani 2016]. On the other hand, the occurrence of Toxoplasma gongii in the pancreas may lead to a weakening of the pancreatic cells when the beta cells are affected. Insulin levels are affected. Damage to the thyroid gland is likely to lead to disruption of the nervous system and damage to pancreatic cells, which in turn increases the risk of diabetes.

Materials And Methods

•The study included the collection of 100 blood samples from people with diabetes and 50 blood samples from healthy people in Samarra General Hospital. Blood was drawn using medical syringes with a capacity of 5 ml, and then placed directly in a centrifuge (centrifuge) 3000 cycles / minute for 5 minutes and keeping serum Blood at a temperature of -20 C ^{o} where Toxoplasmosis was diagnosed using the immunological test (ELISA) using a ready-made kit (kit) for each test manufactured by the German company (Demeditec).

•Distribution of the studied samples into four groups:

- The first group: aborted women infected with toxoplasmosis included (25) samples and their ages ranged between (>20-50) years.
- The second group: women with diabetes included (25) samples, and their ages ranged between (>20-50) years.
- The third group: women with diabetes and cat disease, which included (25) samples, and their ages ranged between (>20-50) years.
- The fourth group: the control group of healthy women and included (25) samples, and their ages ranged between (>20-50) years.2-3-To estimate IgG concentration, the ELISA assay kit used the ELISA- Sandwich technique.

•To estimate the concentration of the C-peptid hormone, the ELISA kit used the Sandwich technique.

•To estimate the concentration of the hormone Glucagon, the ELISA kit used the Sandwich-ELISA technique

•To estimate the insulin concentration, the ELISA kit used the Sandwich ELISA technique.

•To estimate the concentration of the hormone Preptin, the ELISA kit used the Sandwich-ELISA technique.

Statistical Analysis

The results were analyzed statistically using Analysis of Variance (ANOVA). The arithmetic means of the parameters were compared using Duncan's multiple range test at a significant level ($p < 0.05$) [Al-Rawi 2000].

Results and Discussion

The results of the current study showed that there were no significant differences at the probability level of $0.05 \geq p$ for the C-Peptide test in the (Toxo-diabetes) groups compared to the control group, and these results were in agreement with the results of [Mostafi 2019] where they noticed a decrease in C-Peptide in the blood serum, The reason for its decrease may be due to a response to hyperglycemia, and a decrease in the level of C-peptide indicates a breakdown of pancreatic beta cells [Ghorbani 2015].

The results of the current study showed a significant difference at a significant level of $0.05 \geq p$ for the three groups (Toxo - diabetes - Toxo + diabetes) when compared to the control group and these results were consistent with [Mostifi 2019] and through a study conducted on diabetic rats, an increase in the hormone glucagon(Lee 2011). And it was inconsistent with the results of [Evering 2006] they indicated that the level of glucagon decreased in diabetic patients. The researcher [Belijic 2016] indicated that the increase in the level of glucagon can cause the stimulation of the production of new glucose and the process of glycogenolysis (increased circulating plasma concentration).

The different letters on the columns mean that there is a significant difference in the studied groups at a significant level ($P < 0.05$).

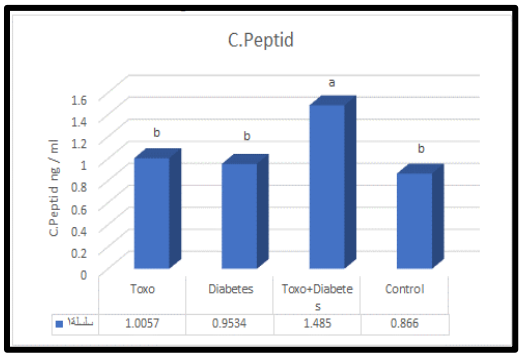

Figure (1) C-Peptide level in blood serum

The different letters on the columns mean that there is a significant difference in the studied groups at a significant level (P <0.05).

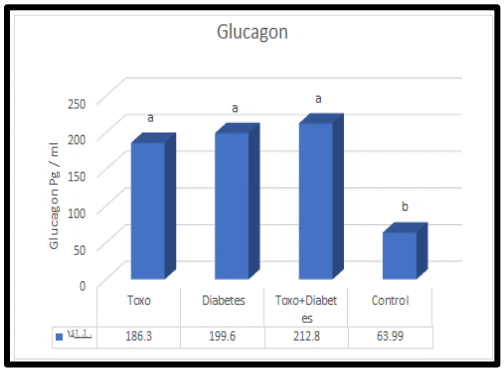

Figure (2) Glucagon level in the blood serum

The results of the current study showed that there were significant differences at the level of probability p≥ 0.05 for the three groups (Toxo - diabetes - Toxo + diabetes) when compared to the control group. It was also identical to what the researcher found [Moran 2011] because most type 2 diabetes patients suffer from insulin resistance more than the true decrease in insulin, and this leads to a compensatory increase in insulin secretion, but this statement applies at the beginning of the disease, Over the course of the infection, insulin will decrease in patients. It is believed that this is caused by a defect in beta cells due to glucose toxicity, beta cell mass reduction, and the accumulation of fibril-like amyloid in beta cells called amylin, and consequently, a deficiency in the hormone insulin [Al-Akaash 2012], and the results showed (Ismail 2012) is no significant increase in the concentration of the insulin hormone with age in patients with type 2 diabetes, and I think the reason for this is that insulin depends on the age of the disease and not the age of the patient, and this result is not compatible with our current results.

The different letters on the columns mean that there is a significant difference in the studied groups at a significant level (P <0.05).

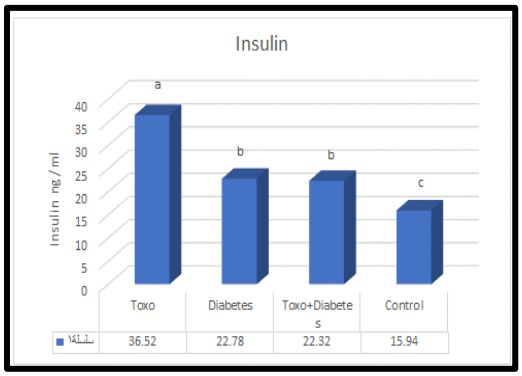

Figure (3) Insulin level in the blood serum

The results of the current study for the three groups (Toxo - diabetes - Toxo + diabetes) showed that the Toxo group did not show a significant difference when compared to the control group. As for the two groups (diabetes - Toxo + diabetes, they showed a significant difference in relation to the control, and these results were consistent with the findings of [Muzaffer 2002], where the results showed a significant increase in the level of protein in patients with diabetes when compared to the control group.

The different letters on the columns mean that there is a significant difference in the studied groups at a significant level (P <0.05).

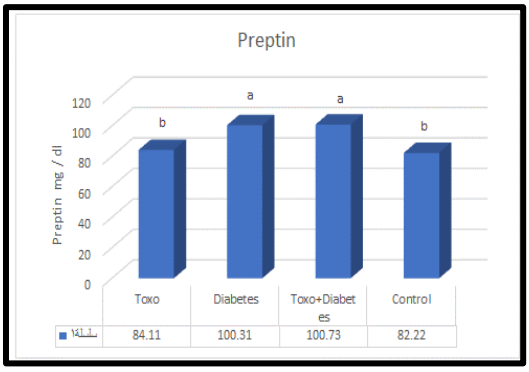

Figure (4) Preptin level in blood serum

Reference

1. AL –Akaash , Aya Saad yaseen (2012) . study of the effect of Diabetes un-dependent – in some physiological and biochemical standards in some patients in Tikrit and Baiji . Thesis Muster , College of Education for Women University of Tikrit .

2. Al-Rawi, Khashi Mahmoud. (2000).Introduction to Statistics, Second Edition, College of Agriculture and Forestry, Mosul.

3. Beljic, T.; Marjanoric, M. ; Vuksanvoic, M. ; Soldatovic, I. ;Kanlic, D. and Topalor, D. (2016). The effect of combination therapy of insulin glargine ,metformin and sitagliptin on insulin secretion, insulin resistance and metabolic parameters in obese subjects with type2 diabetes. Arh , celok , Lek , 144(9-10):497-502.

4. Evering, T. and Weiss, L.M.(2006).The immunology of parasite infections in immunocompromised hosts Parasite immunology, 28,N o. 11, P: 549-565.

5. Evering, T. and Weiss, L.M.(2006).The immunology of parasite infections in immunocompromised hosts Parasite immunology, 28,N o. 11, P: 549-565.

6. Ghorbani, A. and Shafiee-Nick, R. (2015) . Pathological consequences of C-peptide deficiency in insulin- dependent diabetes mellitus .World . J . Diabetes , 6:145-150 .

7. Harker KS , Ueno N , Lodoen MB (2015). Toxoplasma gondii dissemination : a parasite's journry through the infected host . parasite Immunol : 37(3) :141-149 .
8. Holt, R.I. ; Cockram, C.S. ; Flyrbjerg, A. ; Goldstein, B.J.(2010). "Text book of diabetes". 4th .ed.Wiley-Blackwell.pp:3-18,24,25,577.
9. Ismail , Baqaa Hazeem : Rashid , Muhammad Rashid : Abdullah , Suleiman Ajaj .(2012) . A study of the level of total fats and insulin in non-insulin dependent diabetes . Tikrit Journal of Science is pure . 16(1): 1813-1662 .
10. Lee , Y.H. ; Magkos, F. ; Mantzoros, C.S. and Kang, E.S. (2011). Effects of leptin and adiponectin on pancreatic B-cell function .Metabolism , 60 : 1664-1672.
11. Majidiani ,H., Dalvand ,S., Dayani ,A., Galvan_ Ramirez & Foroutan _Rad .(2016) . Is chronic toxoplasmosis a risk factor for diabetes mellitus ? A systematic review and meta-analysis of case-control studies . Brazilian journal of Infectious Diseases 20(6):605-609 .
12. Moran,T.H. and Dailey, M.J.(2011). Intestinal feed back signaling and satiety .physiol Behav ,105:77-81.
13. Mostafi, Evan Mohammed (2019) . Evaluation of metformin , cantin , and omega -3 drugs on some hormones and biochemical variables in rabbits affected with induced diabetes , PhD thesis , Faculty of Science , Tikrit University .
14. Mostafi, Evan Mohammed (2019) . Evaluation of metformin , cantin , and omega -3 drugs on some hormones and biochemical variables in rabbits affected with induced diabetes , PhD thesis , Faculty of Science , Tikrit University .
15. Muzaffer , Ali Khan . (2002) . department of human nutrition , Nwfb , Bakistan Journal of nutrition . 4 : 185 – 187 .
16. Parenti DM , Steinberg W , Kang P (1996) . Infectious causes of of acute pancreatitis . pancreas :13(4) :356-371 .
17. Remington, J.S.; McLeod, R.; Thulliez, P. and Desmants, G. (2000)Toxplasmosis. In : Remington, J.S. and Klein, J.O. (editors) ."Infectious Diseases of the fetus and Newborn Infant". 5th W.B. Saunders Co. Philadelphia P :206-246.
18. Shin DW , Cha DY , Hua QJ , Cha GH , Lee YH (2009). Seroprevalence of Toxoplasma gondii infection and characteristics of seropositive patients in general hospitals in Daejeon , Korea J parasitol :47(2) : 125-130