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Evaluation of the Role of Prolactin in the Prevention of Diabetic Retinopathy

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ABSTRACT

Aim: Investigating the potential role of prolactin in the prevention of diabetic retinopathy

Methods: The study was conducted on 90 diabetic patients who were divided into a group that included 37 patients without retinopathy and a group that included 27 patients with non-proliferative retinopathy and 26 patients with proliferative retinopathy who attended the Endocrinology clinic and Division at Tishreen University Hospital in Lattakia during the period from 2023 to 2024.

Results: Independent samples T-test analysis showed Significant decreased in prolactin level in diabetic patients with DR in comparison to diabetic patients without DR (p=0.0001). Person correlation showed a statistically significant inverse relationship between prolactin levels and Glycosylated hemoglobin levels between patient groups.

Conclusions: From this study it can be concluded that diabetic patients with retinopathy had lower level of prolactin and serum prolactin does seem to have protective role in diabetic retinopathy.

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Introduction

Diabetic Retinopathy: It is one of the complications affects small blood vessels common in diabetic patients leading to vision loss through Diabetic Macular Edema (DMO) and Proliferative Retinopathy (PDR) where he It mainly affects the arteries before the capillaries, the capillaries, and the veins after the capillaries [1-2]. Large vessels may be affected. Also.

Although early diagnosis and treatment can reduce the risk of vision loss in some patients, DR remains a serious threat to vision [3].

Epidemiology: Diabetic retinopathy is considered the number one cause of vision loss in the Western world between the ages of 20-65 years.80% of patients will develop diabetic retinopathy after the first two decades of developing diabetes [4].

Diabetic retinopathy is also the main cause of blindness and visual impairment in adults of working age, which is associated with poor quality of life, low psychological and social level, and increased risk of other diabetic complications and mortality [5].

Globally, about 95 million (35.4%) of patients with diabetes suffer from diabetic retinopathy and about 7.6% from macular edema [6]. It was found that some degree of diabetic retinopathy develops in 99% of patients with type 1 diabetes and in 60% of patients with type 2 diabetes after 20 years of diabetes. It has been noted that the development of developmental diabetic retinopathy is more common in patients with the disease. Type 1 diabetes while macular edema develops Yellow. It occurs in 29% of diabetes patients 20 years or more after developing the disease. It is considered the main reason for the decline in visual ability in these patients. PRL (The pituitary hormone Prolactin) has several functions in immune response, reproduction, growth, osmoregulation, brain function energy metabolism, and behavior [7]. Current studies are interested.

In PRL, which is likely to have a prevention role against DR [8]. The Studies have revealed that Vasoinhibin caused by the proteolysis Of PRL is a multi-function peptide, which was a vasoconstrictive antivasopermeability and antiangiogenic action which gives Vasoinhibin a role in protection from the complications of diabetes on the eye [9]. Proteolysis cleavage of PRL by several endogenous proteolysis enzymes, namely bone morphogenetic protein-1 (BMP1), Cathepsin D and matrix metalloproteinase (MMP) [10]. The retinal Vasoinhibin likely derives from PRL synthesized in the retina and from systemic PRL.

Methods

The research sample included 90The case of a patient with type 1 and 2 diabetes who presented to the Endocrinology and Metabolism Clinic and Division at Tishreen University Hospital in Lattakia during the time period.2023-2024The investigators determined the inclusion criteria in the research. Exclusion criteria were Previous thyroid disorder,Previous pituitary disorders, Medicines that may cause high prolactin, such as (estrogen, haloperidol, metoclopramide, methyldopa, and ranidine),Renal and liver failure,Pregnant women,Alcoholic,Diabetic retinopathy patients treated with laser or inhibitorsVEGF. Data were collected from patients after obtaining informed consent A retinal examination was performed for all patients Using a slit lamp with Folk lens.

The following blood tests were drawn for all patients CBC-GLU-Crea-Urea-Alt-Ast-HbA1c-PRL using an immunoassay mechanism via a device.Finecare.

Statistical Analysis

We used SPSS (IBM, USA) for statistics. Data was tabled using excel (Microsoft Corporation, USA). Discriptive Statistics were calculated, and results were summarized as(mean +_SD) for numeric variables and ratio for categorical variables. Correlation between numeric variables was assessed using Independent T-student. Correlation was significant when $p < 0.05$

Results

Our study included 90A male/female patient with type 1 and type 2 diabetes of varying ages13-82 year. The percentage of males reached 45.6% (41) patient and female54.4% (49) patient. The proportion of the first type reached 16.7% (16) patient and type 283.3% (75) patient. The duration of the infection is less than10Years reached53.3 % (48) patient, more than or equal to 10 Years 46.7% (42) patient. Treatment with oral hypoglycemic agents 67.8 % (61) Patient, insulin therapy 28.9% (26) patient, without treatment 3.3% (3) patient. Proliferative disorder 28.9% (26), non-proliferative disorder 30 % (27) patient, without illness41.1% (37) patient. The percentage of females was higher in the non-proliferative morbidity group74.1%withP=0.04.The mean values of prolactin were lower in the presence of morbidity, especially proliferative morbidity P=0.0001.The mean values of hemoglobin were higher in the morbidity group, especially the proliferative morbidity group P=0.002.We noticed a statistically significant difference in terms of age between the patient groups, as it was higher in the proliferative disease group P=0.001.We noticed a statistically significant difference in terms of the duration of infection, which was more than or equal to10Higher years in the proliferative disorder group with P=0.0001.We did not notice any statistical difference between the groups in terms of type of infection, type of treatment, or blood sugar values.

The Relationship of Prolactin with Variables

Presence of morbidity: The mean values were lower within the morbidity group, especially proliferative morbidity with P=0. 0001.Regarding gender: values were lower in males, especially in the morbidity group P=0.0001.

For Type of Injury: values were low only in type 2 in the morbidity group P=0.04.

Duration of Infection: We did not notice a statistically significant difference, but it was lower within the morbidity group.

Type of Treatment: We did not notice a statistically significant difference Glycosylated hemoglobin: We noticed an inverse correlation with statistically significant differences with... p=0.001The morbidity group and P=0.02Without impairment.

Regarding Age and Blood Sugar Values: We did not notice any relationship or statistical differences.

Table 1: Distribute a Sample 90 Patients by Gender Attending the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Sex	The Number	The Ratio
Male	41	45.6%
Females	49	54.4%
The Total	90	100%

We note from the previous table that 45.6% The studied research sample was male and female 54.4% Females.

Table 2: Distribute a Sample 90 Patients according to the Type of Diabetes who Visited the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Pattern of Injury	The Number	The Ratio
First Type	15	16.7%
Second Type	75	83.3%
The Total	90	100%

We note from the previous table that the majority of the studied research sample was of the second type 83.3%.

Table 3: Distribute a Sample 90 Patients According to the Duration of the Infection Visited the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Duration of Injury (Year)	The Number	The Ratio
<10	48	53.3%
10≥	42	46.7%
The Total	90	100%

We note from the previous table that 53.3% of the research sample studied, the duration of diabetes was less than 10 years and 46.7% With a duration of more than 10 Years, and the duration of diabetes ranged between 6 months and 35 an average year 9.15±7.7year.

Table 4: Distribute a Sample 90 Patients According to the Type of Treatment Who Visited the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Type of Treatment	The Number	The Ratio
Oral depressants	61	67.8%
Insulin	26	28.9%
There is no cure	3	3.3%
The Total	90	100%

We note from the previous table that67.8% of the research sample studied, the treatment used was oral depressants. 28.9% Insulin and 3.3% They had no cure.
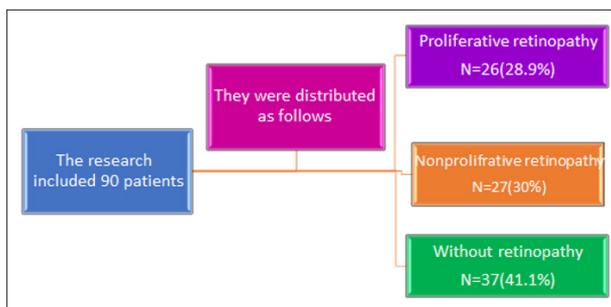
Table 5: The Distribution by Gender in a Sample 90 Patients Attending the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Sex	Proliferative Disorder	Non- Proliferative Disorder	Without Impairment	P-Value
Male	15(57.7%)	7(25.9%)	19(51.4%)	0.04
Females	11(42.3%)	20(74.1%)	18(48.6%)	

We note from the previous table that there are statistically significant differences between the research groups with regard to gender, as we find that the highest percentage in the non-proliferative morbidity group was among females, where they represented 74.1% of which with p-value=0.04.

Table 6: Mean Values for Age in a Sample 90 Patients Attending the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

The Age	Proliferative Disorder	Non- Proliferative Disorder	Without Impairment	P-Value
Mean±SD	60.34+12.2	55.96±14.9	46.40±15.9	0.001
Min - Max	40-82	16-74	13-72	

We note from the previous table that there are statistically significant differences between the research groups with regard to the average values for age, which were higher in patients with diabetic retinopathy compared to a group without the disease, and within the same disease group, the average values for age were higher in the group of proliferative diabetic retinopathy withp-value=0.001.

Table 7: The Distribution Depending on the Pattern of Infection Sample 90 Patients Attending the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Pattern of Injury	Proliferative Disorder	Non- Proliferative Disorder	Without Impairment	P-Value
First style	1(3.8%)	4(14.8%)	10(27%)	0.05
Second style	25(96.2%)	23(85.2%)	27(73%)	

We note from the previous table that there are no statistically significant differences between the research groups regarding the pattern of infection with p-value=0.05.

Table 8: The Distribution Depending on the Duration of the Infection a Sample 90 Patients Attending the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Duration of Injury	Proliferative Disorder	Non- Proliferative Disorder	Without Impairment	P-Value
<10	9(34.6%)	10(37%)	29(78.4%)	0.0001
10≥	17(65.4%)	17(63%)	8(21.6%)	
Mean±SD	13.19±9.4	10.88±6.02	5.04±5.4	0.0001

We notice from the previous table that there are statistically significant differences between the research groups with regard to the duration of the infection, which was higher in diabetic retinopathy patients and higher in the proliferative retinopathy group.

Table 9: The Distribution Depending on the Type of Treatment in a Sample 90 Patients Attending the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Type of Treatment	Proliferative Disorder	Non- Proliferative Disorder	Without Impairment	P-Value
Oral depressants	16(61.5%)	18(66.7%)	27(73%)	
Insulin	9(34.6%)	7(25.9%)	10(27%)	0.5
There is no cure	1(3.8%)	2(7.4%)	0(0%)	

We note from the previous table that there are no statistically significant differences between the research groups with regard to the type of treatment used, and the highest percentage of treatment in all groups was for oral depressants with p-value=0.5.

Table 10: Mean Values of Prolactin in a Sample 90 Patients Attending the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Prolactin	Proliferative Disorder	Non- Proliferative Disorder	Without Impairment	P-Value
Mean±SD	5.62+2.1	7.12±1.3	11.36±2.1	
Min - Max	2.36-10.80	4.06 - 9.80	8.03 - 16	0.0001

We notice from the previous table that there are statistically significant differences between the research groups with regard to the mean values of prolactin, which were lower in patients with diabetic retinopathy compared to a group without the disorder, and within the same group of diseases, the mean values of prolactin were lower in the group of proliferative diabetic retinopathy with p-value=0.0001.

Table 11: Average Values of Glycosylated Hemoglobin in a sample 90 Patients Attending the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Glycosylated Hemoglobin	Non- Proliferative Disorder	Without Impairment	Without Impairment	P-Value
Mean±SD	9.78±1.6	8.39±1.9	7.45±1.5	
Min - Max	7.90-14.50	5.50-14	5.80 - 14.30	0.002

We notice from the previous table that there are statistically significant differences between the research groups with regard to the average values of glycohemoglobin, which were higher in patients with diabetic retinopathy compared to a group without the disease. Within the same morbidity group, the average values of glycosylated hemoglobin were higher in the group of proliferative diabetic retinopathy with p-value=0.002.

Table 12: Average Blood Sugar Values in a Sample 90 Patients Attending the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Blood Sugar	Proliferative Disorder	Non- Proliferative Disorder	Without Impairment	P-Value
Mean±SD	261.80±130.8	303.88+124.6	263.54±121.6	0.3
Min – Max	104-600	124-620	123-600	

We note from the previous table that there are no statistically significant differences between the research groups regarding the average values of blood sugar with p- value=0.3.

Table 13: Mean values of Prolactin according to Sex in a Sample 90 Patients and According to the Presence of Diabetic Retinopathy, Visitors to the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Sex	With Impairment	Without Impairment
Male	5.21+1.5	10.19±1.6
Females	7.42±1.6	12.62+1.5
P-value	0.0001	0.0001

We notice from the previous table that there are statistically significant differences regarding the average values of prolactin according to gender, whether in the diabetic retinopathy group or without the disorder. The values were lower in males compared to females, and the values were lower in the retinopathy group.

Table 14: Average Values of Prolactin According to the Type of Infection a Sample 90 Patients and According to the Presence of Diabetic Retinopathy, Visitors to the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Pattern of Injury	With Impairment	Without Impairment
First style	8.11±1.3	11.55±1.4
Second style	6.32±1.7	11.24±2.1
P-value	0.04	0.8

We notice from the previous table that there are statistically significant differences with regard to the average values of prolactin depending on the type of infection in the diabetic retinopathy group only, where the values were lower with the second type, and the values were lower in the diabetic retinopathy group.

Table 15: Average Values of Prolactin Depending on the Duration of Infection a Sample 90 Patients and According to the Presence of Diabetic Retinopathy, Visitors to the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Duration of Injury (Year)	With Impairment	Without Impairment
<10	6.32±1.9	11.64±2.1
10≥	6.58±1.6	10.19±1.6
P-value	0.2	0.07

We note from the previous table that there are no statistically significant differences with regard to the average values of prolactin depending on the duration of the disease in both the diabetic retinopathy group as well as the group without the disease, except that the values were lower in the retinopathy group.

Table 16: Average Values of Prolactin According to the Type of Treatment in a Sample 90 Patients and According to the Presence of Diabetic Retinopathy, Visitors to the Endocrinology Department at Tishreen University Hospital in Lattakia during the Time Period 2023-2024

Treatment Style	With Impairment	Without Impairment
Insulin	7.19±2.2	11.58±1.8
There is no cure	5.69±1.2	-----
Blood sugar	Pearson Correlation=0.10 P-value=0.1	Pearson Correlation=0.04 P-value=0.9
P-value	0.7	0.4

We note from the previous table that there are no statistically significant differences with regard to the average values of prolactin depending on the type of treatment in both the diabetic retinopathy group as well as the group without retinopathy, except that the values were lower in the retinopathy group.

Table 17: The relationship between Prolactin and (Age, Haemoglobin, Blood Sugar) in a Sample 90 Patients and According to the Presence of Diabetic Retinopathy Referred to the Endocrinology Department at Tishreen University Hospital 2023-2024

Variables	With Impairment	Without Impairment
The Age	Pearson Correlation= -0.12 P-value=0.4	Pearson Correlation= -0.15 P-value=0.3
Glycosylated Haemoglobin	Pearson Correlation= -0.36 P-value=0.001	Pearson Correlation= -0.29 P-value=0.02
Blood Sugar	Pearson Correlation=0.10 P-value=0.1	Pearson Correlation=0.04 P-value=0.9

We note from the previous table that there is an inverse correlation between both prolactin and glycohemoglobin in both research groups, as in the diabetic retinopathy group with high glycohemoglobin, prolactin values decrease, while in the group without morbidity with low glycohemoglobin values, prolactin values increase. There are differences. Statistically significant.

Discussion
Our study included 90 A male/female patient with type 1 and type 2 diabetes of varying ages 13-82 year. The percentage of males reached 45.6% (41) Sick and female 54.4% (49) sick. The proportion of the first type reached16.7% (16) Sick and type 283.3% (75) sick.The duration of the infection is less than10Years reached 53.3% (48) sick, more than or equal to 10 Years 46.7% (42) sick.

Treatment with oral hypoglycemic agents 67.8% (61) Patient, insulin therapy 28.9% (26) Sick, without treatment3.3% (3) sick. Proliferative disorder 28.9% (26), non-proliferative disorder 30% (27) Sick, without illness 41.1% (37) sick. The percentage of females was higher in the non-proliferative morbidity group74.1%withP=0.04.

The mean values of prolactin were lower in the presence of morbidity, especially proliferative morbidity P=0.0001. The mean values of hemoglobin were higher in the morbidity group,

especially the proliferative morbidity group P=0.002.

We noticed a statistically significant difference in terms of age between the patient groups, as it was higher in the proliferative disease group P=0.001.

We noticed a statistically significant difference in terms of the duration of infection, which was more than or equal to10Higher years in the proliferative disorder group with P=0.0001. We did not notice any statistical difference between the groups in terms of type of infection, type of treatment, or blood sugar values.

The Relationship of Prolactin with Variables
Presence of morbidity: The mean values were lower within the morbidity group, especially proliferative morbidity with P=0.0001.
Regarding Gender: values were lower in males, especially in the morbidity group P=0.0001.
For Type of Injury: values were low only in type 2 in the morbidity group P=0.04.
Duration of Infection: We did not notice a statistically significant difference, but it was lower within the morbidity group.
Type of Treatment: We did not notice a statistically significant difference Glycosylated hemoglobin: We noticed an inverse correlation with statistically significant differences with p=0. 001. The morbidity group and P=0.02Without impairment. Regarding age and blood sugar values: We did not notice any relationship or statistical differences.

Conclusions
- We found a decrease in prolactin values with the presence of retinopathy and its association with its degree of severity, especially in males.
- There is an inverse correlation between the values of prolactin and glucose, consistent with the presence and severity of the disorder.
- We did not notice any significance in the relationship between prolactin values and disease groups in terms of age, blood sugar values, or type of treatment.

Author Contribution Statement: AE and HY conceived, designed research, collected study sample and conducted clinical studies. AE and TD analyzed data. AE wrote the manuscript. TD edited the manuscript. All authors read and approved the manuscript.

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