

RESEARCH / INVESTIGACIÓN

Role of Leptin with hypothyroidism in Iraqi diabetic type 2 patients

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Abstract: In thyroid subjects, leptin hormone and thyroid-stimulating hormone levels connect; both are emphatically corresponding with adiposity. "Leptin hormone was essentially raised in the hypothyroid topic," to levels like those seen in corpulent thyroid topic. This study aimed to determine leptin hormone levels, T3, T4, TSH, HbA1c %, FBG, lipid profile in diabetic and diabetic with hypothyroidism patients and compare the outcome with the healthy group. 90 samples were registered in this study with their ages ranging between (40 - 65) years that dole out into 3 groups as follows: thirty healthy groups (G1), thirty patients with diabetes (G2), and category three (G3) include diabetic patients and hypothyroidism as an associated disease. This study revealed a slightly significant elevated leptin in G3, contrasting to G2 and G1. Meantime no significant elevated spotted between G2 and G1. The conclusion could be from this investigation that leptin levels were changed in patients' gatherings that might be utilized in checking and early analysis of thyroid dysfunction in these patients relying upon the significant connection for leptin chemical with T3, T4, and TSH.

Key words: Leptin hormone, hypothyroidism, and diabetic type2.

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Introduction

Diabetes mellitus (DM) and thyroid disorders are two endocrine problems that influence each other in various reactions. Thyroid chemicals add to the guideline of carbohydrates digestion and pancreatic capacity^{1,2}. Sensible components for progression of T2DM in thyroid issue patients might be identified with the upset hereditary articulation of qualities related to physiological distortions prompting hindered glucose utilization by the expanded hepatic glucose yield, muscles, and glucose absorption rise from digestive system³. Leptin is a (146) amino acid protein chemical secreted by adipocytes in light of an increment in fat mass. It is by all accounts a vital atom in the input circle that directs energy balance. Leptin has a double activity: it diminishes hunger and builds energy utilization, making more fat scorched⁴. Leptin gives data to the sensory system on the measure of energy put away in the fat tissue. Serum leptin levels profoundly correspond with muscle to fat ratio mass in grown-ups, youngsters, and babies. Obese individuals have altogether higher flowing leptin than typical. In obesity, a diminished affectability to leptin happens (like insulin opposition in type 2 diabetes), bringing about powerlessness to recognize satiety despite high energy stores and high levels of leptin⁵. Thyroid hormones and leptin are two chemicals that manage power balance via central signaling mechanisms⁶. Aggravation of thyroid capacity is related to noticeable changes in energy consumption and body weight; furthermore, it has accordingly been the subject of much exploration to contemplate the shared jobs of thyroid hormones and leptin in this regard⁷. In thyroid subjects, leptin hormone and thyroid-stimulating hormone levels connect; both are emphatically corresponding with adiposity. "Leptin hormone was essentially raised in the hypothyroid topic" to levels like those seen in corpulent thyroid topic. "The information is steady with the speculation that leptin hormone and the pituitary-thyroid pivot interface in the thyroid state, and that hypothyroidism reversibly increments leptin focuses⁸⁻¹¹.

Materials and methods

Ninety individuals with ages ranging between (40-65) years were joined up with this examination.

They separated into three gatherings as follows:-

1. Gathering (G1) that comprises 30 sound people as control bunch.
2. Gathering (G2) that consists of 30 diabetic patients.
3. Gathering (G3) that includes diabetic patients and hypothyroidism as an associated disease.

Blood samples were gathered from all gatherings after a time of fasting 12-14 hours. The study was conducted between December 2020 – April 2021 in the diabetic & endocrinology center in Al-Yarmouk Teaching Hospital / Iraq.

Estimation of Leptin levels by Competitive Elisa Reveals¹². The T3, T4, and TSH were determined by Enzyme-linked Fluorescent Immunoassay (ELFA) competition method with a final detection¹³. Whole blood was used in the determination of HbA1c. The HPLC method¹⁴ determined the HbA1c. Serum glucose was measured using kits from (Randox Company, United Kingdom) based on the PAP enzymatic determination of glucose¹⁵. TC¹⁶, TG¹⁷, and high-density lipoprotein¹⁸ were estimated using the enzymatic method (Human Gesellschaft fur biochemical and Diagnostica mbH, Germany). The levels of LDL and VLDL were analyzed by using Friedewald equation¹⁹.

Statically study outcomes were communicated as mean \pm SD. T-test was used for comparison among the three studied groups. The P-values (< 0.05) no significant, (> 0.05) significant, (> 0.01) highly significant were considered statically.

Results and discussion

Descriptive was introduced in Table (1), which shows the levels of HbA1c%, F.S.G, T3, T4, TSH, and leptin for every considered gathering. Table (1) showed a highly significant increase in patients' gatherings (G2, G3) contrasting with control bunch in HbA1c% and FSG levels. Likewise, a significant rise in G3 contrasted with G2 was found.

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Results uncovered a significant decrease in levels of T4 and T3 in G3 when contrasted with group one and group two. Furthermore, there is a highly significant increase in TSH level in group three contrasted with groups one and two.

Diabetic patients appear to impact thyroid capacity in the hypothalamic control of thyroid-stimulating hormone discharge and at peripheral tissue by changing T4 to T3. High glucose levels lead to decreased deiodinase enzyme concentration in the liver, decreased T3, rising levels of opposite T3, and low, typical, or undeniable levels of T4²⁰.

Results in Table 1 uncovered a significant rise in listening levels in G3, contrasting with G1 and G2. These outcomes show that serum leptin is somewhat raised in subjects with moderate hypothyroidism, potentially because of the immediate activity of thyroid hormones.

Leptin is another hormone assuming a significant part in the guideline of power balance by tweaking food consumption, thermogenesis, just as lipid and glucose digestion. Concerning interactions between leptin and thyroid hormones, the impact of thyroid capacity and hypothyroidism, specifically on flowing leptin hormone levels, gave clashing information. Subsequently, diminishes, increments, or non-change in leptinaemia were accounted for in hypothyroid patients. This is the way might clarify disparate outcomes that leptin hormone levels fundamentally invert changes in lipid cluster, this boundary differing as indicated by sex, age, and span of hypothyroidism²¹.

Table (2) shows the levels of lipid profile for G1, G2, and G3. Results revealed a significant rise in lipid profile levels without HDL in groups two and three, contrasting to G1. Results likewise showed a significant rise in lipid profile without HDL in G3 contrasting to G2; Results also showed a significant decline in HDL levels in group two and group three contrasting with

G1, while no significance was found in group two-three contrasting with group two in HDL levels.

Conclusions

The conclusion could be from this investigation that leptin levels were changed in patients' gatherings that might be utilized in checking and early analysis of thyroid dysfunction in these patients relying upon the significant connection for leptin chemical with T3, T4, and TSH.

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Parameters	Group 1	Group 2	Group 3	T-Test G1 vs. G2	T-Test G2 vs. G3	T-Test G1 vs. G3
HbA1c%	5.42±0.40	8.23±1.057	10.98±1.39	HS	S	HS
F.B.G (mmol/L)	4.356±0.76	10.607±2.53	11.091±2.935	HS	NS	HS
T3 (nmol/L)	1.67±0.385	2.77±0.173	1.08±0.064	S	S	S
T4 (nmol/L)	82.5±9.550	115.22±27.4	47.91±15.506	S	HS	HS
TSH (nmol/L)	2.23±0.416	3.44±0.07	21.44±4.82	S	HS	HS
Leptin (ng/mL)	3.7 ± 2.1	3.79 ± 0.8	5.07 ± 1.06	NS	S	S

* P-values (> 0.05= NS, < 0.05= S, < 0.01= HS)

Table 1. HbA1c%, F.S.G, T3, T4, TSH, and leptin hormone levels for groups 1, 2, 3.

Parameters (mg/dL)	Group one	Group two	Group three	T - Test G1 vs G2	T - Test G2 vs G3	T - Test G1 vs G3
TC	178.4±7.2	191.4±5.7	262.44±5.6	NS	S	S
Triglyceride	93.04±18.22	175.0±48.8	238.5±7.8	S	S	S
HDL-c	43.166±4.5	34.177±5.32	35.0±3.20	S	NS	S
LDL-c	86.1±12.23	115.9±33.47	201.05±4.1	S	S	S
VLDL	18.608±3.644	35.0±9.76	47.7±1.56	S	S	S

* P-values (> 0.05= NS, < 0.05= S, < 0.01= HS)

Table 2. Lipid profile levels for groups 1,2,3.

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