

STUDY ON RELATIONSHIP BETWEEN CYSTATHIONINE BETA SYNTHASE AND GLUCAGON LIKE PEPTIDE -1 IN IRAQI PATIENTS WITH HYPERTHYROIDISM

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ABSTRACT : The expression of Cystathionine beta-synthase (CBS) is associated with the formation of tumors and the development of a variety of tumors. A serum of forty patients anguish from hyperthyroidism as first group (G1) and group two (G2) consist of (40) healthy Iraqi control. The results indicated a high significant decreased in CBS concentration and a high significant decrease in Glucagon like peptide-1 (GLP-1) in G1 compared with healthy control (G2), while there was a high significant reducing in T₃ and T₄ concentrations and a high significant reducing in TSH in G1. When comparing with (G2) and there was a high significant (-ve) negative correlation between GLP-1 with T₃ in G1.

Key words : Hyperthyroidism, cystathionen beta synthase (CBS), glucagon like peptide-1 (GLP-1), T₃, T₄ and TSH.

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INTRODUCTION

Cystathionine- β -synthase (CBS) is a unique heme-containing enzymes. Moreover is the first rate limiting enzyme that catalysis homocysteine to give hydrogen sulfide (H₂S) and cystathionine in the sulfur conversion pathway. The aberrant expression of CBS was discovered to be strongly contributory in many of physiological and pathological developments for different swellings (Wang *et al*, 2020). Cystathionine beta-synthase play a vital role to formation (H₂S) in brain for human whereas CBS is uncured in uterus, portal vein and other tissues. So that imbalance of H₂S homeostasis due to pathogenesis of B-cell dysfunction led to type1DM and type2DM, after that disorder of H₂S endothelial in jury was happened and high of glucose levels in DM as well as inhibited on insulin release and control B-cell survival. Therefore overproduction from (H₂S) has been occur to be a risk factor in etiology death of B-cell in diabetic patients (Dasgupta *et al*, 2018). Glucagon-like peptide 1 (GLP-1) is an incretin hormone secreted by endocrine L cells in response to food intake, whose biological activities are stimulation of glucose dependent

insulin secretion, insulin biosynthesis, inhibition of glucagon secretion, gastric emptying and food intake (Cases *et al*, 2014). Hyperthyroidism can be diagnosed by measuring of serum thyroid stimulating hormone (TSH), which has the highest sensitivity and specificity for assessing suspected thyrotoxicosis among all laboratory tests. Serum-free T₄ and T₃ have been widely used to improve diagnostic accuracy in addition to TSH (Ross *et al*, 2016; Asban *et al*, 2018).

MATERIALS AND METHODS

Cystathionen beta synthase, Glucagon like peptide -1, T₃, T₄ and TSH levels were measured in sera of 40 Iraqi patients suffering from Hyperthyroidism newly diagnosis without treatment as group one (G1) and 40 healthy controls as group two (G2). Hyperthyroidism diagnosis was according to the Thyroid stimulating hormone human ELISA (Biovender). Cystathionen beta synthase and GLP-1 in sera of patients and control were determined by Enzyme-linked immunosorbent assay (ELISA kit) (Biocompare).

Statistical analysis : The factual examination of this

planned investigation was performed with the Graph Pad Prism® 7 and Microsoft Excel 2013 with significant difference is equal or bellow to 0.05 (Elliott and Woodward, 2007).

RESULTS AND DISCUSSION

Table 1 shows the levels of CBS, GLP-1, T₃, T₄ and TSH respectively concentration in serum of patients with Hyperthyroidism and healthy control.

In this table, we found high significant (P value ≤

0.001) decreasing of CBS (3.74±1.042) in Hyperthyroidism patients group (G1) compared with healthy control (G2) (5.03 ± 1.299).

CBS protein expression levels are elevated in several different human malignancies, with elevated protein expression correlating with parameters such as anaplasia, tumor stage, metastases and chemotherapy resistance (Turbat-Herrera *et al*, 2018).

In study of recent a high significant is found

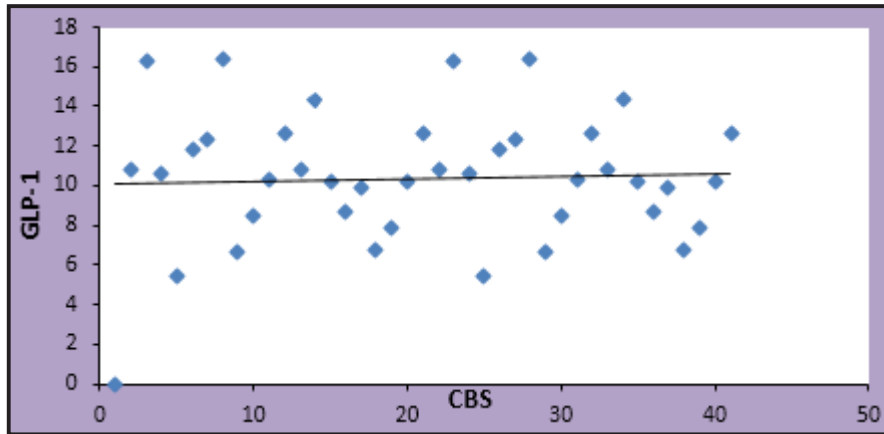


Fig. 1 : Correlation between CBS and GLP-1.

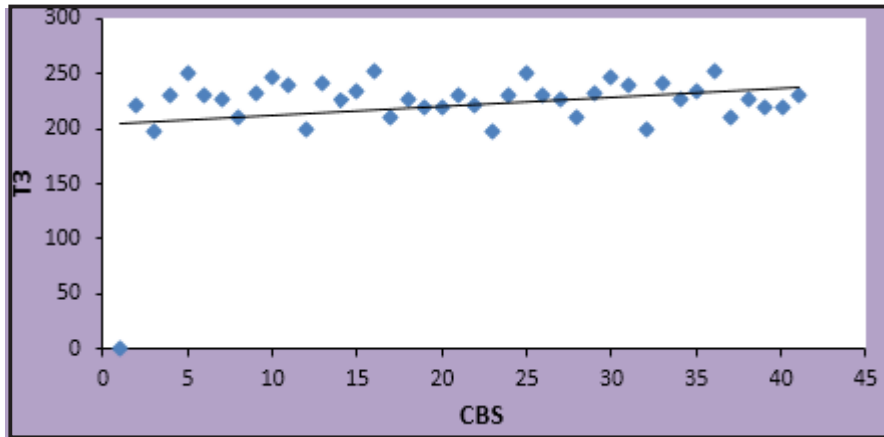


Fig. 2 : Correlation between CBS and T₃.

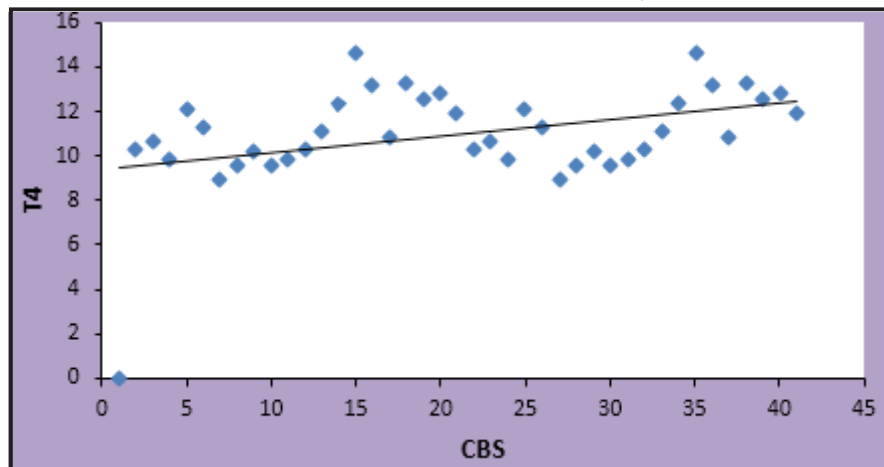


Fig. 3 : Correlation between CBS and T₄.

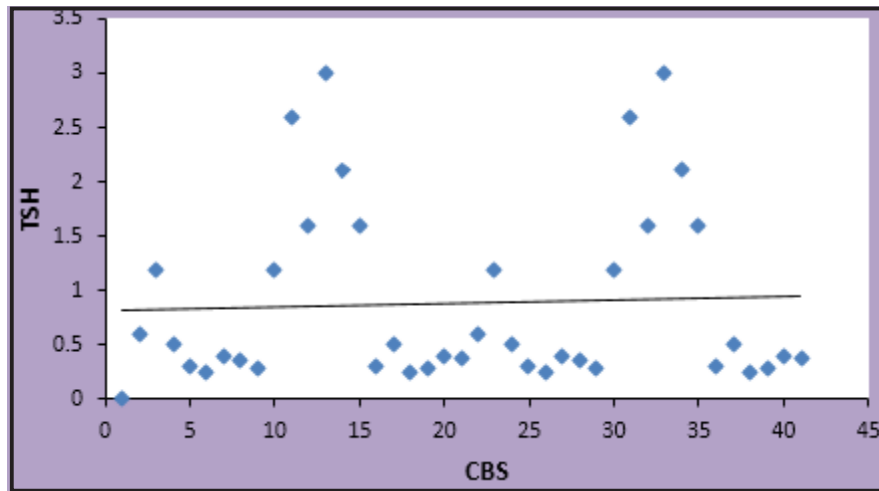


Fig. 4 : Correlation between CBS and TSH.

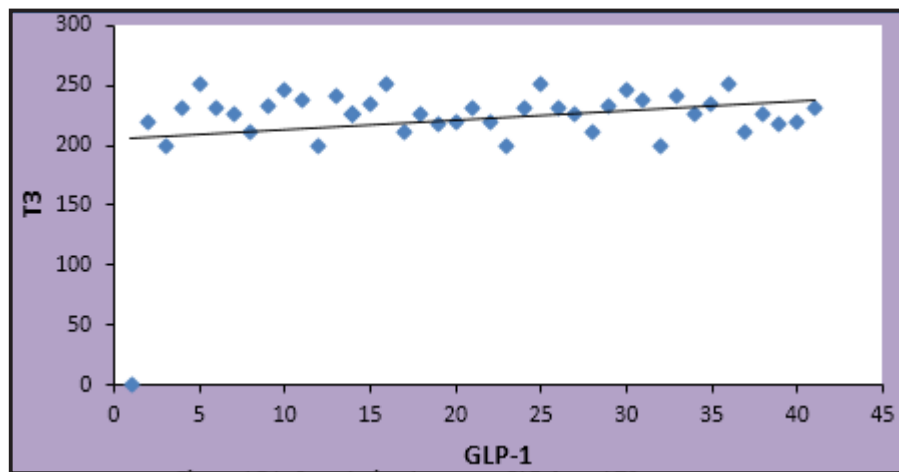


Fig. 5 : Correlation between GLP-1 and T₃.

Table 1 : CBS, GLP-1, T₃, T₄ and TSH in the sera of patients groups with Hyperthyroidism and healthy control.

	The group of patients (No. 40)	Control group (No. 40)	P value
Parameters	G1	G2	G1 vs. G2
CBS (ng/ml)	3.74±1.042	5.03 ±1.299	0.001
GLP-1 (ng/ml)	10.65±2.917	20.50±4.806	0.001
T ₃ (ng/dL)	227.14±14.836	140.63±43.143	0.001
T ₄ (ig/dl)	11.26±1.508	8.39±1.879	0.001
TSH(ml IU/L)	0.91±0.838	2.71±0.633	0.001

decreasing (P value ≤ 0.001) in GLP-1(10.65 ±2.917) in patient group one (G1) compared with healthy control (G2) (20.50 ± 4.806).

GLP-1 receptor agonists increase satiety, reduce appetite, induce weight loss, reduce intestinal motility, slow gastric emptying, and decrease postprandial glucose levels (Sfairopoulos *et al*, 2018). Glucose intolerance and hyperglycemia may develop in patients with hyperthyroidism due to the effect of incretin hormones (glucagon-like peptide-1 [GLP-1] and gastric inhibitory

Table 2 : The correlations between CBS and some bio-chemical parameters.

Parameters		CBS
GLP-1	R	- 0.240
	P	0.135
T ₃	R	0.219
	P	0.175
T ₄	R	-0.183
	P	0.258
TSH	R	- 0.078
	P	0.630

polypeptide [GIP]) (Cira *et al*, 2017).

The levels of T₃ and T₄ in Hyperthyroidism patients were a high significant (P value ≤ 0.001) increasing (227.14 ± 14.836) and (11.26 ± 1.508) compared with healthy control (140.63 ± 43.143) and (8.39 ± 1.879), while there was a high significant decreasing (0.91 ± 0.838) in TSH in G1 as compared with healthy control (2.71 ± 0.633).

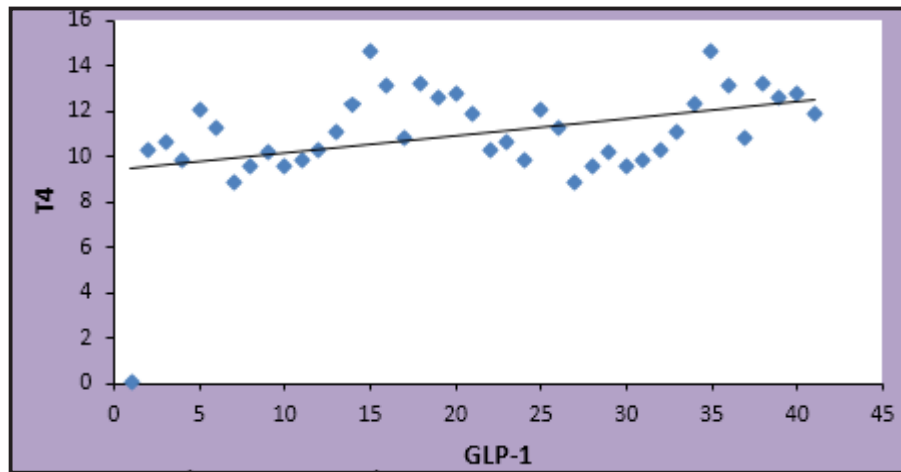


Fig. 6 : Correlation between GLP-1 and T₄.

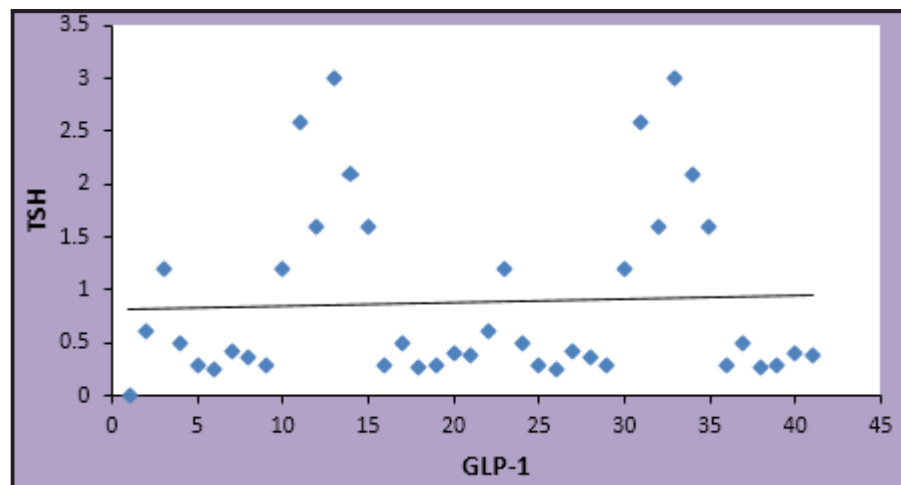


Fig. 7 : Correlation between GLP-1 and TSH.

Table 3 : The correlations between GLP-1 and some bio-chemical parameters.

Parameters		GLP-1
T ₃	R	- 0.601
	P	0.001
T ₄	R	- 0.319
	P	0.045
TSH	R	0.252
	P	0.116

There was a non- significant (P value > 0.05) negative (-ve) correlation between CBS with GLP-1, T₃, T₄ and TSH, as Table in 2, Figs. 1, 2 and 3 for G1.

Also in Table 3 shows high significant (P value ≤ 0.001) negative (-ve) correlation between GLP-1 with T₃, while non significant (P value > 0.05) negative (-ve) correlation was found between GLP-1 and T₄ and positive (+ve) correlation was found between GLP-1 and TSH as Table in 3, Figs. 5, 6 and 7 for G1.

CONCLUSION

This study aimed to determination cystathionin beta synthase (CBS), glucagon like peptide-1, TSH, T₃ and T₄, in Iraqi patients with hyperthyroidism to find the relationship for this parameters with CBS that due to predictor for those patients may be led to complicated from hyperthyroidism to diabetic.

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