ISSN: 1813-1638

The Medical Journal of Tikrit University

Available online at: www.mjotu.com

Biochemical study of Thyroid Hormones in Pregnant Women in Tikrit City

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***Keywords*:**

TSH,
T3,
T4,
Pregnant women,
Tikrit City

ARTICLE INFO

Article history:

Received 01 June 2019
Accepted 01 Aug 2019
Available online 01 Dec 2019

ABSTRACT

Background: this study include The thyroxin's act on nearly every cell in the body and show Hypothyroidism , Hyperthyroidism ,and Thyrotoxicosis in pregnant women in Tikrit city .

Aim To identify thyroid hormones changes pregnant women in city Tikrit for the screening period of November – January determine the value of thyroid hormone (T3, T4 and TSH) , and evaluate the association between them.

Patients and Methods: the samples was conducted in Salah Addin Hospital from ,the patients was 40 case and the control samples was 20 sample . the same ages and for the period from 9\7to 11\7. All patients were (females) the range of is age from 20 to 45 years, and with Control Groups were 40 personal normal women ,They were collected from the medical staff and patients relatives who were free from signs and symptoms of thyroid disorder.

Result :Serum TSH, T3 and T4 were determined in hyperthyroidism, hypothyroidism and normal control (immunoassay). The mean concentration of serum TSH level in patient with hyperthyroidism sd<mean (0.18±0.31) are significantly lower than the mean of normal control (5.40+3.8) as shown in table (1) A study done by, mean TSH level was non significantly (p>0.05) decreased compared with non-pregnant

Conclusion: The differences between the measurements may be due to the different characteristics of the study subjects such as, in current study most women were using non-iodized salt. While, most of the studies were take only subjects in both groups that consuming iodized salt

DOI: http://dx.doi.org/10.25130/mjotu.25.02.12

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Introduction

Thyroid hormone is critical to normal function of cells. In excess, it both over stimulates metabolism and exacerbates the effect of the sympathetic nervous system, causing "speeding up" of various body systems and symptoms resembling an overdose of epinephrine (adrenaline). These include fast heart beat and symptoms of palpitations, nervous system tremor such as of the hands and anxiety symptoms, digestive system hypermotility, unintended weight loss, and (in "lipid panel" blood tests) a lower and sometimes unusually low serum cholesterol.[1] The thyronines act on nearly every cell in the body. They act to increase the basal metabolic rate, affect protein synthesis, help regulate long bone growth (synergy with growth hormone) and neural maturation, and increase the body's sensitivity to catecholamines (such as adrenaline) by permissiveness.[2]. Although this general functional model has considerable experimental support, there remain many open questions. [3]Hypothyroidism, also called underactive thyroid or low thyroid, is a common disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormone.[4] It can cause a number of symptoms, such as poor ability to tolerate cold, a feeling of tiredness, constipation, depression, and weight gain.[5] Occasionally there may be swelling of the front part of the neck due to goiter.[6] Untreated hypothyroidism during pregnancy can leads to delays in growth and intellectual development in the baby, which is called cretinism.[7]

Hyperthyroidism, also known as over active thyroid and hyperthyreosis, is the condition that occurs due to excessive production of thyroid hormone by the thyroid gland.[8] Thyrotoxicosis is the condition that occurs due to excessive thyroid hormone of any cause and therefore includes hyperthyroidism.[9] Some, however, use the terms interchangeably.[10] Signs and symptoms vary between people and may include irritability, muscle weakness, sleeping problems, a fast heartbeat, poor tolerance of heat, diarrhea, enlargement of the thyroid, and weight loss. Symptoms are typically less in the old and during pregnancy.[11] An uncommon complication is thyroid storm in which an event such as an infection results in worsening symptoms such as confusion and a high temperature and often results in death.[12] The opposite is hypothyroidism, when the thyroid gland does not make enough thyroid hormone.[13]

Patients and Methods:

Sampling:

Been completed research samples in Salah Addin hospital laboratories , the study was conducted on patients and the control samples of the same ages and for the period from 9 \ 7 up to 11 \ 7, and divided the samples studied to the following groups:

Group 1 : Control Group consisted of 30 sample

Group I I: consisted of 30 patients with hyperthyroidism

Groups I I I : consisted of 30 patients with hypothyroidism

Have been subjected to all patients and the control group to a questionnaire Questionnaire included a lot of information that

The subject of study and as shown attached to the form- :

-the name of the employee:

-Gender: age:

-X- Type:

As it has been the exclusion of workers who suffer from chronic diseases such as diabetes, stress and other

Collection of blood Samples

Blood samples were collected current study by dragging of venous blood using a syringe and placed in plastic tubes Plain tubes with tight and free cover article anticoagulant , and left at room temperature until it was clotting and was placed in a centrifuge for 10 minutes, and on the speed 3000 rpm, serum was withdrawn mediated minute Micropipette absorbent and placed in a clean, sterile tubes and saved in case of freezing when the temperature (-20) degrees Celsius until you make biochemical tests.

Statistical analysis

Results were analyzed statistically using ready- analysis software (SPSS) was tested compared to the moral differences between the groups using a polynomial Duncan test at the level of probability of $P < 0.01$.

Measure the effectiveness of hormone.

Have been identified on the effectiveness of hormones by the way , which has the use of two test tubes for each sample , the first is a sample , and the other is the Planck , the first control sample and the second sample was prepared according to the method described by the company to determine the effectiveness of the two hormones using a special table for each of these hormones ELISA [14[

Result :

Serum TSH, T3 and T4 were determined in hyperthyroidism, hypothyroidism and normal control (immunoassay). The mean concentration of serum TSH level in patient with hyperthyroidism (0.18 ± 0.31) are significantly lower than the mean of normal control ($5.40+3.8$) as shown in table (1) A study done by Zarghamiet al., found that, mean TSH level was non significantly ($p>0.01$)

decreased compared with non-pregnant subjects which was similar to the result of present study(13) and Mehranet al., showed that, mean TSH value was non significantly decreased in the third trimester(14). This result was similar to the result of current study .and The Mean concentration of serum TSH level in patients with hypothyroidism (15.5±1.04) higher than the mean of normal control (5.38±2.70) as shown in table (2) this result obtained from standard curve of TSH as shown in figure (3). The mean concentration of serum T3 level in patients with hyperthyroidism (4.9±0.8) are significantly higher than the mean of normal control (1.21±0.210) as shown in table (1) and the mean concentration of T3 level in patients with hypothyroidism (0.4±0.1) are significantly lower than the mean of normal control (1.13±0.27) as shown in table (1) this result obtained from standard curve of T3 as show in figure (3). The mean concentration of serum T4 level in patient with hyperthyroidism (4.5±4.6) are significantly higher than the mean of normal control (8.93±3.13) as shown in table (1) and the mean concentration of T4 level in patient with hypothyroidism (3.0±0.5) are significantly lower than the mean of normal control (8.04±3.10) as show in table (2). This result was obtained from standard curve of T4 as show in figure (4) Changes in albumin concentrations affect the binding of T4 and T3 to carrier proteins which lower the blood levels of T4 and T3 whenever pregnancy progresses (15) . In the third trimester of pregnancy serum T4 and T3 levels decrease . A decrease in free hormone will be further amplified when the iodide nutrition status of the mother is restricted or deficient(16) .

Table (1) comparison between patients with hyperthyroidism and control group in females

Number of patient (n)	Hyperthyroidism	Control
Mean of age	42±9.8	30.78±12.1
TSH µIU/ml	0.18±1.31	5.40±3.8
Total T3 (µg/ml)	4.9±0.8	1.21±0.210
Total T4 µg/dl	4.5±4.6	8.93±3.13

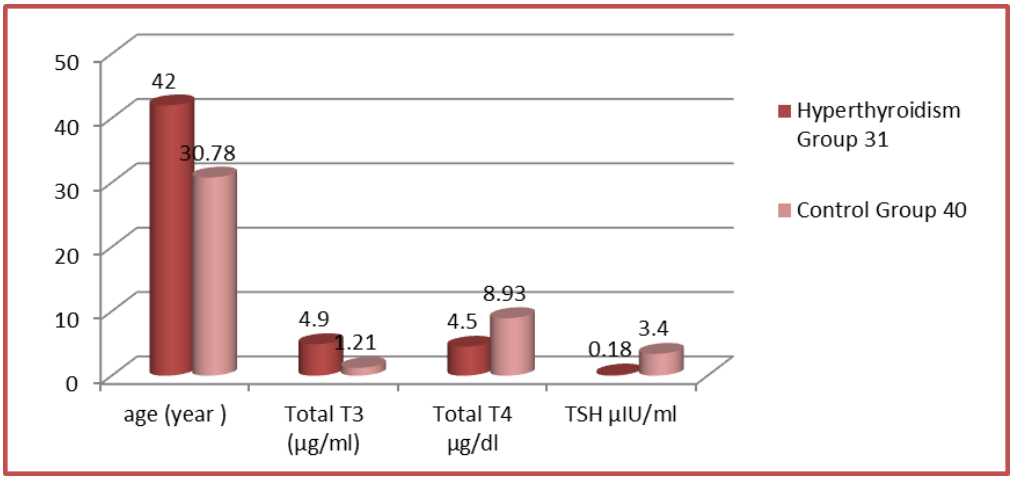

Figure (3) comparison between patients with hyperthyroidism and control group in females

Table (2)) comparison between patients with Hypothyroidism and control group in females

Number of patient (n)	Hyperthyroidism	Control
Mean of age	43±13.1	42.7±12.1
TSH µIU/ml	15.5±1.04	5.38±2.70
Total T3 (µg/ml)	0.4±0.1	1.13±0.27
Total T4 µg/dl	3.0±0.5	8.04±3.10

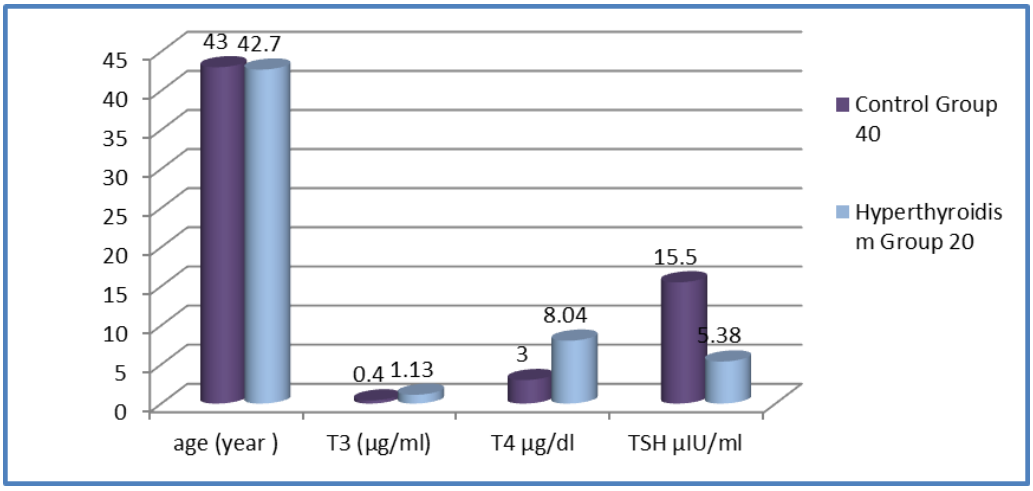

Figure (4)) comparison between patients with Hypothyroidism and control group in females

Conclusion:

Standard curve of TSH.

To determine the thyroid stimulating hormone used in this study the immunoassay technique , plot the standard curve between the absorption (Y axis's) and the concentration of TSH hormone (X axis's) in µIU/ml , obtained the strata line with equation(Y= 0.1542x+0.1136) and R2 =0.9998 as shown in figure (3) .

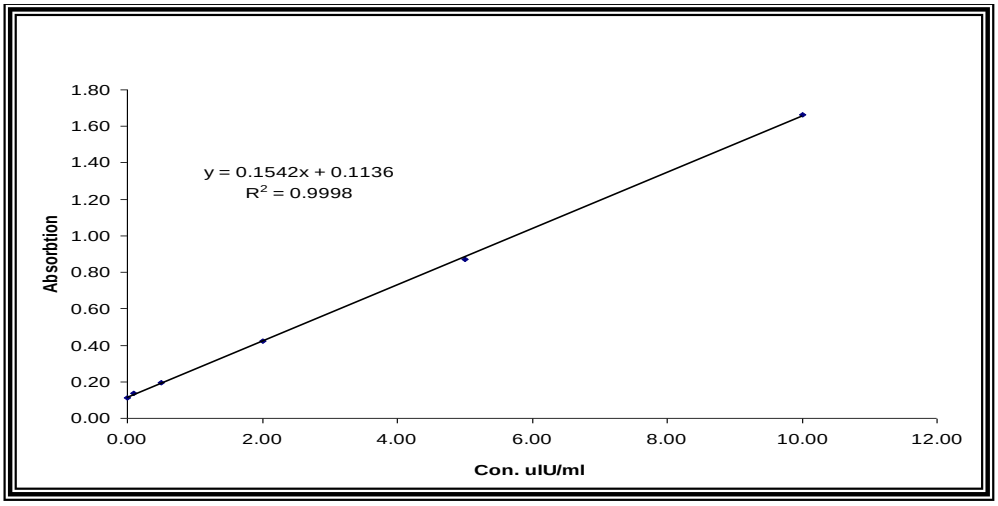

Figure (3) standard curve of TSH.

Standard curve of T3.

To determine the triiodothyronine hormone used in this study the immunoassay technique, plot the standard between the absorption (Y axis's) and the concentration of T3 hormone (X axis's) in µg/ml, obtained the curve with equation (Y=-0.1404x+1.8657) and R2 =0.9851 as show in figure (4).

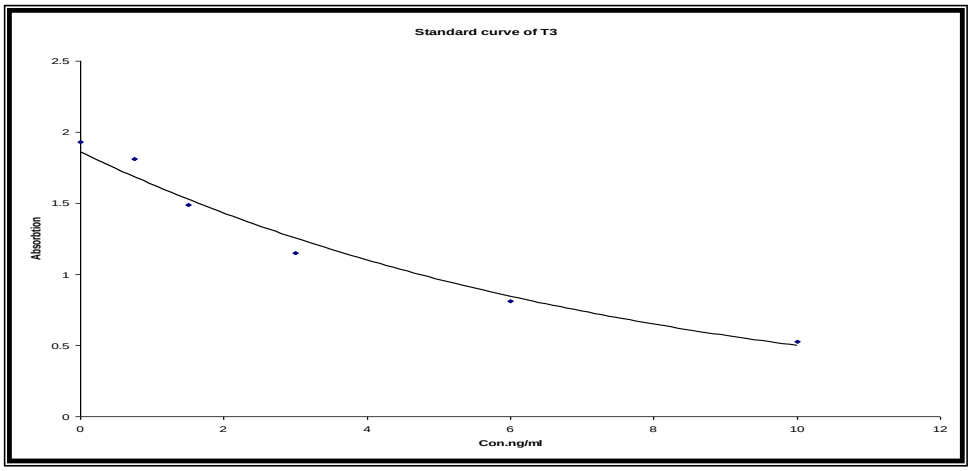

Figure (4) Standard curve of T3.

Standard curve of T4.

To determine the Tetraiodothyrionine hormone used in this study the immunoassay technique, plot the standard between the absorption (Y axis's) and the concentration of T4 hormone in µg/dl, obtained the curve with equation(Y= -0.05x+1.41) and R2=0.6908 as show in figure (5).

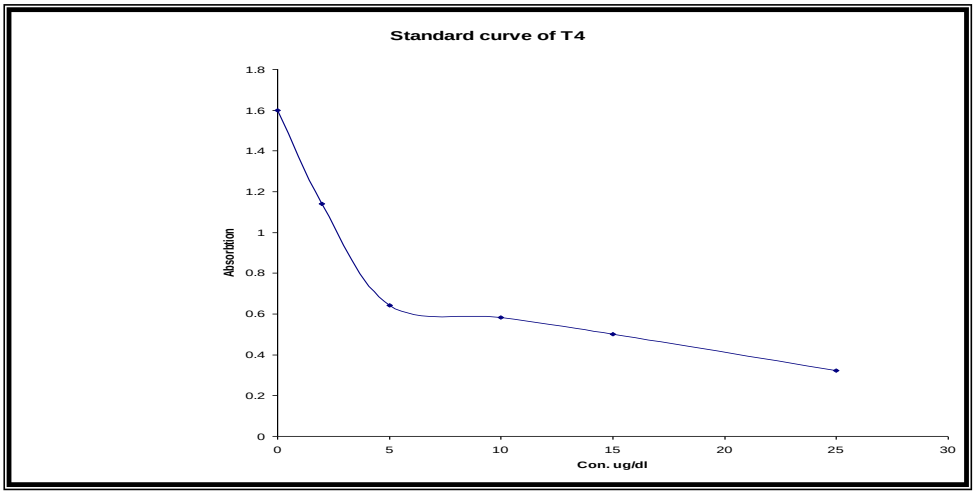

Figure (5) Standard curve of T4

Discussion:

These results compared with results of other studies in which, it was noticed that, it differs from the results of Pasupathi et al., study when compared the mean values of each thyroid function test between pregnant and non-pregnant women . They found that, the mean TSH, mean T4 and mean T3 were significantly lower in pregnant women in comparison with non-pregnant(19).Also differs from the results of Zarghamiet al., study when compared overall mean of thyroid function test of pregnant to non-pregnant women, they noticed a significant decline in mean T4 and T3 levels with non-significant decrease in TSH level in pregnant women compared with non-pregnant one and this result was similar to the result of current study(13). Reasons for these differences may be due to the sample size . Besides that, in the present study have only the subjects that have changes in hormones while other studies have all subjects . Present study results were similar to the Erem et al(20)., study who carried out a study pregnant women and healthy non-pregnant women (control) in eastern Black Sea region on maternal thyroid function in women .

The results of present study were different from the results of The varajah et al., study. They found in their study a non-significant increase in the mean TSH level from the second to the third trimester . Mean T4 level was significantly declined from the second to the third trimester of pregnancy . Mean T3 level was non significantly decreased from the second to the third trimester(17). Also, different from the study results of Dhattet al., who found that, there was no significant difference of thyroid hormones between second and third trimesters (18) .

The differences may be due to the different characteristics of the study

subjects such as, in current study most women were using non-iodized salt. While, most of the studies were take only subjects in both groups that consuming iodized salt.

References :

1- Boelaert ,K and J A Franklyn. "Thyroid hormone in health and disease "Journal of Endocrinology ,(2015) . Vol . 187 , pp. 1-15.

2- Paul M. Yen, "Physiological and Molecular Basis of Thyroid Hormone Action "Physiological Reviews , (2011) .Vol. 81,No. 3 , PP. 1097-1142 ,

3- Kreuzberg ,U and Theissen " Single- channel a activity and expression of atrial L- Type Ca +2 channel in patients with latent hyperthyroidism "AJP –Heart and circulatory physiology , (2010) Vol. 278 , Issue 3 , PP.723-730

4- Beate ,K and Janos H, " TSH receptor mutation V509 A causes familial hyperthyroidism by release of interhelical constraints between transmembrane helices TMH3 and TMH5 "Journal of Enocrinology , 2015.Vol. 186 , PP. 377 -385.

5- Dr. U. Satyanarayana M.Sc., Ph.D., F.I.C., F.A.C.B. Professor of biochemistry .biochemistry UPPALA AUTHOR-PUBLISHING INTERLINKS, Publisher: Arunabha Sen. (2013) P 487.P 463 P460 .

6- Michelle G. Synthesis of thyroid hormone. Physiology;38:31-34

7- Sacher, Ronald; Richard A. McPherson. Wilmanns Clinical interpretation (2013) P 87.P 462 P463 .

8- Kenneth A. American college of physicians. Management of hyperthyroidism and hypothyroidism 2011 ; 24: 60-67.

9-Buckingham BA, Costin G, Roe TF, et al(Hyperthyroidism in children) . Am J Dis child . 2011;135(2) :112-7.

10- Emanuel O. Bram's, MD A Case –Based and practical Guide for Primary Care.1998 , P63

12- Young , D. S.. Effects of disease on clinical Iab tests. (2011) , 4th ed.

13-Zarghami, N., Rohbani-Noubar, M., &Khosrowbeygi, A.. Thyroid hormones status during pregnancy in normal Iranian women. Indian Journal of Clinical Biochemistry, (2015) 20 (2), 182–185.

14- Mehran, L., Amouzegar, A., Delshad, H., Askari, S., Hedayati, M., Golshan, A.,et al.. Trimester-specific reference ranges for thyroid hormones in Iranian pregnant women. Journal of Thyroid Research, (2011) .1-18.

15- Panesar, N. S., Li C. Y., & Rogers, M. S.. Reference intervals for thyroid hormones in pregnant Chinese women. Ann. Clin. Biochem. (2011) , 38(4), 329–332.

16- Demers, L., M., & Spencer, C. A.. Laboratory support for the diagnosis and monitoring of thyroid disease. The national academy of clinical biochemistry, vol., 2012, 1–125.

17- Thevarajah, M., Chew, Y. Y., Lim, S. C., Sabir, N., &Sickan, J.. Determination of trimester specific reference intervals for thyroid hormones during pregnancy in Malaysian women. Malaysian J. Pathol. (2009), 31(1), 23–27.

18- Dhatt, G. S., Jayasundaram, R., Abdul-Wareth, L., Nagelkerke, N., Jayasundaram, K., Darwish, E. A., et al.. Thyrotrophin and free thyroxine trimester-specific reference intervals in a mixed ethnic pregnant populatio-n in the United Arab Emirates. Clinica., Chimica., Acta. (2013), 370, 147–151.

19- Pasupathi, P., Chandrasekar, V., & Kumar, U. S.. Thyroid hormone changes in pregnant and non-pregnant women: A case-control study. Thyroid Science, 2009. 4(3), 1–5.

20- Erem, C., Kavgaci, H., Karahan, C., Mocan, M. Z., &Telatar, M.. Thyroid function tests in pregnant women with and without goiter in the eastern Black Sea region. Gynecol. Endocrinal(2010)., 15(4), 293–297.