Function of thyroid gland of normal healthy pregnant women during the second trimester of pregnancy.

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Abstract :

Background **:** During pregnancy, the mother's thyroid gland undergoes many physiological changes, leading to an increase in thyroid volume which is often associated with higher urinary iodine excretion. *Aim of study:* To study the levels of thyroid function in second trimester of pregnancy. *Subjects and methods:* A longitudinal study was conducted in Gynecological clinics at Alalm city Salah din Government from the 1st of August 2016 to the end of march 2017. Ninety pregnant women were participated in the study. About 10 ml of venous blood was drawn from pregnant woman. Samples were collected between (9-11) A.M., after overnight fasting, the blood was drawn from the capital vein using disposable needles and syringes with using tourniquet in all cases. The blood was allowed to clot in plain tubes at room temperature. The serum was aspirated after centrifugation (at 3000 rpm) for 30 minutes, divided into liquates in plastic tubes and stored at deep freeze (-18_20C^0) until the time of estimation. ***Result*****:** The result show that, there is a high significant in T3 and T4 there are no significant difference between three month in TSH concentration as compare to its trimester. In other hand, there is no significant difference ($p \leq 0.001$) among pregnant of cholesterol , LDL and VLDL concentration. but there is there is significant difference ($p \leq 0.001$) among pregnant of triglyceride and HDL value when compare to different month. *Conclusion*: We calculated clinically relevant second trimester values for thyroid function tests through pregnancy to facilitate improved management of thyroid disease in pregnancy in our local population.

Key Words: Second trimester, Pregnancy, thyroid hormones, Lipid profile.

.وظيفة الغدة الدرقية في النساء الحوامل السليمات طبيعية خلال الثلث الثاني من الحمل

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الخلاصة

المقدمة: خلال فترة الحمل ، تخضع الغدة الدرقية للكثير من التغيرات الفسيولوجية ، مما يؤدي إلى زيادة في حجم الغدة الدرقية والتي غالبا ما ترتبط بزيادة إفراز اليود في البول. **الهدف من الدراسة**: دراسة مستويات وظائف الغدة الدرقية في الثلث الثاني من الحمل. **طرق البحث :** تم إجراء دراسة طولية في عيادات أمراض النساء في مدينة علم بمدينة صلاح الدين من 1 أغسطس 2016 حتى نهاية مارس 2017. شاركت 90 سيدة في هذه الدراسة. تم سحب حوالي 10 مل من الدم الوريدي من امرأة حامل. تم جمع العينات بين (9-11) صباحا ، بعد صيام بين عشية وضحاها ، تم سحب الدم من الوريد باستخدام الحقن الطبية . كان يُسمح للدم بالتجلط في أنابيب عادية عند درجة حرارة الغرفة. تم رش المصل بعد الطرد المركزي (عند 3000 دورة في الدقيقة) لمدة 30 دقيقة ، مقسمة إلى سوائل في أنابيب بلاستيكية وتخزينها في تجميد عميق حتى وقت التقدير. **النتائج**: تظهر النتيجة TSH لا يوجد فرق كبير بين ثلاثة أشهر في تركيز T4 و T3 أن هناك درجة عالية من الأهمية في بين الحوامل من تركيز ($p\leq0.001$) بالمقارنة مع الثلث الاول. من ناحية أخرى ، لا يوجد فرق كبير بين الحوامل من قيمة الدهون ($p\leq0.001$) ولكن هناك فرق كبير .VLDL و LDLالكوليسترول ، عند المقارنة بشهر مختلف. **الخلاصة**: حسبنا قيم الفصل الثاني ذات الصلة سريريا HDL الثلاثية و لاختبارات وظيفة الغدة الدرقية خلال الحمل لتسهيل إدارة محسنة لمرض الغدة الدرقية في الحمل في السكان المحليين.

الكلمات المفتاحية: الثلث الثاني- الحمل, مرتسم الدهون و ظيفة الغدة الدرقية

Introduction:

Pregnancy trimester were define according to the American College of Obstetricians and Gynecologist' definition: Frist trimester (1-3)weeks, second trimester (14_26) weeks, and third trimester (27) weeks . [1] During pregnancy, the extrathyroid T4 pool is increase in order to maintain hemostasis of the free hormone concentration, so that at the beginning of pregnancy the thyroid adjustment is continuous and T4 and TBG levels are constantly change. [2,3] During pregnancy, the mother's thyroid gland undergoes many physiological changes, leading to an increase in thyroid volume which is often associated with higher urinary iodine excretion. It is also associated with the formation of new thyroid nodules with the histological features of nodular hyperplasia, [4]. Very early in pregnancy, the increase in estrogen levels causes an approximate doubling in thyroxine binding globulin (TBG) that can lead to an increases in total T4 concentration and a reduced free fraction In healthy women, the final effect consists of a significant increase in the total thyroxine pool, mainly in the first trimester [4,5].

Evident maternal thyroid failure during the first half of pregnancy has been associated with several pregnancy complications including preeclampsia, premature labor, fetal death and low birth weight and intellectual impairment in the offspring, [6].Most of the changes in maternal metabolism and inflammatory status are considered to be normal physiological responses to support fetal growth and development. These changes typically return to pre-pregnancy states soon after delivery. These adverse pregnancy outcomes are associated with increased future

risk of diabetes and cardiovascular disease both in mothers and offspring, though the extent to which these are causal or reflect pre-existing maternal risk is unclear [7].

The **Aim** of study is to study the levels of thyroid function in second trimester of pregnancy.

Subjects & methods:

A longitudinal study was conducted on Gynecological clinics at Alalm city Salahdin Government from the 1st of August 2016 to the end of march 2017. Ninety pregnant women were participated in the study. healthy pregnant women, aged between 18 - 41 years. About 10 ml of venous blood was drawn from pregnant woman. Samples were collected between (9-11) A.M., after overnight fasting, the blood was drawn from the capital vein using disposable needles and syringes with using tourniquet in all cases. Two ml blood was mixed with anticoagulant EDTA for analyzing hematological parameters. Four ml of clotted sample was used to determine the levels of thyroid hormone and four ml for determine lipid profile. The blood was allowed to clot in plain tubes at room temperature. The serum was aspirated after centrifugation (at 3000 rpm) for 30 minutes, divided into liquates in plastic tubes and stored at ($-20C^0$) until the time of estimation. VIDAS Techniques used for estimated thyroid hormones and Cobas c 111 analyzer used for estimated lipid profile.

Results

The age range was (18 to 41) years. Regarding T3: there is a high significant differences ($p \leq 0.007$) in mean and stander deviation of T3 value of pregnant in month one (1.626 ± 0.325),

month two (2.187 ± 0.572) and month three (2.581 ± 0.618), as show in table (1) .

There is 37.23% increase in concentration of T3 compare to normal range. Regarding T4: there is a high significant reduction (p≤ 0.005) in mean T4 value of pregnant in month one (140.00±34.81), month two (121.43±32.54) month three (97.77± 18.58), As show in table (1) .

There is 30.2% reduction in concentration of T4 compare to normal range. Regarding TSH: there are no stander differences among three month (P>0.652) in TSH value month one (1.127 ± 0.734), month two (1.265 ± 0.542) and month three (1.266 ± 0.624).), As show in table (1).

There is 10.98% change in concentration of TSH compare to normal range. Regarding cholesterol : there is no significant difference (p≤0.001) among pregnant of cholesterol value in month one (198.67 ± 36.47mg/dl) , month two (209 ±29.04 mg/dl) and month three (193.73 ± 26.55), As show in table (2).

Regarding triglyceride: there is significant difference (p≤0.052) among pregnant of triglyceride value in month one (152.40 ± 40.45 mg/dl) , month two (170.63 ±35.12 mg/dl) and month three (168.93 ±32.75 mg/dl), As show in table (2).

Regarding HDL : there is significant difference (p≤0.001) among pregnant of HDL value in month one (59.65± 11.78 mg/dl) , month two (64.16±14.11mg/dl) and month three (54.26±13.34 mg/dl), As show in table (2).

Regarding LDL: there is no significant difference (p≤0.866) among pregnant of cholesterol

value in month one (107.66 ±25.59mg/dl), month two (108.37±25.32mg/dl) and month three (104.97± 26.85mg/dl), As show in table (2).

Regarding VLDL: there is no significant difference (p≤0.117) **Regarding HB**: there is highly significant difference (P≤0.001) in HB among three months month one (**10.123± 1.040**gm/dl), month two (**9.403 ± 1.144** mg/dl) and month three (**10.727±1.562**mg/dl**)**, as show in table (4.3) & figure (1).

In present study we found elevated T3, which was significant and decrease in T4 value and TSH is stay stable in second trimester as compared to other trimester. Kumar et al16 measured serum levels of T3, T4, and TSH in 124 pregnant women that were apparently normal, healthy young primigravidas with no known

among pregnant of cholesterol value in month one (30.77 ±7.91mg/dl) , month two (34.12±7.02) and month three (34.68±8.48mg/dl), As show in table (2).

Regarding PCV: there is a significant reduction **(P≤0.004)** in mean PCV value in month one **(33.553 ± 3.431%),** month two **(31.230 ± 3.761%)** and month three **(28.060 ± 4.645)** , as show in table (3).

Discussion

metabolic disorders and normal carbohydrate gestational intolerance test. They found that mean TT3 increased during the second trimester and then declined in the third trimester compared to the first trimester. This is in agreement to our study where TT3 level increased the Kumar *et al.* also showed mean TT4 level rose

in the second trimester and then decreased during the third trimester . Kumar et al. also found that the mean of TSH levels rising progressively through the trimesters of pregnancy.[8]

Reference:

1. Bourjeily, G., Chalhoub, M., phornphutkul, C., *et al.* Neonatal thyroid function: effect of a single exposure to iodinated contrast medium in utero. Radiology . rsna.org ; 2010. 256(3), 744_750.
2. Mansourian, A. R. Thyroid function tests during first-trimester of pregnancy: A review of literature. Pakistan journal of biological sciences; 2010. 13(14), 664_673.
3. Pe'rez_Lo'pez F. R. (2007). Iodine and thyroid hormone during pregnancy and postpartum. Gynecological endocrinology, 22 (5), 1_15.
4. Shah MS, Davies TF, Stagnaro-Green A. The thyroid during pregnancy: a physiological and pathological stress test. Minerva Endocrinol. 2003; 28: 233-45.
5. Alexander EK, Marqusee E, Lawrence J, *et al*. Timing and magnitude of increases in levothyroxine requirements during pregnancy in women with hypothyroidism. N Engl J Med. 2004; 351: 241-9
6. Brent GA. The debate over thyroid-function screening in pregnancy. New Eng J Med. 2012; 366: 562–563.
7. Rich-Edwards JW, Fraser A, Lawlor DA, Catov JM. Pregnancy characteristics

and women's future cardiovascular health: an underused opportunity to improve women's health? Epidemiol Rev. 2014; 36: 57–70.

8. Kumar A, Gupta N, Nath T, Sharma JB, Sharma S. Thyroid function tests in pregnancy. Indian J MedSci 2003; 57: 252-8.

Table (1) the mean and standard deviation of thyroid hormone

Parameters	**Month 1**	**Month 2**	**Month 3**	**P-value**
T3	1.626 ± 0.325	2.187 ± 0.572	2.581 ± 0.618	0.001
T4	140 ± 34.81	121 ± 32.54	97.77 ± 18.58	0.001
TSH	1.127 ± 0.734	1.265 ± 0.542	1.266 ± 0.624	NS

Table (2) The mean & SD of lipid profile

Parameters	**Month 1**	**Month 2**	**Month 3**	**P-value**
Cholesterol (mg/dl**)**	198.67 ± 36.47	209 ±29.04	193.73 ± 26.55	NS
Triglyceride (mg/dl**)**	152.40 ± 40.45	170.63 ±35.12	168.93 ± 32.75	0.052
HDL mg/dl	59.65 ±11.78	64.16 ±14.11	54.26 ±13.34	0.017
LDL mg/dl	107.66 ±25.59	108.37 ±25.32	104.97 ±26.85	NS
VLDL mg/dl	30.77 ±7.91	34.12 ±7.02	34.68 ±8.48	NS

Table (3) the mean and standard deviation of Hemoglobin and pack cell volume (PCV) in the 1st, 2nd and 3rd month of pregnacy.

Parameters	Month 1	Month 2	Month 3	P- value
HB g/dl	**10.123 ± 1.040**	**9.403 ± 1.144**	**10.727 ± 1.562**	**0.001**
PCV %	**33.553 ± 3.431**	**31.230 ± 3.761**	**28.060 ± 4.645**	**0.001**