

Establishment of Serum GOT & GPT in Pregnant Women Through trimesters in holly Al- Najaf Governorate

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Abstract:

The search of a new parameters for monitoring and even pregnant women are still an impartment issue in many research fields. Some studies focused on the role of Glutamate Oxaloacetate Transferase (GOT) status, while others concentrated on Glutamate Pyruvate Transaminase(GPT) disturbances or even stress disorders of liver function. This study was conducted on randomly selected 70 pregnant women attending in Al-Zahra hospital for delivery in Al- Najaf province. The subject were divided into three main Trimester groups: 1st Trimester group(10 pregnant women).2nd Trimester group (20 pregnant women) & 3^{ed} Trimester group :(20 pregnant women)and Control group (20 non pregnant women).

The study was carried out from 1/7/ 2013 – 1/4/2014.The age of subject and control groups were range of 15-45years.The results show significant increase ($p < 0.05$) for concentration of both GOT&GPT in 2nd trimester in subjects as compared with control group and same groups. Also there was a relationship between age and enzyme activity.

Introduction:

First trimester, Traditionally, medical professionals have measured pregnancy from a number of convenient points, including the day of last menstruation, ovulation, fertilization, implantation and chemical detection. In medicine, pregnancy is often defined as beginning when the developing embryo becomes implanted in the endometrial lining of a woman's uterus[1]. Most pregnant women do not have any specific signs or symptoms of implantation, although it is not uncommon to experience minimal bleeding. After implantation, the uterine endometrium is called the decidua. The placenta, which is formed partly from the decidua and partly from outer layers of the embryo, connects the developing embryo to the uterine wall to allow nutrient uptake, waste elimination, and gas exchange via the mother's blood supply[2].. The umbilical cord is the connecting cord from the embryo or fetus to the placenta. The first 12 weeks of pregnancy are considered to make up the first trimester. Weeks 13 to 28 of the pregnancy are called the second trimester The developing embryo undergoes tremendous growth and changes during the process

of fetal development. and growth of the abdomen between 26 weeks and 40 weeks gestation[3]..

Aminotransferase:

The aminotransferases constitute a group of enzymes that catalyze the interconversion of amino acid and alpha-ketoacids by transfer of amino groups. These group consist of two enzymes:

□ Alanine aminotransferase: (L-Alanine:2-Oxoglutarate Aminotransferase, ALT, formerly Glutamate Pyruvate Transaminase, and (GPT).

□ Aspartate aminotransferase: (L-Aspartate: 2-Oxoglutarate Aminotransferase, AST, formerly Glutamate Oxaloacetate Transferase, (GOT).Three letters abbreviation, AST and ALT, have been suggested for the Aminotransferase are widely distributed in animal tissues, they aurorally present in human plasma. GOT is present in high concentration in cell of cardiac and skeletal muscle, aminotransferase, together with the old abbreviation GOT and GPT still in use[4].

Both enzymes are present in high concentration in the liver [5]., their activities in liver are 7000-and 3000-fold higher than serum activities, respectively .They are considered as a soluble cytoplasmic and mitochondrial enzymes, GPT is solely cytoplasmic, but GOT is located in the cell cytoplasm and in the mitochondria [6].These enzymes are released from the cell and their serum levels are increased in liver necrosis or abnormal membrane permeability [7].

Alanine and Aspartate aminotransferases indicate not only the liver cell damage but also demonstrate the type of the cellular damage [9]. In conditions associated with a mild degree of tissue injury, the predominant form in serum is that from the cytoplasm, although some mitochondrial enzyme is also present. Severe tissue damage results in the release of much mitochondrial enzyme as well. Alanine aminotransferase has longer half-life than GPT. The half-life of total AST is 17 ± 5 h, while that of GPT is 47 ± 10 hours [10].

Transamination play a key role in intermediary metabolism as it provides a means for the synthesis and degradation of amino acid in living cells. The process involves the intermolecular transfer of an amino group from a donor alpha-amino acid to an acceptor alpha-keto acid without intermediate formation of ammonia [11]. GOT catalyzes the reaction in equation (1),and GPT catalyzes the analogous reaction in equation (2) as shown in fig.(1) :

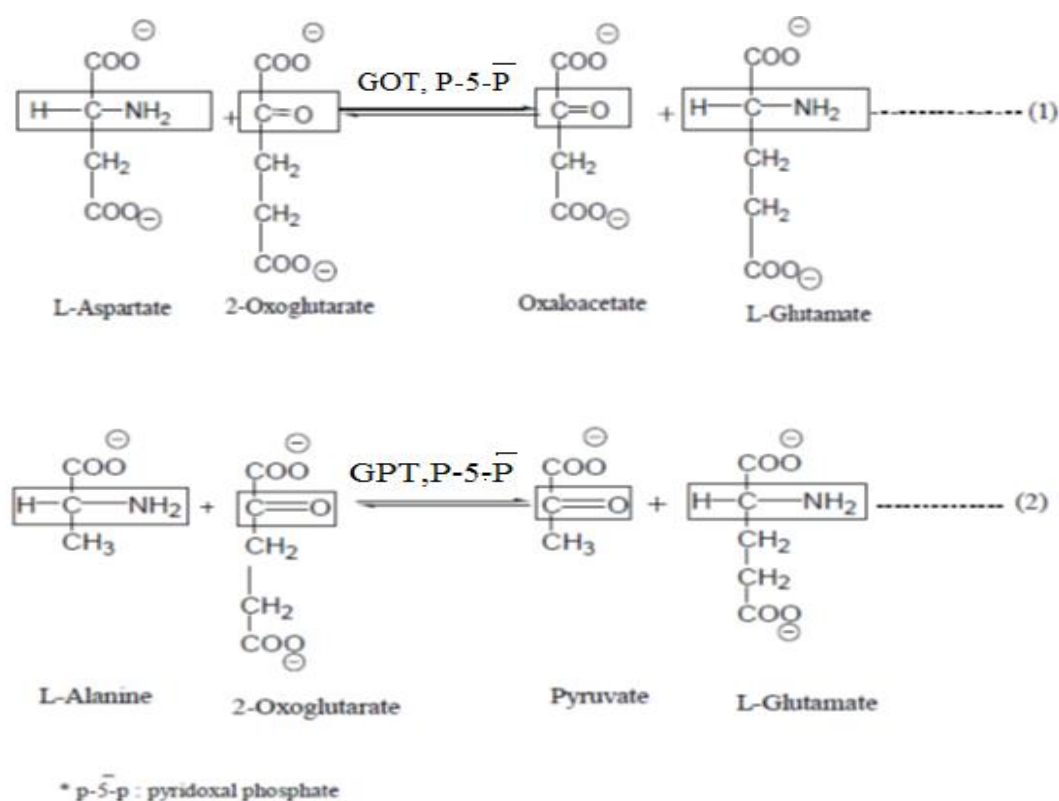


Fig. 1: GOT ,GPT play a role in intermediate reactions in living cells

Age:

The age of individuals affect the values of many blood constituents, enzymes activity is associated with age of individuals in both sexes. Serum GOT activity is moderately higher during the neonatal period than in adults, and until approximately age 15 years, GOT activity is slightly higher than that GPT [12]. In adults, GOT activity tend to be lower than that of GPT until approximately age 60 years, when the activities become roughly equal. An informal survey of attendees at a national meeting indicated that fewer of laboratories have age .

Material and Method :

. The spacemen (n=90) were collected from AL zehra hospital for delivery subjects and this study was carried out from 1/4/2013 to 1/3/2014,, having age group between 25–45 years,. The blood samples were collected into the sample bottles without anticoagulant. Soon after the blood samples were centrifuged at 2500 rpm for 10 minutes and the serum was separated out and stored in refrigerator for analysis. The serum was used to investigate, m respectively 5ml blood was taken and centrifugation for measured GOT & GPT activity in sera of individuals according to the method of Reitman and Frankel [13].Also determination the activity of GOT & GPT from the

standard curve obtained from the serial dilution of standard pyruvate solution .Fig (2 & 3).

Statistical analysis :

The result were expressed as mean \pm SD and analyzed statistically by Spss system ver.20[14].. The association between factors and the enzymes activity were analyzed by using student t-test and ANOVA analysis. student t-test was used to Express the association between the enzyme activity with age between the levels of enzymes and the various factors were performed by the linear regression analysis($p < 0.05$).

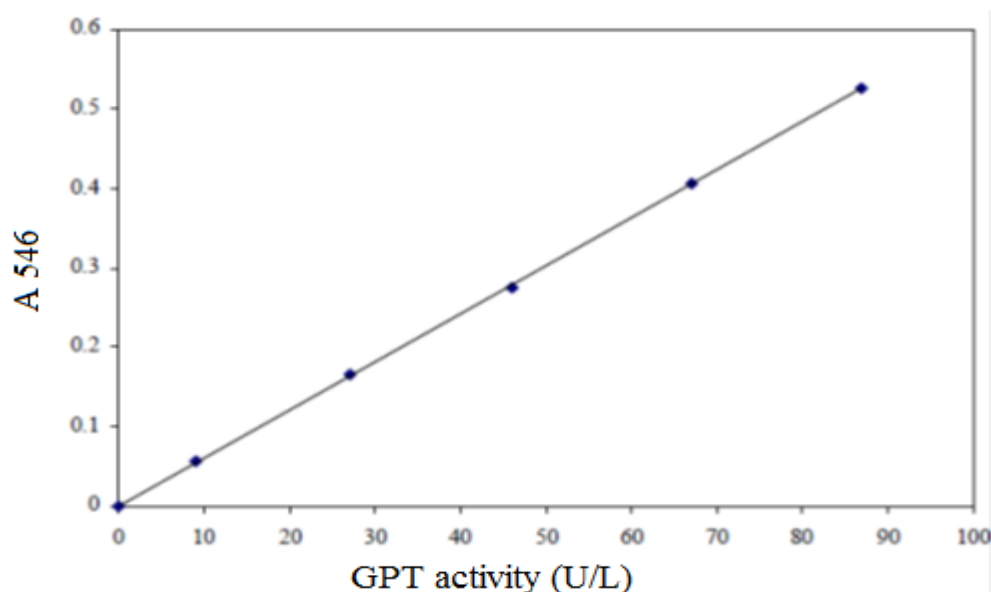


Fig. 2 : Standard curve for determination of GPT

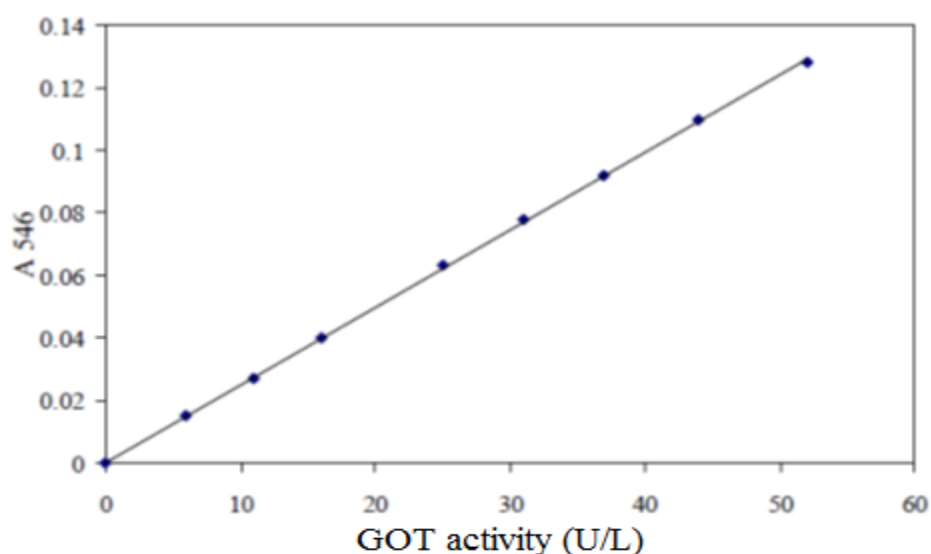


Fig. 3 : Standard curve for determination of GOT

Result and Discussion

Determination of GOT&GPT (U/L)through trimester contrast with control group:-

In a current study, no significant change found in concentration of GOT&GPT for 1st and 3^{ed} groups as compared with control group. As shown in figure (4), but there was, a significant increase in GOT ($p < 0.05$) in 2nd group, as compared with same & control groups .As shown in figure (4). This significant may be related with the progesterone hormone which elevated among the gestation period, or may be related for anemia [15].

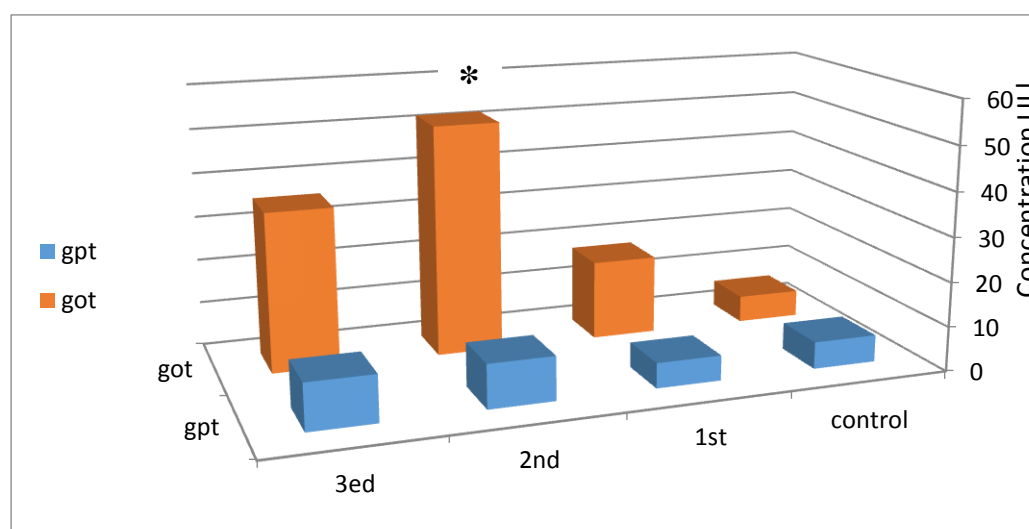


Fig .4:Determination of GPT&GOT(U/L) for study groups contrast with control group.

* means significant difference at ($p < 0.05$) between groups.

Determination of GOT&GPT (U/L)through trimesters contrast with age:-

In a current study, no significant change found in concentration of GOT&GPT for 1st and 3^{ed} groups as compared with control group . As shown in figure (5), but there was, a significant increase in GOT ($p < 0.05$) in 2nd group , as compared with control group and between same groups.

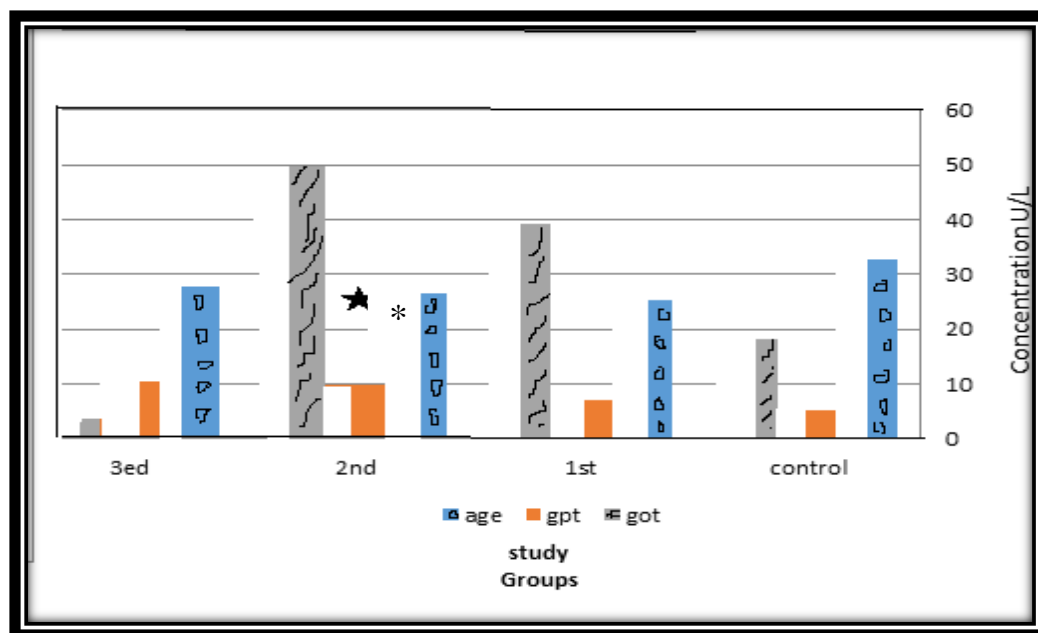


Fig .5:Determination of GOT & GPT (U/L) for study groups contrast with age
 * means significant difference at ($p < 0.05$) between groups.

.As shown in fig (5). this significant may be related to change of concentration of sex female hormones that's related with age women, menopausal women which cause a stress [16], so there is a correlation between age and study groups (fig.4&5)

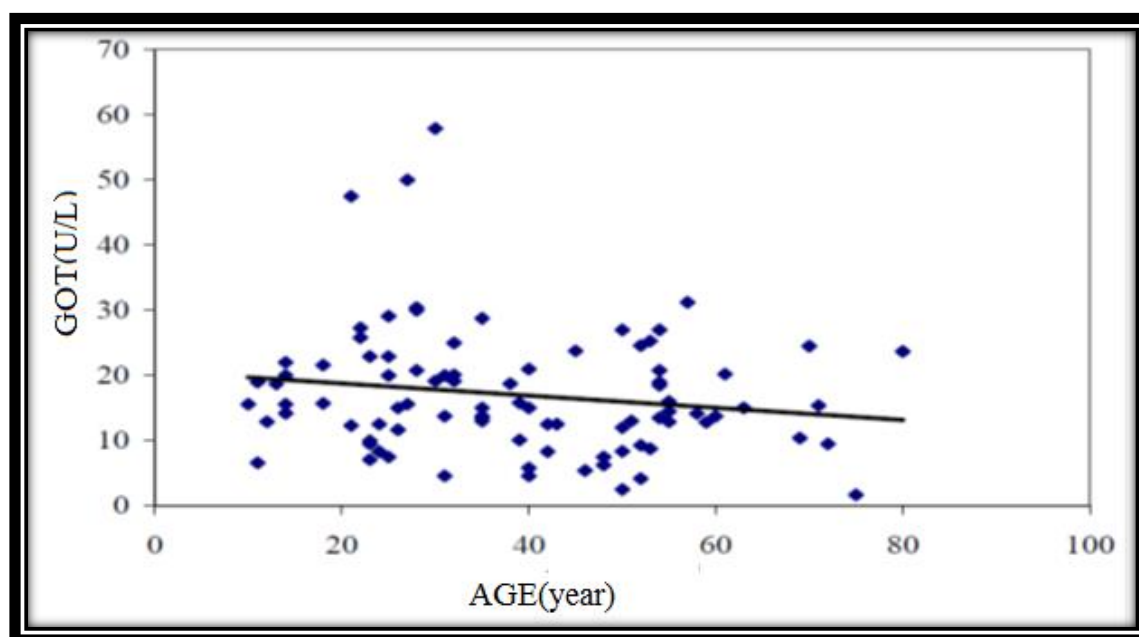


Fig 4: Correlation of serum GOT activity with age

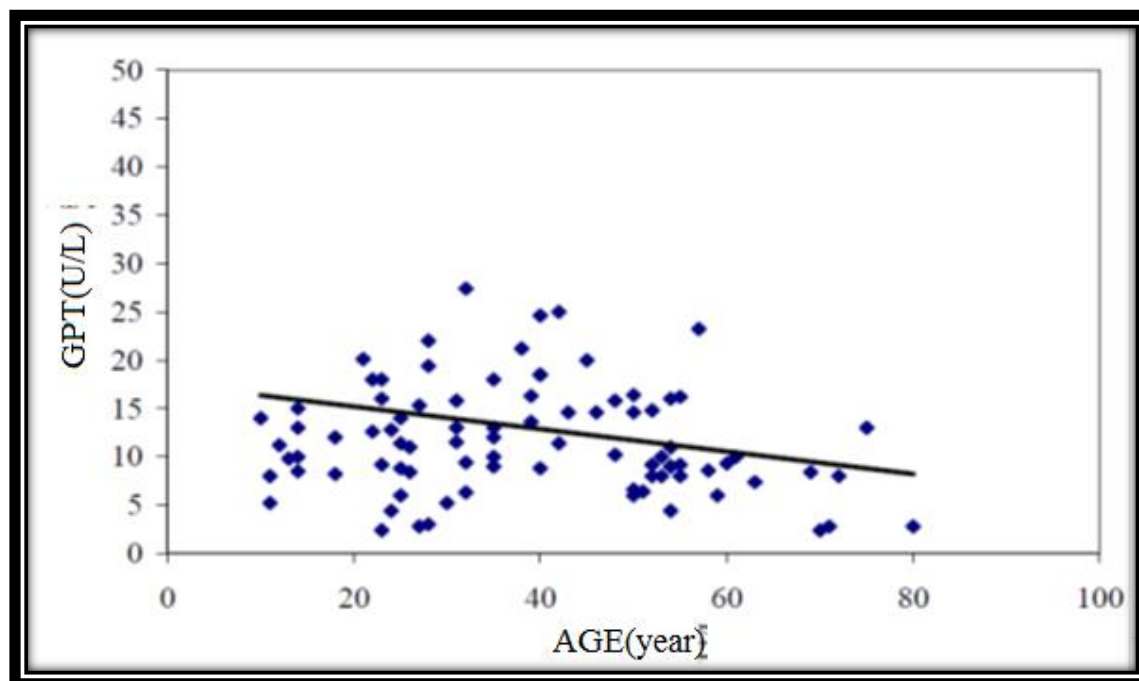


Fig. 5: Correlation of serum GPT activity with age

But Tsesis et al [17] revealed that plasma enzymes (GPT and GOT) showed no-significant change throughout pregnancy. Highest GPT level was observed at the end of 1st trimester and highest GOT level was observed at the end of 3^{ed} trimester. During pregnancy serum transaminases remained within the normal range. So a slight increase in GOT level at the end of 1st and 3^{ed} trimester are indicative of specific stress during pregnancy. Liver cell injury or necrosis is measured by determining the activity of alanine amino transferase.(ALT)(GPT) and aspartate amino transferase (AST) (GOT). In most published studies, GPT and GOT serum activity were found to be within normal limits during pregnancy. In a recent paper of Dr. Bacq, et al [18] Serum alanine amino transferase was slightly but significantly higher during the second trimester, but was no different during the third trimester. Values were within normal ranges. The serum GOT activity was during all three trimester not significantly higher than in the control group. An increase in GOT and GPT levels was found during labor, which might be caused by contractions of uterine muscle[19],.

Reference

1.Sadler,T.W.Langman's Medical Embryology 10th edition .Lippincott & wilkins.2009.

2. Baby's Best Chance. Fourth revision sixth^{ed} 2013. WWW.British Columbia.gow.ink.Ca.
3. Huang. Xing-Jiu , Choi, Yang-Kyu. Im, Hyung-Soon. Yarimaga. Oktay, Yoon. Euisik, (Aspartate Aminotransferase (AST/GOT) and Alanine Aminotransferase (ALT/GPT) Detection Techniques. *Sensors* 2006, 6, 756-782.
4. Sigal, S and Doly LW. An overview of morality and sequelae of preterm birth from infancy to adulthood. *Lancet* 2008 ;371 (9608):261-9.
5. Dufour, Lott, Nolte, Gretch, Koff: Guidelines for performance of laboratory tests of liver function and injury, performance specifications for laboratory tests. *Am Assoc Clin Chem.* 64;2027-2049, 2000.
6. Hyeon CK, Chang MN, Sun H: Normal serum aminotransferase concentration and risk of mortality from liver diseases: prospective cohort study. *BMJ* 24: 328(7446); 983, April 2004.
- 7 . Jaeschke H. Molecular mechanisms of hepatic ischemia-reperfusion Injury and preconditioning. *Am J Physiol Gastrointest Liver Physiol* 2003;284:G15–G26.
8. Rahman TM, Wendon J. Severe hepatic dysfunction in pregnancy. *Q J Med* 2002;
9. Price CP, Alberti KG: Biochemical assessment of liver function. In: 95: 343-35
- 10 .Wright R, Alberti KG, Karran S, Mill ward-Sadler GH, eds. Liver and biliary disease-pathophysiology, diagnosis, management. London: WB Saunders; 381-416, 1979.
11. EC Niederhoffer et. al.: Biochemistry and molecular biology. P9, 1999.
12. Siest G, Schiele F, Galteau M, Panek E, Steinmetz J: Aspartate aminotransferase and alanine aminotransferase activities in plasma: statistical distributions, individual variations, and reference values. *Clin Chem* 21; 1077-1087, 1975.

13. Reitman S., and Frankel S.: A colorimetric method for the determination of serum glutamic oxaloacetic and glutamic pyruvic transaminase. *Am J Clin Pathol.* 28; 56-62, 1957.
14. Norusis, M. IBM SPSS Statistics Base 20. Prentice Hall. 2011.
15. Stephen JT et. al.: Dietary and seasonal influences on blood chemistry and hematology in captive harbor seals. *Marine Mam Sc*, 22(1); 104-123, 2006.
16. Tsesis S1, Gruenbaum BF, Ohayon S, Boyko M, Gruenbaum SE, Shapira Y, Weintraub A, Zlotnik A. The effects of estrogen and progesterone on blood glutamate levels during normal pregnancy in women. *Gynecol Endocrinol.* 2013 Oct;29(10):912-6. doi: 10.3109/09513590.
17. Bacq Y, Zarka O, Brechot JF, Mariotte N, Tichet SVJ, Weill J. Liver function test in Normal Pregnancy: A prospective Study of 103 Pregnant Women and 103 Matched Control. *Hepatology* 1996; 23(5): 1030-1034.
18. Guntupalli RS, Steingrub J. Hepatic disease and pregnancy: An overview of diagnosis and management. *Crit Care Med* 2005; 33(10.Suppl.): 332-339.
19. JC Phelan and BG Link: When income affects outcome: Socioeconomic status and health. www.inhhcpar.rutgers.edu/rwj/downloads/research-in-profile-iss06-feb2003.

معرفة الاداء الوظيفي لأنزيمي GPT&GOT لدى النساء خلال فترة أثلث الحمل في العمر الانجابي

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الخلاصة :

تم تقدير القيم الطبيعية للأسبارتيت امينو ترانسفيريز (AST) (GOT), والألنين أمينو ترانسفيريز (ALT) (GPT) في أمصال كل من مجاميع الدراسة والسيطرة. إذ تضمنت الدراسة 90 امرأة بالعمر الانجابي موزعة كالتالي :

المجموعة الأولى وتمثل الثلث الأول وتشمل 10 امرأة حامل و المجموعة الثانية وتمثل الثلث الثاني وتشمل 20 امرأة حامل. اما المجموعة الثالثة وتمثل الثلث الثالث وتشمل 20 امرأة حامل. والمجموعة الرابعة :- وتمثل مجموعة السيطره وتشمل 20 امرأة متزوجة غير حامل. تراوحت الأعمار لكافة المجاميع من (15-45) سنة ,فضلا عن ذلك فقد تم تقويم تأثير عامل العمر والتي قد تؤثر على هذه القيم عند مستوى احتمالية ($P < 0.05$).

اشارت نتائج الدراسة الى وجود انخفاض معنوي ($P < 0.05$) في مستوى تركيز أنزيم GOT في الثلث الثاني للحمل مقارنة مع مجاميع الدراسه ومجموعة السطرية . كذلك لوحظ انخفاض معنوي ($P < 0.05$) في مستوى تركيز أنزيم GOT في الثلث الثاني للحمل .

أظهرت نتائج تقويم تأثير العمر على فعالية الأنزيمات بوجود علاقة ارتباطية بين العمر وفعالية الأنزيمات بينت الدراسة نتائج قيم بعض الأنزيمات , وتقترح الأخذ بنظر الاعتبار تأثير عامل العمر عند تفسير نتائج قياسات فعاليات هذه الأنزيمات