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Assessment of concentration total protein & Albumin and some liver enzymes in contrast with age for pregnant women through trimesters of gestation in holly Al- Najaf Governorate/ Iraq

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Abstract:

The present study is conducted to verify the serum Total protein and Albumin protein and some liver enzymes for pregnant women through Trimester period. In addition and other factors was sought for their effects on the established this value , like age.80 pregnant women were enrolled ,including 20 subject for first trimester and 20 for second trimester ,20 for third trimester in addition for control group (20). The results indicated for a significant decrease ($p<0.05$) of Total protein concentration in 2nd trimester that combined with the studying group beside to control group, while Albumin levels showed a significant ($p<0.05$) decrease in studying groups in respect with those of control group. 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 liver enzymes (GOT&GPT) in 2nd trimester in subjects as compared with control group and same groups. Also there was a relationship between age and both proteins& enzyme activity.

Conclusion: The lack of protein and reducing concentration of liver enzymes during development, compromises the integrity of the structural and functional liver. Manifested in adulthood.

Introduction:

Pregnancy is a period of increased metabolic demands with changes in the women's physiology and the requirements of a growing fetus [2]. Gestation is a period between conception and delivery and has been associated with increased dietary protein requirements in human. During their period of rapid growth, the fetus and placenta accrue proteins very rapidly [4]. Protein and vitamin deficiencies are common feature in pregnant women belonging to the lower socioeconomic groups, thus affecting serum protein concentrations [2]. Protein status is usually assessed by measuring levels of total serum proteins, albumin, or plasma non-essential and essential amino acid ratio [21]. A direct relationship of quality and quantity of dietary proteins with decrease in plasma proteins in cases of protein malnutrition has been reported and maternal malnutrition may be aggravated by pregnancy [5]. Variation in the level of serum proteins occur

between racial groups and under physiological and pathological conditions [6]. Changes in serum studied by a number of investigators using a variety of pregnancy have been proteins concentration during techniques. The patterns so far reported are not in complete agreement with each other [8]. The needs of protein for net deposition in maternal tissues and growth of the fetus and placenta are not distributed evenly throughout pregnancy. The maternal protein is preferentially deposited early in pregnancy, which potentially can be the placenta and fetus at a later stage [2]. Serum total proteins of 4.49, 5.55, 4.73 and 5.31 g/100ml are measured in pregnancies between diabetic and non-diabetic women, respectively. The differences between diabetic and non-diabetic and between pregnant and menopausal women are non-significant [8]. Serum total proteins decrease during pregnancy [12]. pregnancy has a suppressing effect on serum protein values to that of menopausal age ,which may partly be due to sharing of serum proteins during pregnancy occurs from 7.3 g/100ml in 3rd trimester. The decrease in serum protein is mainly due to accretion of proteins by the fetus [17]. Serum protein concentration is markedly lower in the course of pregnancy .the maximum difference of total proteins is observed in 32 and 36 weeks [12] protein level decrease during pregnancy may be due to an increase in demand by the fetus [9].

Albumin concentration contributes significantly to the alterations of serum total protein level [13]. During pregnancy plasma volume is significantly higher while albumin level is significantly lower than non-pregnant women. The cause of increased volume is mainly hormones, because aldosterone and estrogens, increase fluid retention by the kidneys [18]. Albumin levels decreases at the end of 3rd. During pregnancy, the changes in maternal plasma are due to progressive haemodilution which result from fluid retention . this is maximal at about the 30th week and the effects are more in the reduced concentration of albumin and of calcium which is bound to albumin [7].

Aminotransferase:

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

*Alanine aminotransferase: (L-Alanine: 2-Oxoglutamate 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 [13].

Both enzymes are present in high concentration in the liver [14], 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. [These enzymes are released from the cell and their serum levels are increased in liver necrosis or abnormal membrane permeability [14].

Alanine and Aspartate aminotransferases indicate not only the liver cell damage but also demonstrate the type of the cellular damage [11]. 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 [12].

Material & 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, respectively 5ml blood was taken and centrifugation for measured GOT & GPT activity in sera of individuals according to the method of [16].Also determination the activity of GOT & GPT from the standard curve obtained from the serial dilution of standard pyruvate solution .Fig (2 & 3).

Chemicals:

Albumin and Total protein Kit were purchased from Biolabo SA laboratories, Maizy France.

Principle of total protein (GORNALL A1949, TIETZ,1995):

Colorimetric method described by Gornail and al. The peptide bonds of proteins react with cu^{2+} in alkaline solution to form a colored complex which absorbance proportional to the concentration of total protein in the specimen is measured at 550 nm. The biuret reagent contains sodium potassium tartrate to complex cupric ions and maintain their solubility in alkalin solution

REAGENTS

Vial R1 BIURET REAGENT	
Sodium hydroxide	370 mmol/L
Na-K Tartrate	10 mmol/L
Potassium iodide	3 mmol/L
Copper II sulfate	3 mmol/L
Vial R2 Standard	
Bovin Albumin	6g/dL

Procedure

	Reagent Blank	Standard	Assay
Reagent R1	**1 ml**	**1 ml**	**1ml**
Standard		**20 µl**	
Specimen			**20 µl**
Demineralized water	**20 µl**		

Principle of albumin (DOUMAS. 1971, DOUMAS, 1972)

In buffered solution at pH 4.2, bromocresol green binds albumin to form a colored compound which absorbance, measured at 630 nm (620-640) is proportional to the albumin concentration in the specimen

REAGENTS

Vail R1 BROMOCRESOL GREEN

Succcinic acid 83 mmol/L

Bromocresol green (BCG) 167µmol/L

Sodium hydroxide 50mmol/L

Polyoxyethylene monolauryl ether 1.00 g/L

Vail R2 STANDARD

Bovin albumin 5.0 g/L (725 µmol/L)

	Blank	Standard	Assay
Reagent	**2ml**	**2ml**	**2ml**
Demineralized water	**10µL**		
Standard		**10µL**	
Specimen			**10µL**

Statistical analysis:

The result were expressed as mean ±SD and analyzed statistically by Spss system ver.17. The association between factors and the enzymes activity were analyzed by using student t-test and ANOVA at levels of Albumin &Total protein used to express the association between the Levels of Albumin & Total protein with age.

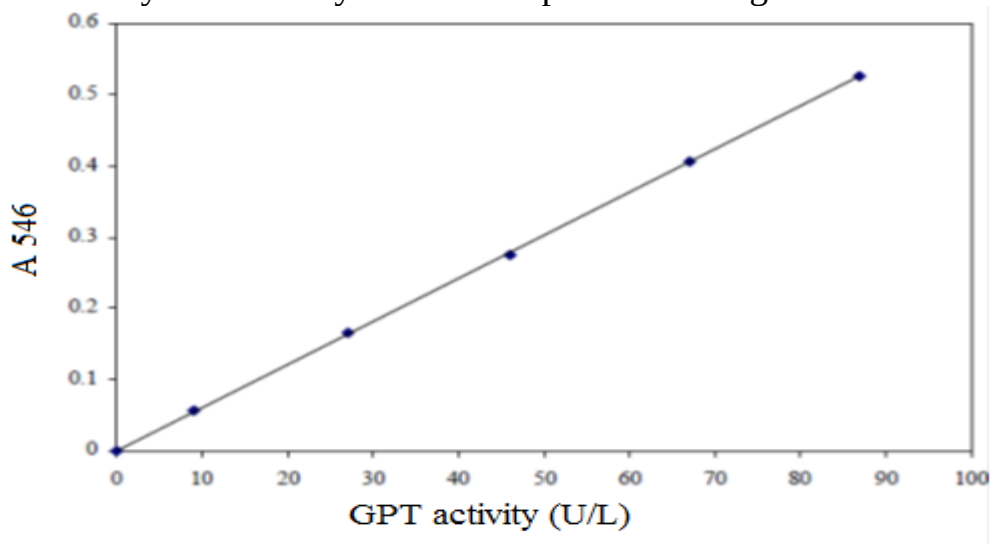

Fig. 2: Standard curve for determination of GPT

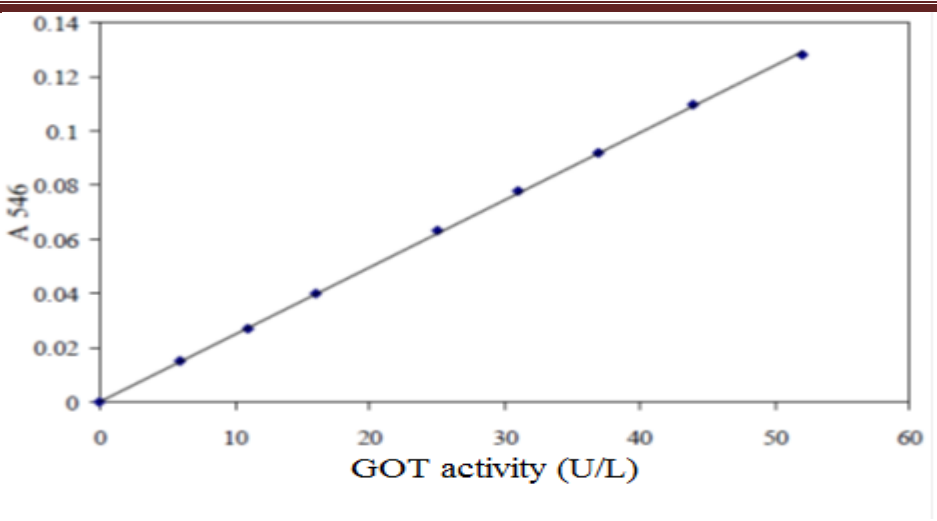

Fig. 3: Standard curve for determination of GOT

Results:

Determination of Total protein and Albumin contrast with control group:

In a current study, in dependent of appendix (1, 2, 3). There is no significant change found in concentration of Total protein for 1st and 3ed groups as compared with control group. As shown in figure (1), but there was, a significant decrease in Total protein ($p<0.05$) in 2nd group, as compared with same & control groups .As shown in figure (1). There is a significant decrease of Albumin concentration in all studying groups as compared with control group.

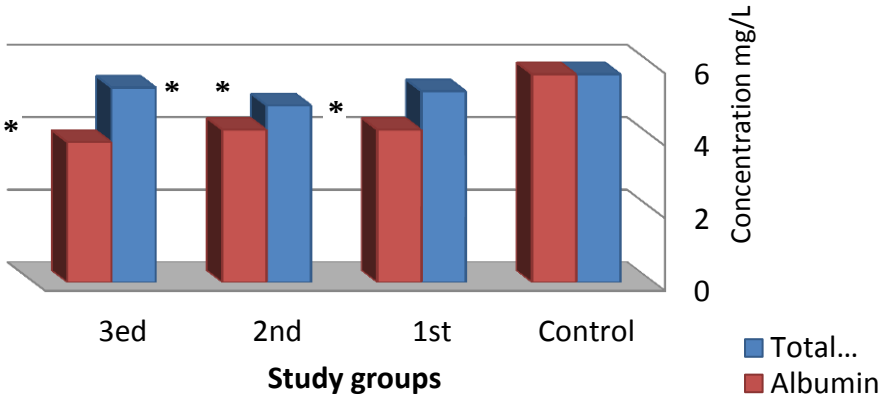

Fig. 1: Determination of Albumin & Total protein mg/dL for study groups contrast with control group.

May pregnancy is associated with significant change in the functions of normal liver. Although he precise mechanisms underlying these various alterations are not clear in every case, their recognition is essential to a proper clinical evaluation of liver abnormalities during pregnancy (Alonso).

Determination of Total protein and Albumin contrast age:

In a current study, A significant change ($p<0.05$) found in concentration of Total protein for 1st and 2nd and 3ed groups as compared with control group. As shown in figure (2), also a significant decrease in ($p<0.05$) in all groups, as compared with control groups. That's may related for The pregnant woman

experiences physiological changes to support fetal growth and development. During the pregnancy serum estrogens and progesterone levels increase progressively and reach a maximum during the third trimester. These sex steroids have effects on metabolic, synthetic and excretory hepatic function include proteins metabolism.

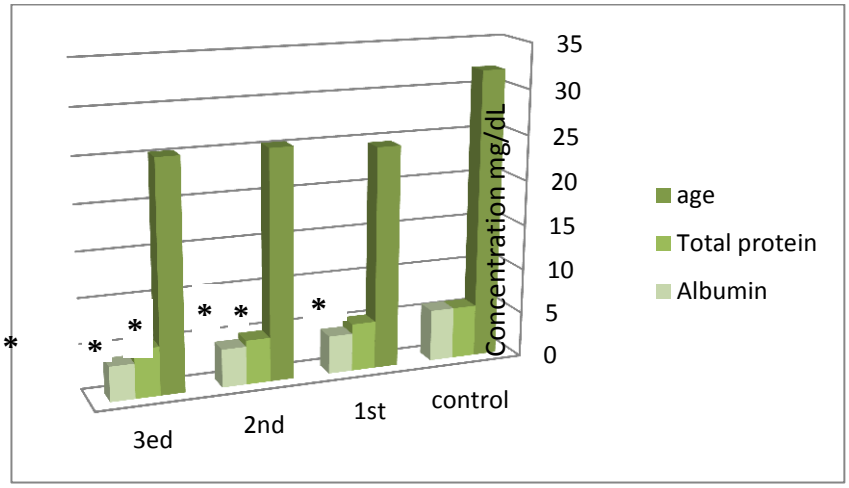

Figure 3.2:Determination of Albomin&Total protein mg/dLfor study groups contrast with age.

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

In a current study, no significant change found in concentration of GOT&GPT for 1st and 3ed 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 [18].

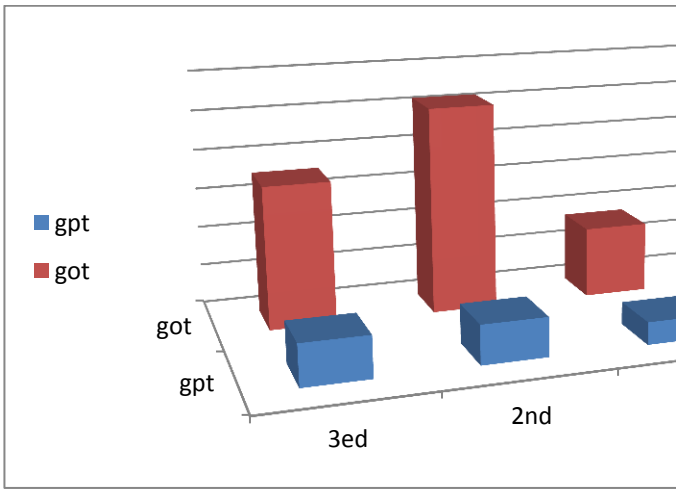

Fig .4:Determination of GPT&GOT(U/L) for study groups contrast with control group.

* 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 3ed 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.

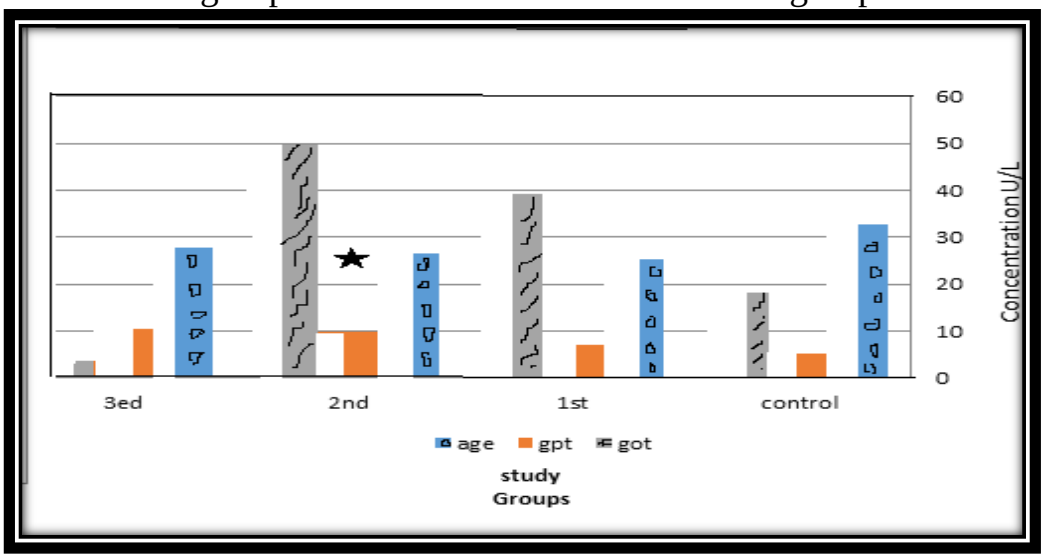

Fig .5:Determination of GOT & GPT (U/L) for study groups contrast with age

* 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).

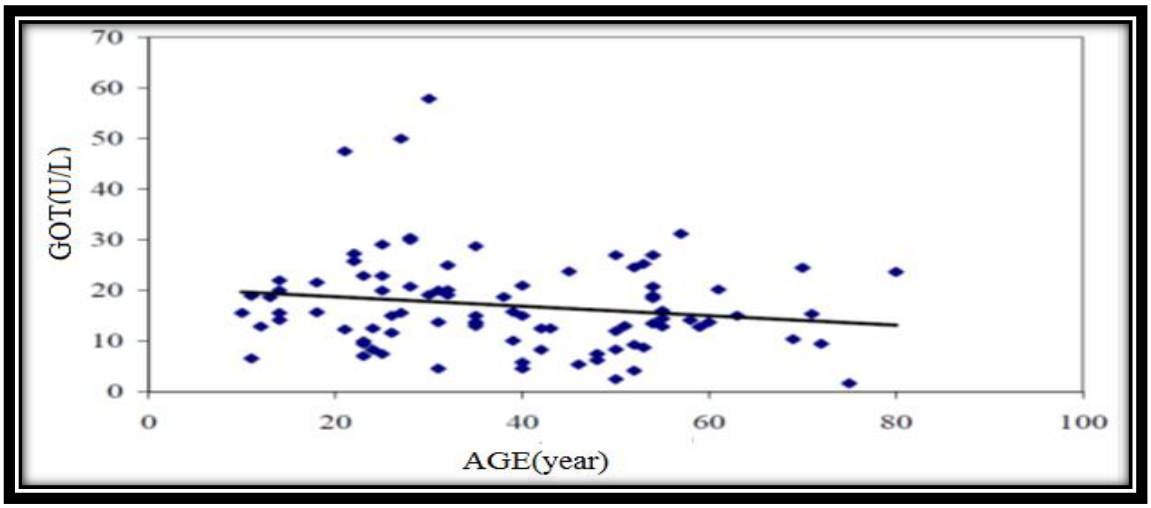

Fig 4: Correlation of serum GOT activity with age

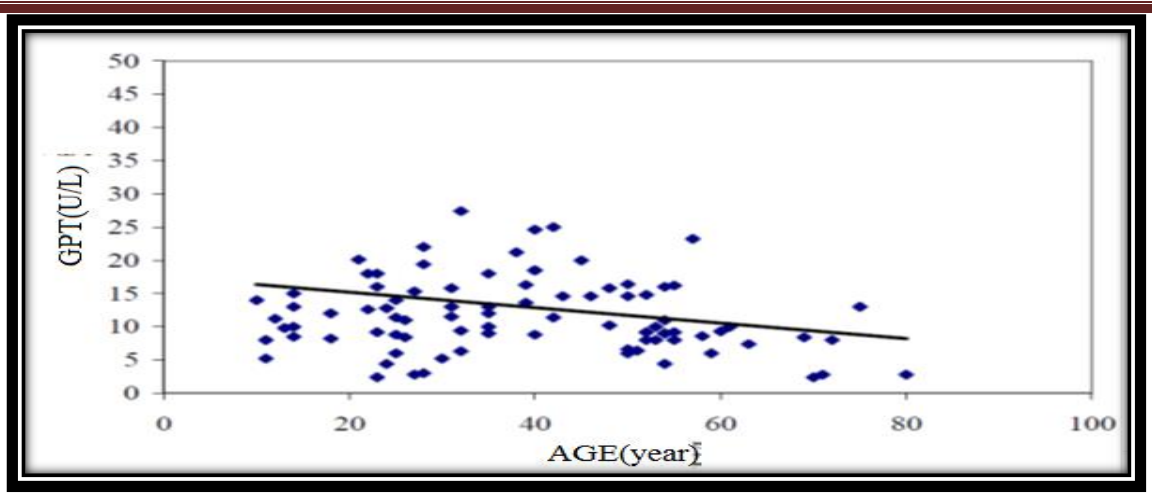

Fig. 5: Correlation of serum GPT activity with age

But [20] reveled 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 3ed trimester. During pregnancy serum transaminases remained within the normal range. So a slight increase in GOT level at the end of 1st and 3ed 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 publish studies, GPT and GOT serum activity were found to be within normal limits during pregnancy. In a recent paper [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 [22].

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APPENDEX (1) Analysis of variance of Age in individual at group study :

Age	1st	2nd	3rd	control
Mean	**24.57**	**25.35**	**25.0**	**32.0**
St. divation	**4.42**	**7.05**	**2.47**	**8.22**
St. error	**1.015**	**1.57**	**0.665**	**1.83**

APPENDEX (2) Analysis of variance of serum albumin concentration of individual group study:

Total protein	1st	2nd	3rd	control
Mean	5.27	4.88	5.37	5.74
St.error	0.179	0.228	0.183	0.117
St. diviation	0.523	0.523	1.024	0.819

APPENDEX (3) Analysis of variance of serum albumin concentration of individual at group study:

Albumin	1st	2nd	3rd	control
Mean	4.21	4.21	3.87	5.74
St.error	0.156	0.202	0.171	0.117
St. diviation	0.681	0.904	0.766	0.523

تقدير تركيز البروتينات الكلية وبروتين الالبومين وبعض انزيمات الكبد خلال اثلاث الحمل للنساء ضمن العمر الانجابي في محافظة النجف ألأشرف

أ . م . د سناء عبادي حبيب

الخلاصة:

ان البحث عن متغيرات جديده نافعة في تشخيص ومتابعة الحوامل من المجالات المهمة في حقل البحث حيث ركزت بعض الدراسات على حالة الحمل بينما ركزت بحوث اخرى على تقدير البروتينات بما فيها البروتينات الكلية والألبومين وبعض انزيمات الكبد كمتغيرات حاصلة في الكبد في اثناء فترات الحمل الثلاثية. اجريت هذه الدراسة على80 أمرأه حامل وبالعمر الإنجابي، المراجعات لمستشفى الزهراء للولادة محافظة النجف الاشرف وللفترة من 1/8– 2014/4/1. قسمت عينات الدراسة الى اربع مجاميع كالأتي:-

المجموعة ألأولى: وتمثل الثلث ألأول وتشمل 20 أمرأه حامل، والمجموعة الثانية: وتمثل الثلث الثاني وتشمل 20 أمرأه حامل، والمجموعة الثالثة: وتمثل الثلث الثالث وتشمل 20 أمرأه حامل، أما المجموعة الرابعة: وتمثل مجموعة السيطرة وتشمل 20 أمرأه متزوجة غير حامل. تراوحت الأعمار لكافة المجاميع من (15-45) سنة. أذ تم تقدير مستوى تركيز البروتين الكلي والألبومين وتقدير القيم الطبيعية للأسبارتيت امينو ترانسفريز (AST) (GOT)، وألألنين أمينو ترانسفريز (ALT) (GPT) في أمصال كل من مجاميع الدراسة والسيطرة عند مستوى احتمالية ($P< 0.05$). بينت نتائج الدراسة ان تركيز البروتين الكلي ينخفض معنويا ($P<0.05$) في الثلث الثاني للحمل مقارنة مع مجاميع الدراسة والسيطرة. أما تركيز الألبومين فقد لوحظ وجود انخفاض معنويا ($P< 0.05$) مقارنة مع مجاميع الدراسة نفسها والسيطرة. واشارت نتائج الدراسة الى وجود انخفاض معنوي ($P<0.05$). في مستوى تركيز أنزيم (GOT) في الثلث الثاني للحمل مقارنة مع مجاميع الدراسة ومجموعة السيطرة . كذلك لوحظ انخفاض معنوي ($P< 0.05$) . في مستوى تركيز أنزيم GOT في الثلث الثاني للحمل واشارت نتائج الدراسة الى ان القيم الطبيعية للبروتينات الكلية والألبومين وانزيمات الكبد للحوامل تتأثر بتقدم العمر.