
Liver Function Tests Disorder Among Pregnant Women in Murzok General Hospital

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Abstract

The objective of this study was to determine the results of the liver function test (LFT) conducted among women from Murzok General Hospital- Libya. Blood samples were randomly collected from 288 respondents between the age range of 24-46 years old. The Screen Master was used to analyze the levels of AST, ALT, ALP and Albumin. The results of the study revealed differing levels during the three trimesters of pregnancy. Pregnant women who are in their second trimester are found to have higher levels of AST compared to those who are in their first trimester and those in their third (12.12±4.0, 18.22±6.4, 10.10±3.2 IU/L), and slight change for ALT (10.68±4.0, 4.52±1.1, 7.07±3.2 IU/L). The study also shows abnormally high ALP levels for women who are in their second trimester of pregnancy and two times higher for those in the third trimester than in the first (113.27±42.5, 158.11±54.3, 229.33±56.0 IU/L). The study further reveals a mean of 41.29 g/l serum albumin concentration for women who are in their first trimester and a lower mean of 36.6 g/l from those in their third trimester.

INTRODUCTION

Some of the normal physiological changes of pregnancy can mimic abnormalities associated with liver disease. However, these physiological changes in liver function during pregnancy are commonly transient, rarely permanent.¹ Disorders arising in pregnancy such as, pre-eclampsia and eclampsia, acute fatty liver of pregnancy (AFLP), hemolysis, elevated liver enzyme and low platelets (HELLP) syndrome, cholestasis, hyperemesis gravidarum and isolated cases of high levels of liver enzymes can have serious implications. Proper interpretation of liver function tests (LFTs) at an early stage can lead to timely management and may

reduce complications in both mother and fetus.¹

Pregnancy causes very few alterations in the results of standard liver tests, the aminotransferases (AST and ALT), Gamma-glutamyl trans-peptidase (GGTP), total bilirubin, and serum bile acid level remains within the normal range. The alkaline phosphatase rises modestly in the third trimester. The albumin level is lower than in non-pregnant women, and the cholesterol level higher.²

In an uncomplicated pregnancy, many laboratory-test results may appear abnormal.

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according to standards derived from a non-pregnant population. Serum albumin concentrations decrease from a mean of 4.2 g per deciliter in non-pregnant women to 3.1 g per deciliter near the end of gestation because of an increase in plasma volume.³ Serum alkaline phosphatase concentrations rise above the normal range for non-pregnant women during the fifth month of pregnancy and continue to rise to the value of two to four times normal by the end of gestation because of the leakage of placental alkaline phosphatase into the maternal blood.⁴

Hyperemesis gravidarum is characterized by nausea and vomiting; in severe cases, it may lead to dehydration. It generally occurs during the first trimester of pregnancy, although it may occur up to the 20th week. Alkaline phosphatase may be elevated twice the normal value and aminotransferase values can rise to as much as 200 U per liter.⁵

Intrahepatic cholestasis of pregnancy usually present during the third trimester, at a mean of 30 weeks of gestation. The alkaline phosphatase value may be four times of the normal value. Aminotransferase values are 2 to 10 times normal, although higher levels have been reported.^{6,7,8} Pre-eclampsia is a complication of approximately 5 to 10 percent of pregnancies and occurs late in the second trimester or in the third. More recently, this dysfunction has been associated with other findings in the HELLP syndrome. This syndrome may complicate the course in 3 to 10 percent of

patients with pre-eclampsia and is noted in 0.1 percent of all pregnancies.^{9,10,11}

Abnormalities in the HELLP syndrome includes hemolysis (with elevated bilirubin levels and lactate dehydrogenase levels greater than 600 IU per L), moderately elevated transaminase levels (AST and ALT levels of 200 to 700 IU per L) and a platelet count less than 100,000 per mL (100×10^9 per L). Acute fatty liver of pregnancy most frequently complicates the third trimester and is commonly associated with preeclampsia (50 to 100 percent).¹⁰ The laboratory abnormalities in acute fatty liver of pregnancy include moderate elevations of transaminase levels (AST and ALT less than 1,000 IU per L).^{12,13}

MATERIAL AND METHODS

A total number of 288 pregnant women with age ranging from 24-46 years old and in the various stages of pregnancy from Murzok General Hospital were used as respondents of the study . Blood samples were randomly drawn and lefted to clot. Serum sample were then separated and stored for one month at a temperature of -20 degrees centigrade and later assayed for determination of AST, ALT ,ALP and Albumin using Screen Master and Analyticon Comp. reagents . The Minitab Graph Statistical Analysis program was primarily used for statistical treatment and analysis of the results of the study.

RESULTS AND DISSOCIATION

This study aimed to determine the liver function tests (LFTs) among Pregnant women in Murzok General Hospital. Normal liver function tests (LFTs) in pregnancy were done to assess any alterations from the normal value of aminotransferases (AST and ALT) ,ALP and Albumin .

Out of 288 respondents, 81 were on their first trimester,74 in the second trimester and 133 were in the third trimester of pregnancy. The manufactures of the assay kits recommended the following ranges as basis for determination: AST, was 7-35IU/L, ALT

was 0-35 IU/L, ALP was 30-140IU/L, and 35-53 g/l for Albumin Table 1 and figure 1& 2 show the results of the mean activities of AST and ALT enzymes in pregnant women. The mean value AST activity was 12.12±4.0 ,18.22±6.4 and 10.10±3.2IU/L for the first trimester , second trimester and third trimester respectively. On the other hand, the mean activity of ALT enzyme was 10.68±4.0, 4.52±1.1 and 7.07±3.2IU/L for the first trimester , second trimester and third trimester respectively.

Table1. Mean values of AST and ALT in pregnant women.

Liver enzymes	Trimesters		
	1st	2nd	3rd
AST(IU/l)	12.12±4.0	18.22±6.4	10.10±3.2
ALT(IU/l)	10.68±4.0	4.52±1.1	7.07±3.2

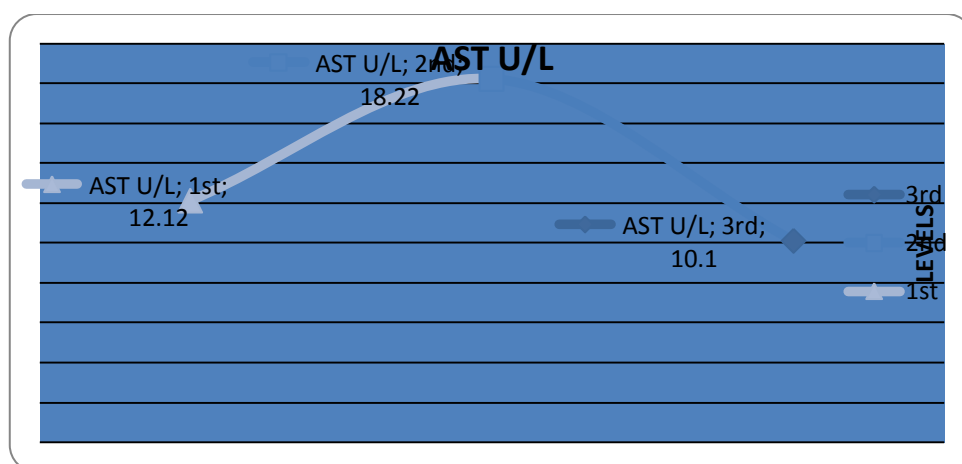


Figure 1. Mean values of AST in three trimester of pregnant women.

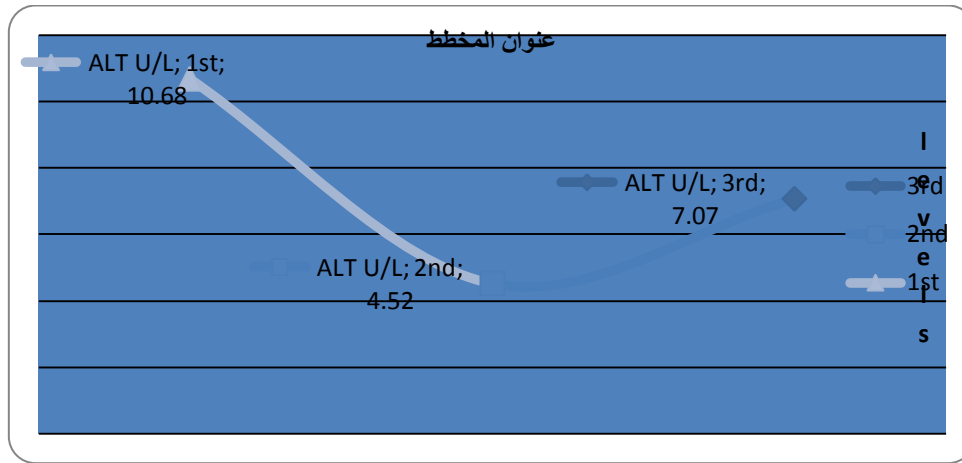


Figure 2. Mean values of ALT in three trimester of pregnant women.

The mean values were carried out by statistical analyses of aspartate transaminase (AST) and alanine transaminase (ALT). It was found that the result values taken from the pregnant women all throughout the three trimester was within the laboratory reference range values. This study revealed common liver disorder as shown in the levels of liver enzyme throughout the different trimesters of pregnancy which are also associated with specific diseases of pregnancy. This is mostly seen in hyperemesis gravidarum, intrahepatic cholestasis of pregnancy, severe pre-eclampsia, HELLP syndrome and acute fatty liver of pregnancy.^{14,15}

In addition, table 2 and figure 3 & 4 show the mean values for ALP in three trimester (113.27±42.5, 158.11±52.3, 229.33±63.0 IU/L) respectively. The result also revealed significant different in the

mean values of ALP elevation for the three trimesters ($p < 0.05$). However, the alkaline phosphatase value is found to be four times than normal for women with Intrahepatic cholestasis during the second and third trimester.¹⁶ The serum ALP level also rises during the third trimester of pregnancy because of the enzyme form in the placenta.¹⁷ In the three trimesters, albumin has the following mean values (41.29±4.2, 40.10±6.2, 36.65±4.7 IU/L) respectively. The laboratory values in AFLP are elevated an alanine aminotransferase concentration in the range of 300 U per liter, and a low albumin value.^{18,19,20} Serum albumin concentrations decrease from a mean of 4.2 g per deciliter in a non-pregnant women to 3.1 g per deciliter near the end of gestation because of an increase in plasma volume.³

Table2. Mean values of ALP and Albumin in pregnant women.

Liver function tests	Trimesters		
	1st	2nd	3rd
ALP(IU/l)	113.27±42.5	158.11±52.3	229.33±63.0
Albumin(g/l)	41.29±4.2	40.10±6.2	36.65±4.7

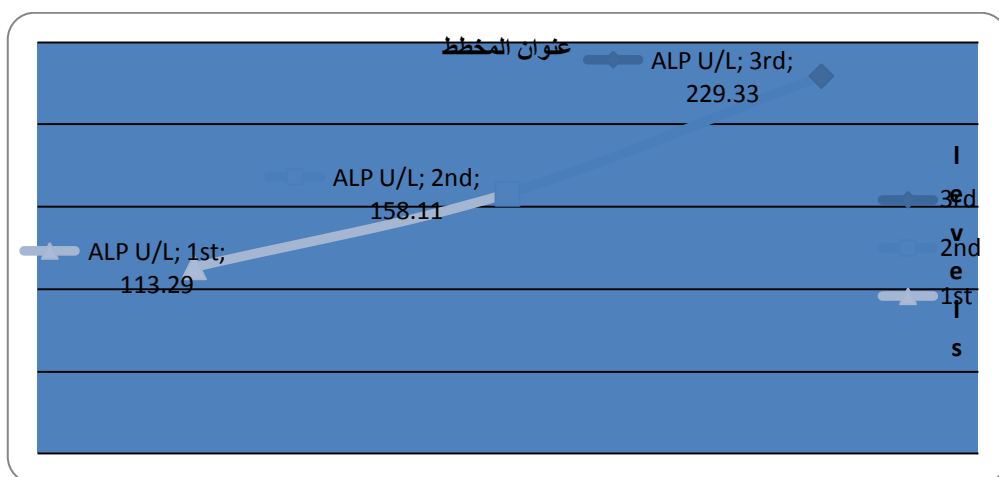


Figure 3. Mean values of ALP in three trimester of pregnant women.

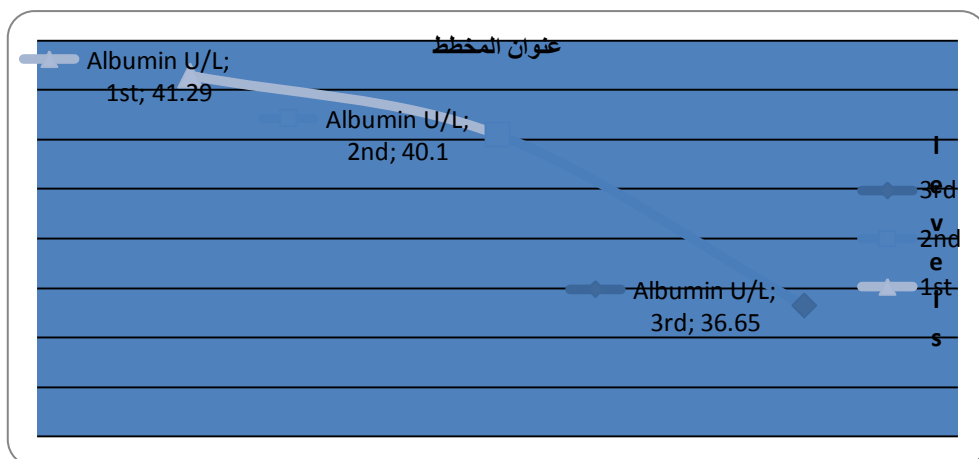


Figure 4. Mean values of Albumin in three trimester of pregnant women.

CONCLUSION

The study therefore conclude that the mild or moderate elevations of the results of the laboratory tests during the three trimester of pregnancy are linked to a specific diseases of pregnancy. However ,

the slight enzyme elevations or abnormal level do not necessarily indicate liver disease

التغيرات في مستوى تركيز وظائف الكبد عند النساء الحوامل المترددات

على مستشفى مرزق العام

علي محمد نوح

الملخص

تم جمع عينات دم من نساء حوامل لمختلف مراحل الحمل عشوائياً لعدد 288 امرأة، ما بين عمر 24-46 سنة، بهدف معرفة و تقييم مستوى التغير في اختبارات وظائف الكبد عند النساء الحوامل المترددات على مستشفى مرزق العام وقد تم تقسيمهم الى ثلاثة مراحل بحسب مدة الحمل وتم اجراء تحليل مصل الدم للاختبارات (AST, ALT, ALP, Albumin) بواسطة جهاز تحليل الطيف (Screen Master).

أظهرت نتائج الدراسة اختلاف مستويات متوسطات القيم لنشاط انزيم AST خلال المراحل الثلاثة (الثالث الاولي ، الثانية ، الثالثة) من فترة الحمل (4.0±12.12 ، 6.4±18.22 ، 10.10±(3.2) IU/L) على التوالي ، ووجد ان النساء الحوامل في المرحلة الثانية من الحمل لديهم ارتفاع في متوسطات القيم مقارنة مع كل من بالمرحلة الأولى والثالثة من الحمل . بينما أظهرت النتائج ايضاً تغير قليل في مستوى متوسطات القيم لإنزيم ALT خلال المراحل الثلاثة من الحمل (4.0±10.68 ، 1.1±4.52 ، 3.2±7.07 IU/L) على التوالي. أما إنزيم ALP فان متوسطات القيم في المراحل الثلاثة من الحمل ، أظهرت ارتفاع غير طبيعي عند النساء الحوامل في المرحلة الثانية من الحمل و ضعف ارتفاع متوسطات القيم في المرحلة الثالثة مقارنة مع المرحلة الأولى (42.5±113.27 ، 54.3±158.11 ، 229.33±56.0 IU/L) على التوالي. و إن الاختلاف بين متوسطات مستوى تركيز أنزيم ALP باختبار T بقيمة معنوية تساوى اقل من 0.05 . أما متوسطات تركيز قيم الألبومين عند النساء الحوامل في المرحلة الثالثة (4.7±36.65 IU/L) انخفضت مقارنة مع متوسطات تركيز القيم عند النساء الحوامل في المرحلة في المرحلة الأولى (4.2±41.29 IU/L) . وأظهرت نتائج الدراسة أن التغيرات الطفيفة أو الغير طبيعية في مستوى تركيز اختبارات وظائف الكبد خلال المراحل الثلاثة للحمل ناتجة عن التغيرات الفسيولوجية والأمراض المتعلقة بالحمل ومرتبطة بفترة مراحل الحمل الثلاثة.

REFERANCE

1. Pradumna Jamjutel, Amir Ahmad, Tarun Ghosh, and Philip Banfield, (2009). *Liver function test and pregnancy*. Journal of Maternal –Fetal and Neonatal Medicine ;22(3):274-283.
2. Bacq Y., Zarka O., Brechot J. and et al,(1996). *Liver function tests in normal pregnancy*. Hepatology ;23:1030–4.
3. Elliott J.R. and O’Kell R.T. ,(1971). *Normal clinical chemical values for pregnant women at term*. Clin Chem;17:156-7.
4. Zuckerman H., Sadovsky E. and Kallner B.,(1965). *Serum alkaline phosphatase in pregnancy and puerperium*. Obstet Gynecol;25:819-24.
5. Adams R.H., Gordon J. and Combes B., (1968). *Hyperemesis gravidarum. I. Evidence of hepatic dysfunction*. Obstet Gynecol;31:659-64.
6. Reyes H., (1992) *The spectrum of liver and gastrointestinal disease seen in cholestasis of pregnancy*. Gastroenterol Clin North Am;21:905-21.
7. Reid R., Ivey K.J., Rencoret R.H. and Storey B., (1976) *Fetal complications of obstetric cholestasis*. BMJ;1:870-2.
8. Fisk N.M., Bye W.B. and Storey G.N.B.,(1988). *Maternal features of obstetric cholestasis*. Aust N Z J Obstet Gynaecol;28:172-6.
9. Barron W.,(1992). *The syndrome of preeclampsia*. Gastroenterol Clin North Am ;21:851-72.

10. Roberts W.E., Perry K.G. Jr. , Woods J.B. and et al,(1994). *The intrapartum platelet count in patients with HELLP (hemolysis, elevated liver enzymes, and low platelets) syndrome. Am J Obstet Gynecol*;171:799–804.
11. Sibai B.M., Ramadan M.K., Chari R.S. and et al,(1995). *Pregnancies complicated by HELLP syndrome (hemolysis, elevated liver enzymes, and low platelets): subsequent pregnancy outcome and long-term prognosis. Am J Obstet Gynecol*;172(1 Pt 1):125–9.
12. Treem W.R., Rinaldo P., Hale D.E. and et al,(1994). *Acute fatty liver of pregnancy and long-chain 3-hydroxyacyl-coenzyme A dehydrogenase deficiency. Hepatology*;19:339–45.
13. Sims H.F., Brackett J.C., Powell C.K., and et al,(1995). *The molecular basis of pediatric long chain 3-hydroxyacyl-CoA dehydrogenase deficiency associated with maternal acute fatty liver of pregnancy. Proc Natl Acad Sci U S A*;92:841–5.
14. Sibai B.M., Anderson G.D. and McCubbin J.H.,(1982). *Eclampsia II: clinical significance of laboratory findings. Obstet Gynecol*;59:153-7
15. Martin J.N. Jr., Blake P.G., Perry K.G. Jr. and et al,(1991). *The natural history of HELLP syndrome: patterns of disease progression and regression. Am J Obstet Gynecol*;164:1500-13.
16. Reid R., Ivey K.J., Rencoret R.H. and Storey B.,(1976) *Fetal complications of obstetric cholestasis. BMJ*;1:870-2.
17. Pratt D.S., Kaplan M.M.,(1999). *Laboratory tests. In: Schiff ER, Sorrell MF, Maddrey WC, editors. Schiff's . diseases of the liver. 8th ed, Vol. 1. Philadelphia: Lippencott-Raven; pp 205–244.*
18. Riely C.A.,(1987). *Acute fatty liver of pregnancy. Semin Liver Dis*;7:47-54.
19. Kaplan M.M.,(1985). *Acute fatty liver of pregnancy. N Engl J Med*;313:367-70.
20. Rolfes D.B and Ishak K.G.,(1985). *Acute fatty liver of pregnancy: a clinicopathologic study of 35 cases. Hepatology*;5:1149-58.