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Evaluation of Liver function Tests in Normotensive and Hypertensive pregnancy.

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Abstract:

Pregnancy-induced hypertension (PIH) is responsible for significant maternal and prenatal morbidity, liver function affected by this disease. Liver function tests (LFTs), namely S.ALP, S.AST, S.ALT, Albumin, Bilirubin and prothrombin time were evaluated in forty hypertensive pregnant women, forty healthy pregnant women along with forty aged matched non pregnant women as a control who attended to Hospital, the results showed that: S.ALP, S.AST, S.ALT and Bilirubin were significantly higher ($P<0.001$) in hypertensive pregnant women when compared to normotensive and control, albumin was significantly lower ($P<0.001$) in hypertensive pregnant when compared to normotensive and control whereas prothrombin time did not give significantly different between the studied groups.

Keywords: AST,ALT, LFTs, PIH

Introduction:

Pregnancy is a functional state related with several variations in metabolic, biochemical, physiological, hematological and immunological processes [1]. Pregnant females experiences more than a few variations in their organs, the process of its adaptation to the developing fetus [2]. Through prenatal period the serum estrogen and progesterone levels increase progressively and reach a maximum throughout the third trimester [3]. these sex steroids have effects on metabolic, synthetic and excretory hepatic function [4]. Pregnancy may be complicated by severe liver problems, hypertension is the most common medical disorder in pregnancy [5,6,7]. Hypertensive disorders of pregnancy are responsible for significant maternal and perinatal morbidity and are the third leading cause of pregnancy related deaths, superseded only by haemorrhage and embolism [8]. Hypertensive disorders occurs in approximately 6-8% of all pregnancies, 10% of first pregnancies, and 20-25% of women with a history of chronic hypertension [9]. Liver holds a very important position in the metabolic system of the body, its active participation in metabolism of carbohydrates, proteins and fats including detoxification of noxious substances gives it a unique position in controlling the metabolic pathways of the body [2]. Liver function test (LFT) abnormalities occur in 3% of the pregnancies [10], and usually disappear after delivery, as the liver cannot metabolize quickly the large quantity of estrogen and progesterone produce during pregnancy [11]. The anatomic and physiological changes that accompany pregnancy alter physical findings and liver biochemistries, the identification of these physiological changes is important for the diagnosis of liver disease during pregnancy [12]. The aim of this study was to evaluate the changes in serum levels of routine LFTs, i.e., ALK, ALT, AST, Albumine, total serum Bilirubin (T.S.B) and prothrombin time during normotensive and hypertensive pregnancy compared with a control of age-matched non pregnant women.

Materials and Method:

This study was conducted in Department of Obstetrics and Gynecology / AL-Yarmouk Hospital from 1st February to 1st December 2015, the study was carried out on 40 hypertensive pregnant women, 40 healthy pregnant women as cases all these women were in the third trimester of pregnancy and 40 healthy non pregnant women as controls. Those with a major systemic disease which may elevate the patient's blood pressure or which may change the liver function tests, e.g., liver disease, diabetes, renal disease were excluded. Women with hypertensive disorders of pregnancy were selected on the basis of definitions given by National high blood pressure education program (NHBPEP 2000) [13]. Blood samples were taken from the studied groups and the serum separated by centrifuge at 3000 r.p.m for 15 min and kept frozen till analysis. Labrotary data were obtained by using commercial available kits: Albumin (BCG method), T.S.B (Linear chemicals S.L), S.ALP (Kind and king), S.ALT, S.AST (Randox kit), prothrombin time (Neoplastin cl plus kit)

Statistical analysis: Data analyzed by used spss and Anova (F-test). Values were expressed as meant±SD. "P" value ≤ 0.05 was considered to indicate statistical significance [14].

Results:

Blood pressure of cases and controls were shown in Table-1. The mean level of systolic and diastolic blood pressure were significantly higher (P<0.001) in hypertensive pregnant women when compared to normotensive and control. Liver function of cases and control were shown in table.2 ANOVA test showed significant difference in levels of all the variables among study groups except prothrombin time and age of mother which was non-significant.

Table 1: Blood Pressure of Cases and Controls

Variables (Mean±SD)	Non-pregnant n=40 (Control)	Normotensive Pregnant n=40 (Case)	Hypertensive Pregnant n=40 (Case)	LSD	Probability
Systolic BP (mm of Hg)	113.25±7.97	108.750±7.9	158.5±8.92	3.668	P<0.001
Diastolic BP (mm of Hg)	76.5±4.83	73.0±5.16	111.75±7.1	2.566	P<0.001

Table 2: Age and serum LFTs levels of Cases and Control

Variables (Mean±SD)	Non-pregnant n=40 (Control)	Normotensive Pregnant n=40 (Case)	Hypertensive Pregnant n=40 (Case)	LSD	Probability
Age	28.08±1.37	27.88±1.59	27.98±1.49	NS	NS
S.ALP(K.A. U/dl)	5.83±0.87	12.83±0.87	23.70±1.65	0.515	P<0.001
ALT(U/L)	7.55±0.50	12.45±0.75	21.30±1.38	0.4	P<0.001
AST(U/L)	7.15±0.66	9.43±0.71	16.95±1.97	0.533	P<0.001
T.S.B(mg/dl)	1.00±0.01	0.83±0.38	1.00±0.00	0.0353	P<0.001
Albumin (g/dl)	4.40±0.50	3.53±0.51	3.55±0.50	0.139	P<0.001
Prothrombin Time(sec)	11.63±0.54	12.63±0.54	12.45±0.75	NS	NS

Discussion:

The exact pathology of the hypertensive disorders of pregnancy are not known [1]. Many theories have suggested that endothelial dysfunction caused by factor released from ischemic placenta may be a causative factor for disease pathogenesis [15]. This dysfunction leads to increased sensitivity of the vasculature to vasoactive compounds which leads to reduction of perfusion and loss of fluid from intravascular compartment [16]. Liver function tests (LfTs) describes a panel of laboratory tests profiling discrete aspects of liver function, liver cell injury or necrosis is measured by determing AST and ALT levels. While liver synthetic function is quantified by determining albumin level and prothrombin time , biliary obstruction are evaluated by measuring alkaline phosphatase and bilirubin levels [17,18]. Serum ALP is often noted to be elevated in normal pregnancy due to placental isoenzyme production and an increase in the bone isoenzyme rendering it a poor means of diagnosis cholestasis during the third trimester of pregnancy [2,19] but the levels may be further increased in hypertensive pregnant women [12]. The results show a significantly elevated levels of serum ALP in PIH when compared with normal pregnant and control(P<0.001) , this result was in agree with another studies [1,10,21]. In the present study the mean serum ALT and AST in PIH was found significantly higher (P< 0.001) than the normotensive and control group, an elevated level of ALT and AST in hypertensive pregnancy was also cited by some other workers [10,20,21]. Serum bilirubin of hypertensive pregnant women in this study was significantly higher (P<0.00) from their normotensive pregnant and healthy non-pregnant women, several research workers also had found an elevated level serum bilirubin in their study populations which is in line with the findings of the present study [10.22]. Liver dysfunction can appear at any point of pregnancy and causes great anxiety to the patient, her family and sometimes her medical attendants [23], and an elevation in liver function test is noted [24], ALT and AST may also be elevated and hyper-bilirubinemia may accur, especially in the presence of haemolysis, periportal hemorrhagic necrosis in the periphery of the liver lobule is probably the lesion that

causes elevated serum liver enzyme levels [25]. Several physiological changes occur during pregnancy , for example the blood volume expand due to retention of salt and water, this induced a state of hemodilution [2], because hemodilution serum albumin levels decrease during all three trimesters [17,26]. The results show a significant decrease ($P<0.001$) in albumin level in hypertensive pregnant compared with normotensive and non pregnant women. The results show that the differences in prothrombin time was statistically not significant between the studied group. Alonso [17] found that the prothrombin time and partial prothrombin time remain unchanged during pregnancy and serum fibrinogen increase in the third trimester of pregnancy.

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تقييم وظائف الكبد في الحوامل الطبيعيات والمصابات بارتفاع ضغط الدم

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الخلاصة:
تم اختبار وظائف الكبد والتي شملت (انزيمات S.ALP، AST، ALT، الالبومين، البيلروبين وزمن التخثر) في مصل دم اربعين امرأة حامل مصابة بالضغط، اربعين امرأة حامل غير مصابة فضلا عن اربعين امرأة غير حامل بأعمار مقاربة للنساء الحوامل كتجربة ضابطة في مستشفى اليرموك / قسم النسائيه والتوليد ، بينت النتائج: حدوث ارتفاع معنوي ($P<0.001$) في مستوى انزيمات S.ALP، AST، ALT و البليروبين في الحوامل المصابات بالضغط مقارنة بالحوامل الطبيعيات وغير الحوامل كما بينت النتائج حدوث انخفاض معنوي ($P<0.001$) في مستوى الالبومين في الحوامل المصابات بالضغط مقارنة بالحوامل الطبيعيات وغير الحوامل بينما لم تظهر النتائج فرق معنوي في زمن التخثر بين المجاميع المدروسة.