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RESEARCH ARTICLE

Study of Serum Lipid Profile AST and LDH in Pre-Elampsia and Eclampsia

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Abstract

Introduction: Pre-eclampsia is common medical complication of pregnancy. Pregnancy is a physiological state associated with many alterations in metabolic, biochemical, physiological, hematological and immunological processes. **Material and methods:** The present study was conducted on 20 normal pregnant women (Group-I), 20 pre-eclamptic pregnant women (Group-II), and 20 eclamptic pregnant women (Group-III). The blood samples were collected from all the women and analyzed for Serum Lipid profile ,AST and LDH. **Results:** Mean TG (255.50±32.93 vs 199.70±22.22) levels are significantly higher in group of women who had preeclampsia as compare to normal controls ($p<0.001$). While mean HDL-C (36.10±9.58 vs 51.50±7.98) levels were significantly lower in women with preeclampsia than in normal control subjects ($p<0.001$). In Case of eclampsia mean LDL cholesterol (141.3±12.62 vs 118.6 ± 12.32) are significantly higher and mean HDL-C (31.87±8.39 vs 51.5 ± 7.98) levels were significantly lower than in normal control subjects ($p<0.001$). Mean Serum AST& LDH concentrations were significantly higher in preeclamptic and eclamptic patients as compared to normal pregnant women.**Conclusion:** The assessment of serum Lipids, AST and LDH are very useful markers to identify the occurrence of the complications of pre-eclampsia and eclampsia in early pregnancy, which may reduce the risk of occurrence of disease.

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INTRODUCTION: Pre-eclampsia is common medical complication of pregnancy. In India,the incidence of pre-eclampsia is reported to be 8-10% of the pregnancies[12]. It contributes significantly to maternal and fetal mortality and morbidity. Pre-eclampsia is a multisystem disorder characterized by hypertension to the extent of 140/90 mm Hg or more, proteinuria (≥300mg/day) and edema induced by pregnancy after 20th week[6]. Without intervention, pre-eclampsia progresses to eclampsia which is characterized by malignant hypertension and epileptiform convulsions requiring emergency caesarian section[16]. The association of altered lipid profile in essential hypertension is well documented. In early pregnancy, there is increased body fat accumulation associated with increased lipogenesis, while in late pregnancy, there is accelerated breakdown of fat depots which play an important role in fetal development [11]. Early pregnancy dyslipidemia is associated with an increased risk of preeclampsia[7]. Women with a history of pre-eclampsia have significant differences in lipid parameters and an increased succeptibiliy to lipoprotein oxidation when compared with women who had normal pregnancy[10]. Higher levels of Aspartate Transaminase (AST) and Lactate Dehydrogenase (LDH) are a useful biochemical marker that reflects the severity of the occurrence of the complications of pre-eclampsia. LDH is most often measured to evaluate the presence of tissue damage. The enzyme LDH is in many body tissues, especially the heart, liver, kidney, skeletal muscle, brain, blood cells, and lungs. Acute clinical symptoms that danger fetus life in pre-eclampsia correlate with

distinct activity of AST and LDH. The present study is designed to evaluate the risk of pre-eclampsia & eclampsia in association with lipids and to find out whether there is any correlation between cardiac enzymes [serum AST & LDH], pre-eclampsia and eclampsia.

MATERIAL AND METHODS:

The present study was carried out in the Department of Biochemistry in collaboration with Department of Obstetrics and Gynecology, Jawahar Lal Nehru Medical College and Associated Group of Hospitals, Ajmer. A total number of 60 participants of ages 20 to 40 years were chosen and they were divided into 3 groups of 20 subjects each, **Group I:** Normal pregnant women (n=20),**Group II:** Pre-eclamptic pregnant women (n=20) and **Group III:** Eclamptic pregnant women (n= 20). Women with concomitant disease such as diabetes or a history of gestational diabetes, chronic hypertension, and kidney disease or coagulation disorders were excluded. All pregnant women were taken in the third trimester of pregnancy. Blood sample was collected from anticubital vein by aseptic technique. The fasting lipid profile [Total Cholesterol (TC), Triglycerides (TG), High Density Lipoprotein-cholesterol (HDL-C),Very Low Density Lipoprotein-cholesterol (VLDL-C) Low Density Lipoprotein-cholesterol (LDL-C)], serum LDH and serum AST were estimated in all the groups. The serum lipid profile was estimated by the enzymatic CHOD-POD method for TC, by the GPO-PAP method for TG and by the CHOD-POD/ phosphotungstate method for HDL-C. Calculation of LDL-C and VLDL-C **:** VLDL-C level in serum is derived by dividing serum triglycerides by 5 and LDL-C is obtained using Friedwald's formula (Friedwald *et al.*, 1972), namely, LDL-C = Total cholesterol – (HDL-C + VLDL-C). Serum AST was estimated by Reitman and Frankel's method and serum LDH done by UV kinetic method. The estimations were carried out on semi autoanalyzer. Data were statistically analyzed by unpaired T test and expressed in terms of 'P' value.

RESULTS: Demographic data of normal, preeclamptic and eclamptic group is shown in table 1&2.

Table 1: COMPARISON OF SERUM LIPIDS AST & LDH IN NORMAL AND PRE-ECLAMPTIC PREGNANT WOMEN

Tests	Normal pregnant women (n=20)	Pre-eclamptic pregnant women (n=20)	p-value
Total Cholesterol (mg/dl)	210.0 ± 15.19	233.3 ± 35.63	P > 0.001
Triglycerides (mg/dl)	199.7 ± 22.22	255.5 ± 32.93	P < 0.001
HDL-C (mg/dl)	51.5 ± 7.98	36.1 ± 9.58	P < 0.001
VLDL-C (mg/dl)	39.9 ± 4.56	51.1 ± 6.69	P < 0.001
LDL-C (mg/dl)	118.6 ± 12.32	146.1 ± 28.86	P > 0.001
Serum AST (IU/L)	21.8 ± 7.19	40.3 ± 11.22	P < 0.001
Serum LDH (IU/L)	356.2±79.11	729.7 ± 174.33	P < 0.001

P < 0.001 = Highly Significant

Table 2: COMPARISON OF SERUM LIPIDS AST & LDH IN NORMAL AND ECLAMPTIC PREGNANT WOMEN

Tests	Normal pregnant women (n=20)	Eclamptic pregnant women (n=20)	p-value
Total Cholesterol (mg/dl)	210.0 ± 15.19	228.5±22.62	P > 0.001
Triglycerides (mg/dl)	199.7 ± 22.22	248.9±55.30	P > 0.001
HDL-C (mg/dl)	51.5 ± 7.98	31.87±8.39	P < 0.001

VLDL-C (mg/dl)	39.9 ± 4.56	49.7±11.67	P > 0.001
LDL-C (mg/dl)	118.6 ± 12.32	141.3±12.62	P < 0.001
Serum AST (IU/L)	21.8 ± 7.19	59.3 ± 14.32	P < 0.001
Serum LDH(IU/L)	356.2±79.11	1404.15± 486.98	P < 0.001

P < 0.001 = Highly Significant

Serum lipid profile was compared between cases &controls. Mean TG (255.50±32.93 vs 199.70±22.22) levels are significantly higher in group of women who had preeclampsia as compare to normal controls (p<0.001) as shown in Table-1. While mean HDL-C (36.10±9.58 vs 51.50±7.98) levels were significantly lower in women with preeclampsia than in normal control subjects (p<0.001) as shown in Table-1. In Case of eclampsia mean LDL cholesterol (141.3±12.62 vs 118.6 ± 12.32) are significantly higher and mean HDL-C (31.87±8.39 vs 51.5 ± 7.98) levels were significantly lower than in normal control subjects (p<0.001) (Table-2). Mean cholesterol levels were not statistically different between pre-eclamptic, eclamptic and normal subjects as shown in Table-1&2. The Mean ± SD value of serum AST and LDH in normal pregnant women was 21.80±7.19 UI/L and 356.20±79.11UI/L, in pre-eclamptic women it was 40.3±11.22 and 729.70±174.33 UI/L, and in eclamptic women was 59.3±14.32 and 1404.15±486.98UI/L. Serum AST & LDH levels showed statistically highly significant increase in both pre-eclamptic and eclamptic women (P<0.001) (Table-1&2), when compared to normal pregnant women.

DISCUSSION:

Pre-eclampsia has long known to be associated with abnormal placentation and impaired placental perfusion. However , other conditions characterized by poor placentation, such as intrauterine growth retardation ,do not necessarily result in pre-eclampsia[13]. This has lead to the growing concept that maternal predisposing factors must combine with the placental disorder to result in preeclamptic maternal syndrome [4]. During pregnancy, there is an increase in the hepatic lipase activity and decrease in lipoprotein lipase activity[17]. Hepatic lipase is responsible for the increased synthesis of the TGs at the hepatic level, whereas the decreased activity of lipoprotein lipase is responsible for the decreased catabolism at the adipose tissue level, the net effect of which will be an increase in circulating TGs [20].

In this study we investigate the role of lipid profile in the occurrence of Pre-eclampsia and Eclampsia. There was a positive correlation between Preeclampsia and lipid parameters as shown in Table-1. Serum triglyceride concentration rise more significantly in pre-eclampsia in our study which corroborated with the findings of many workers [5,7]. The principle modulator of this hypertriglyceridemia is oestrogen as pregnancy is associated with hyperoestrogenaemia. Oestrogen induces hepatic biosynthesis of endogenous triglycerides, which is carried by VLDL[9]. This process may be modulated by hyperinsulinism found in pregnancy[1] . Increased TG, found in pregnancy induced hypertension, is likely to be deposited in predisposed vessels, such as the uterine spiral arteries and contributes to the endothelial dysfunction, both directly and indirectly through generation of small, dense LDL[21]. Moreover, this hypertriglyceridemia may be associated with hypercoagulability[14]. In our study, incontrast to normal pregnant women, the rise in serum TG was statistically significant (p<0.05) in preeclamptic patients, but not so significant in eclamptic patients (p>0.05). This finding can be explained as because the eclamptic process is very frequently associated with aggravated hepatic damage which inhibits the enhanced de novo synthesis of triglyceride in liver. Moreover, VLDL which carries the endogenous triglyceride is also synthesized in the liver and the increase in triglyceride in gestation is estimated mainly in the VLDL[23]. LDH is an intracellular enzyme that converts lactic acid to pyruvic acid, and elevated levels indicate cellular death and leakage of enzyme from the cell as shown in our study (Table 2) and also supported by HS Qublan, 2005[18]. AST is also an intra cellular enzyme involved in amino acid and carbohydrate metabolism, its elevated levels show the damage in the organ whose cells are rich in this enzyme (i.e. liver) (as shown in table 1&2 and also found in other studies[3,15,18]. LDH may be increased due to liver damage. This endothelial vascular damage is the main cause in the occurrence of preeclampsia. The results showed that the serum AST and LDH levels were significantly higher in women with preec- lampsia. The elevated AST and LDH levels in preeclampsia are also found in many other studies [3,15,18]. When illness or injury damages cells, LDH and AST may be released into the bloodstream, causing the level of LDH and AST in blood to rise. High levels of LDH and AST in the blood indicate acute or chronic cell damage, but additional tests will be necessary to discover its cause. Abnormally low LDH levels occur only rarely and are not usually harmful.

CONCLUSION: The assessment of serum Lipids, AST and LDH are very useful markers to identify the occurrence of the complications of pre-eclampsia and eclampsia in early pregnancy, which may reduce the risk of occurrence of disease.

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