Original Article

Alterations in the Serum Lipoproteins of Primiparous Females Suffering from Eclampsia and its Comparison with Normal Pregnant Females

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ABSTRACT

Objective: To assess the alterations in the serum lipoproteins in primiparous females suffering from eclampsia and its comparison with the normal healthy female pregnancy.

Study Design: Observational / analytical study.

Place and Duration of Study: This study was conducted at the Department of Gynaecology, Teaching Hospital Ghazi Khan Medical College, Dera Ghazi Khan from January 2019 to September 2019.

Materials and Methods: This transverse research work carried out on 50 primiparous patients of eclampsia and 15 pregnant females with normal blood pressure. The record of the history of every female was maintained on questionnaire. Utilization of standard methods carried out for the measurement of the blood pressure. We collected a blood sample of 5 milliliter from every participant to examine the level of serum lipoproteins.

Results: Average age of hypertensive females was 20.18±0.50 years whereas average age of the healthy controls was 21.80±1.14 years. We found a significant difference in the level of lipoproteins. Women present with eclampsia had 26.70%, 27.40%, 29.0%,30.80% and 63.20% high low density lipoprotein cholesterol, triglycerides, ratio between total cholesterol and high density lipoprotein cholesterol, ratio of low density lipoprotein cholesterol to high density lipoprotein cholesterol and ratio of triglycerides and high density lipoprotein cholesterol correspondingly as compared to the group of healthy controls. The concentrations of high density lipoprotein cholesterol, ratio between high density lipoprotein cholesterol and low density lipoprotein cholesterol and level of apolipoprotein A-1 were 24.80%, 54.50% and 25.80% respectively, less in the group of patients as compared to the group of healthy controls.

Conclusion: The assessment of the concentration of serum lipoprotein in the duration of antenatal period can be beneficial in early identification and prevention of the development of eclampsia.

Key Words: Primiparous, Pregnancy, Assessment, Alterations, Pressure, Eclampsia

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INTRODUCTION

Eclampsia is very complicate multi-system hypertensive abnormality present in whole world in the duration of late pregnancy. This complication is also a leading cause of high rate of morbidity of mothers as well as fetal.[1]

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Eclampsia has a sudden onset therefore, it is a dangerous anomaly in pregnancy. This complication has the features for the development of the colonic seizures in persons already suffering from preeclampsia. Risk of the development of the pregnancy-induced hypertension increases with increase in age.[2] This complication has association with the dysfunction and hypoxia of placenta.[3] It characterization carried out by blood pressure of 140/90 mmHg or increase in systolic blood pressure (SBP) of greater than 30.0 mmHg or diastolic blood pressure of greater than 15.0 mmHg after 20 gestational weeks along with proteinuria ≥ 300.0mg per 24 hours or higher or equal to 1+ or 100.0 mg /dl by dipstick response.[4,5] Preeclampsia normally occurs in the period of 2nd or 3rd trimester of pregnancy and this problem is more frequent with the 1st pregnancy of females in nulliparous. About 7.0% to 10.0% pregnancies are complicated by pregnancy induced hypertension in the countries which are under-development.[6] The rate of incidence of pregnancy-induced hypertension in India is

15.20%, and this incidence is 4 times greater in the nulliparous females as compared to the in multipara.[7] In Berhampur, maternal mortalities because of pregnancy-induced hypertension was 32.0% which is two time greater than the rate of incidence present in India.[8,9]

In Nigeria, rate of prevalence is high in the North regions of country with incidence rate of 17.0% and it is responsible for 40.0% maternal mortalities.[10] Most of the affected are the females of teenage because of early marriages in that country. In Pakistan, the rate of incidence of eclampsia is about 19.0%. A research performed in Peshawar, Pakistan stated the rate of maternal mortality because of eclampsia as16.70% that accounted for 29.40% of total maternal mortalities in the duration of one-year period.[11] Some studies documented the alterations in the level of lipoproteins inhypertension.[12] There is increase in the serum lipids in the period of pregnancy and it is elevated 2 times in pregnancy-induced hypertension.[13]

Abnormal concentrations of lipoprotein are accountable for damages to endothelium which can lead to high BP as well as proteinuria and these two are vital signs of pregnancy induced hypertension.[14] The alterations in the concentration of lipoproteins cause damages to endothelium, atherosclerosis and other diseases of heart. Main sign of pregnancy-induced hypertension is the hypertension, this is because of the vasospastic incidents in uterus, brain and placenta.[15] This research work carried out to compare the alterations in the serum lipoprotein of healthy pregnant females and primiparous females suffering from eclampsia.

MATERIALS AND METHODS

This study carried out on the pregnant females who got admission in the Gynecology Department of Teaching Hospital Ghazi Khan Medical College, Dera Ghazi Khan from 5th January 2019 to 20th September 2019. There were 65 females with pregnancy comprising 15 normotensive primiparous females and 50primiparous females suffering from eclampsia at age of gestation of greater than 20 weeks in this research work. We took the written consent from the participants of this research work after explaining them the purpose of this research work. Ethical committee of the institute gave the permission to conduct this research work. Females from both groups present with history of DM (Diabetes Mellitus), Hypertension, renal diseases, disorders of liver, multiple pregnancies, females with history of eclampsia in their family and history of utilization of various drugs influencing the lipid levels for treatment got exclusion from this research work.

We included the primiparous pregnant females of eclampsia with gestational age of greater than twenty weeks. The diagnosis of the patients of eclampsia carried out with the presence of persistent hypertension (140.0/90.0 mmHg or higher), proteinuria (identified by the heat test of urine) without or with edema. We collected the history of every patient and used standard methods for the measurement of blood pressure of every patient. We obtained the five-milliliter blood from every participant of both groups. We transferred all the specimens on ice cubes for further investigation in the research laboratory of the institute. The measurement of serum triglycerides and Total Cholesterol carried out with the utilization of enzymatic method of Elitech diagnostic kits made up of France. The measurement of serum high density Lipoprotein-Cholesterol carried out with the utilization of the Merck Diagnostics kits made up of Germany. We used the T-test for the determination of statistical significance. SPSS-20 was in use for the statistical analysis of collected information.

RESULTS

Average age and mean gestational age of the pregnant females in both groups were comparable. Systolic blood pressure and diastolic blood pressure of group of patients was much increased and it was much significant when compared with the group of controls (Table-1)

Table No.1: Comparison of different variables of primiparous pregnant women with the control group

Variable	Patients	Control	P value
Age (years)	20.18±0.50	21.80±1.14	NS
Gestation age (weeks)	29.54±0.48	28.71±1.0	NS
Systolic BP (mmHg)	156.69±2.72	113.13±2.03	0.001
Diastolic BP (mmHg)	103.49 ±2.0	74.02±1.52	0.001

Average levels of blood lipid in the females with normal pregnancy and in primiparous females suffering from eclampsia are available in Table-2. There were significant differences available in serum high density lipoprotein cholesterol (P<0.0010), very low density lipoprotein cholesterol (P<0.0010), triglycerides (P<0.0010), total cholesterol and high density lipoprotein cholesterol ratio (P<0.0010), serum triglycerides and high density lipoprotein cholesterol ratio (P<0.0010), ratio of high density lipoprotein cholesterol and very low density lipoprotein cholesterol (P<0.010) and level of apolipoprotein A1 (P<0.0010) among both groups. But we found significant disparity (P>0.050) in total cholesterol, low density lipoprotein cholesterol, level of apolipoprotein B-100, ratio of low-density lipoprotein to apolipoprotein B-100 and ratio of high-density lipoprotein and level of apolipoprotein A-1 in the patients suffering from eclampsia and healthy females with pregnancy. Females suffering from

eclampsia were present with 26.70%, 27.40%, 29.0%, 30.80% and 63.20% high low density lipoprotein cholesterol, triglycerides, ratio of total cholesterol and high density lipoprotein cholesterol, ratio of low density lipoprotein cholesterol and high density lipoprotein cholesterol and ratio of triglycerides and high density lipoprotein cholesterol respectively in comparison with the group of healthy pregnant females. The concentrations of high-density lipoprotein cholesterol, ratio of high-density lipoprotein cholesterol and very low-density lipoprotein cholesterol and level of apolipoprotein A-1 were24.80%, 54.50% and 25.80% respectively, low in the group of patients as compared to their healthy controls (Table 2).

Table No.2: Comparison of lipoprotein concentrations in primiparous women with eclampsia and normal pregnancy

Parameter	Eclampsia group Mean±SEM	Control group Mean±SEM	% deviation from control	P value
Total cholesterol (mg/dL)	211.51±4.74	204.18±14.37	3.4 ⇑	NS
HDL cholesterol (mg/dL)	38.62±1.06	51.10±2.34	21.3 ⇓	0.001
LDL cholesterol (mg/dL)	107.45±4.27	104.45±12.35	2.4 ⇑	NS
VLDL cholesterols (mg/dL)	63.02±3.41	40.0±3.47	43.0 ⇑	0.001
Triglyceride (mg/dL)	325.88±15.68	221.0±15.77	44.0 ⇑	0.001
APO-A1 (mg/dL)	141.49±3.75	187±9.21	22.0 ⇓	0.001
APO-B100 (mg/dL)	116.88±2.86	124.08±3.15	5.60 ⇓	NS
TC: HDL-C ratio	5.28±0.09	3.85±0.26	34.0 ⇓	0.001
LDL-C: HDL-C ratio	2.67±0.06	2.0±0.19	31.0 ⇑	0.01
Triglycerides: HDL-C ratio	6.28±0.40	4.31±0.33	88.0 ⇑	0.001
HDL-C: VLDL-C ratio	0.62±0.03	1.20±0.09	42.6 ⇓	0.001
LDL: APO-B100	0.89±0.06	0.85±0.04	4.2 ⇑	NS
HDL: APO-A1	0.21±0.02	0.18±0.03	8.5 ⇑	NS

DISCUSSION

Rise of the serum lipids in the duration of pregnancy period and hypertension induced by pregnancy have been stated in many researches works.[16,17] Remarkably great alterations have been recorded in the triglycerides, which may go as high as 2 to 3 times in last three months of pregnancy period.[18] We noticed the same pattern in this current research work where a significant increase in serum triglycerides was noticed in eclampsia patients when its comparison carried out with females having normal pregnancy. The hyperoestrogenemic pregnancy state is mainly accountable for this increase in the level of triglycerides in the period of pregnancy. Estrogen is the cause of induction of hepatic biosynthesis of endogenous triglycerides which is carried by the very low-density lipoprotein.[19] Enhanced level of triglycerides, discovered in pregnancy inducted hypertension[20] is expected to be deposited in susceptible vessels, like the spiral arteries of uterine and contribute to the dysfunction of endothelium, through the creation of small and dense low-density lipoprotein. Mohanty[21] in his research discovered a significant rise in the cholesterol of serum in toxemia of pregnancy in primiparous pregnant females. The results of current research work are contrary to mentioned outcomes where concentration of cholesterol increased upto certain amount but no significant change in the level of total cholesterol was examined. These findings of current research work are consistent with the results of other stated research studies.[20,22] In the current research work, the average level of high-density lipoprotein cholesterol was approximately 24.0% low in the patients suffering from eclampsia as compared to the females having normal pregnancy (P<0.0010). Some other research works also reported the similar findings.[23,24]

In current research work, change in the low density lipoprotein cholesterol was not much significant in the participants of both groups but the levels of serum very low density lipoprotein cholesterol increased significantly (P<0.0010) in pregnant females suffering from eclampsia, which may be because of the hypertriglyceridemia causing increase entry of very low density lipoprotein that carries the endogenous triglycerides into the circulation. The levels of very low-density lipoprotein cholesterol as reported by some other research works[25] might increase to 2.50 folds at term over the level before pregnancy. Level of very low-density lipoprotein further increase in case of eclampsia as discovered in this current research work and as stated by some other research works.[20,26] In the present research work, the concentration of APO B-100 reduced in the group of patients, but it was not much significant. There was a significant reduction was recorded in the ratio between high density lipoprotein cholesterol & very low-density lipoprotein cholesterol in the group of pregnant females suffering from eclampsia as compared to the pregnant females with normal pregnancy. These findings of current research

work are comparable with the results of one other research study conducted by Enquobahrie.[27] There is not recognition yet about the significance of these ratios in the duration of pregnancy and prevalence of eclampsia, however, we cannot ignore the significance of changed ratio of serum lipids as these ratios point to some additional risks in the patients of eclampsia with pregnancy.

CONCLUSION

The assessment of the concentration of serum lipoprotein in the duration of antenatal period can be beneficial in early identification and prevention of the development of eclampsia.

Author's Contribution:

Concept & Design of Study:	Afia Alam
Drafting:	Arfa Alam Buzdar
Data Analysis:	Tehreem Alam Buzdar
Revisiting Critically:	Afia Alam, Arfa Alam Buzdar
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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