ORIGINAL RESEARCH PAPER
Volume-9 | Issue-5 | May-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

TO STUDY THE CHANGES IN PLASMA LIPID PROFILE IN PREGNANCY AND ROLE OF LIPID PROFILE AS PROGNOSTIC INDEX IN PREECLAMPSIA AND IUGR.

Obstetrics & Gynaecology

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ABSTRACT

The present study was carried out to study the changes in plasma lipid profile in pregnancy and role of lipid profile as prognostic index in preeclampsia and IUGR. The prospective study was conducted in the department of Obs and gyne in collaboration with the department of biochemistry over a period from May 2012 to December 2012. Data was collected from 150 normotensive pregnant women with period of gestation up to 20 weeks, attending antenatal clinic in department of Obs and gyne,P.B.M hospital, Bikaner. Blood samples were analyzed for total cholesterol, triglycerides,LDL,HDL,VLDL respectively at 20 weeks and 3 Rd trimester by using 'accurex' diagnostic kits .

KEYWORDS

Lipid, Preeclampsia, Triglycerides, Cholesterol, Hypertension, Normotensive.

INTRODUCTION:

Pregnancy is marked by major physiological and metabolic changes in the mother in order to support the nutritional and metabolic needs of the growing conceptus. Metabolically important dynamic adjustment occurs including insulin resistance, hyperlipidemias and changes in protein amino acid metabolism (King et al 1994).

Anabolic changes in lipid metabolism promotes accumulation of maternal fat store in early and mid pregnancy. In contrast, this pattern shifts to the catabolic state of net metabolism of adipose lipid depot during the second half of pregnancy.(Herrera et al 1986). This shift from an anabolic to a catabolic state promotes the use of lipids as a maternal energy source while preserving glucose and amino acid for the fetus. This results in physiological hyperlipidemia of pregnancy. Expected elevations for Triglycerides and Cholesterol during a normal gestational period usually does not exceed 332 mg/dl and 337 mg/dl respectively. (Ahmet Basaran).

But this hyperlipidemia is of concern because it is associated with endothelial dysfunction and gives rise to pregnancy associated complications especially pre-eclampsia and its adverse effect as eclampsia, intrauterine growth restriction etc.

In contrast to dyslipidemia of pre-eclampsia, women with IUGR actually have lower VLDL,LDL and cholesterol concentrations. One hypothesis is that failure to mobilise or synthesize lipids in the face of inadequate placental perfusion contributing to fetal growth restriction.This dyslipidemia is evident during the first and second trimester which is far preceding the clinical manifestations of pre-eclampsia.(Lorentzen et al. 1995). This pre-eclamptic dyslipidemia does not seem to be a consequence of the disease because it is present long before the disorder becomes clinically overt.

In view of the above relevations, the present study was designed to study the changes in plasma lipid profile in pregnancy and to study the role of lipid profile as a prognostic index in pree clampsia and IUGR.

AIMS AND OBJECTIVES:

The present study was taken up in the department of obstetrics and gynecology in collaboration with the department of biochemistry, SP Medical College Bikaner.

To study the changes in plasma lipid profile in pregnancy and to evaluate whether there is any association between changes in plasma lipid profile and various pregnancy complications such as preeclampsia, IUGR.

MATERIAL AND METHODS:

The present study was a prospective study which was conducted in the Department of Obstetrics & Gynecology, P.B.M. Hospital, Sardar Patel Medical College, Bikaner. Pregnant women attending the antenatal clinic were enrolled I n study after an informed consent.

In the study population, 150 normotensive pregnant women with periods of gestation up to 20 weeks attended antenatal clinic in the Department of Obstetrics and Gynecology, P.B.M. Hospital were enrolled in the study. Out of which 8 patients were lost to follow up and 1 patient was excluded from study, as she aborted at 20th weeks of gestation. Women selected for the study received a detailed explanation before taking informed consent.

Patients were enrolled in the study group and detailed history was taken regarding history of hypertension in previous pregnancy, past history of hypertension and family history. A detailed history regarding age, parity, past obstetric history, past medical history was taken with special stress at eliciting history of pre-existing HTN ,Diabetes, renal disease ,liver disease, smoking or any drug addiction history .General physical examination was done specially to note pallor, pedal oedema. Weight, pulse, BP was taken. Arterial BP was measured by auscultatory method with a mercury sphygmomanometer in sitting position by placing the cuff on the right arm BMI was calculated. Abdominal examination was done to record fundal height, presentation, lie, fetal heart sound. Symphysiofundal height and abdominal girth were noted. Patients were called at a monthly interval till 28 weeks, 15 days till 36 weeks than weekly till 40 weeks. Follow up of all subjects were done in a routine antenatal clinic.

Patients were considered hypertensive if BP was greater than or equal to 140/90mm/Hg at two reading 6 hr apart. Patients developing pregnancy induced hypertension were advised further investigations like blood urea, serum creatinine, Serum uric acid, serum bilirubin , CBC, fundus examination and their lipid profile.

Data were analysed by multiple logistic regression.

OBSERVATIONS:

Table-1Maternal lip id profile ≤ 20 weeks of gestation and at III trime ster of pregnancy

Parameters (mg/dl)	≤ 20 week (First Visit)	3rd Trimester (2nd Visit)	P-value
TG	155±54.6	187 ±56.4	0.0001
TCH	194±39.8	219±41.5	0.0001
HDL	40.4±5.63	38±5.1	0.0001
LDL	120±35.7	139±38.9	0.0001
VLDL	24.15±8.81	31.6±8.08	0.0001

It is clear from table-1 that maternal lipoprotein levels were increased as the gestational age increased except for HDL-CH that decreased with increasing gestational age. The mean value of various lipoprotein level i.e. TG, TCH, HDL, LDL, VLDL at ≤20 weeks of gestation were 155±54.6mg/dl, 194±39.8mg/dl, 40.4±5.63mg/dl,

120±35.7mg/dl, 24.15 ±8.81mg/dl and at III trimester were 187 ±56.4mg/dl, 219±41.5mg/dl, 38±5.1mg/dl, 139±38.9mg/dl, 31.6±8.08mg/dl respectively for each parameter. P value of each parameter was significant (p-value 0.0001).

Table-2 Comparison of lipid profile at ≤ 20 weeks gestation among normotensive pregnant women and women developing PIH.

Lipoprotein (mg/dl)	PIH	Normotensive	P-value
	≤ 20 week (First week)	≤ 20 week (First Visit)	
TG	211.83±45.02	150.42±52.21	0.0001
TCH	218.16±48.53	192.70±37.96	0.032
HDL	39.33±8.45	40.75±5.25	0.40
LDL	126.83±33.11	120.24±35.72	0.54
VLDL	31.5±11.52	23.58±8.16	0.002

Table-2 shows that maternal lipoprotein levels were higher among patients developing PIH later in pregnancy as compared with normotensive pregnant women at their first antenatal visit (≤ 20 week). The mean value of serum TGS in PIH patients was 211.83±45.02 as compared with mean serum TGS value of normotensive pregnant women i.e. 150.42±52.21, which was highly s ignificant (p-value 0.0001).

Table-3 Comparison of lipid profile at III trimester among normotensive pregnant wome n and women developing PIH.

Lipoprotein (mg/dl)	PIH	Normotensive	P-value
	At III Trimester	At III Trimester	
TG	234.16±69.81	183.29±52.69	0.002
TCH	245.00±63.36	217.84±37.84	0.023
HDL	39.00±6.45	37.95±4.89	0.49
LDL	155.58±57.88	138.04±36.07	0.138
VLDL	36.33±8.92	31.31±7.82	0.040

It is clear from table-3 that maternal serum lipoprotein levels were higher among PIH patients with mean value of serum TGS 234.16±69.81 mg/dl compared with normotensive pregnant women i.e. 183.29±52.69, which was significant (<0.05).

Table-4 Comparison of lipid profile at ≤ 20 weeks of gestation among healthy pregnant women and women who had IUGR foetus

Lip id profile	IUGR	Healthy PregnantWomen	P-value
	≤20week (FirstVisit)	≤20week (FirstVisit)	
TG	180.0±54.16	154.38±54.52	0.220
TCH	196.14±55.09	194.81±39.07	0.93
HDL	38.57±7.89	40.74±5.50	0.323
LDL	121.85±19.97	120.74±36.36	0.93
VLDL	27.42±11.87	24.09±8.65	0.33

Table no. 4 shows that maternal lipid levels were higher among IUGR pregnant women and there was no statistical significant difference observed in lipid levels in IUGR pregnant women and healthy pregnant women at ≤ 20 week of gestation.

Table-5Comparison of lipid profile at III trimester among healthy pregnant women and women who had IUGR foetus

Lipid profile	IUGR	HealthyPregnantWomen	P-value
	IIITrimester	IIITrimester	
TG	181.42±89.33	187.94±54.62	0.77
TCH	230.28±55.44	219.62±40.84	0.51
HDL	38.28±50.49	38.02±5.09	0.89
LDL	144.28±50.49	139.29±38.38	0.74
VLDL	33.28±15.28	31.65±7.61	0.61

It is evident from table no. 5 that there is altered maternal plasma lipid level and no correlation exists between IUGR pregnant women and healthy pregnant women at III trimester.

RESULTS:

The present study was conducted on pregnant women attending the antenatal clinic in the Obstetrics and Gynecology Department, P.B.M. Hospital, Sardar Patel Medical College, Bikaner from May 2012 to December 2012. A total of 150 pregnant women at gestational age at or below 20 weeks were registered in the study after taking informed consent. Out of which 8 patients were lost to follow up and 1 patient was diagnosed to have H. Mole and excluded from study. These 141 patients were finally included in the study and were followed. Out of these, 12 patients subsequently developed PIH and 7 patients had IUGR foetuses, giving a prevalence rate of 8.5% and 4.9% respectively. While out of 12 PIH patients, 3 patients developed IUGR pregnancy later.

DISCUSSION:

Pregnancy induced hypertension (PIH) continues to be a main obstetric problem in present day health care practice. It affects not only maternal health but also puts fetal development at risk. The high blood pressure problems of pregnancy are very frequent during pregnancy in puerpurium. It is accountable for 12% of maternal mortality worldwide.

In the present study the prevalence rate of patients who developed PIH was 8.5% and women developing IUGR was 4.9% respectively.

In present study it was found that maternal lipid levels increased with increasing gestational age except for the HDL cholesterol that decreased with increasing gestational age. The mean value of various lipid levels i.e. TGS, TCH, LDL, HDL, VLDL at ≤ 20 weeks of gestation were 155±54.6mg/dl, 194.±39.8mg/dl, 120±35.7mg/dl, 40.4±5.63mg/dl, 24.15±8.81 mg/dl respectively. The mean value of various lipid levels TGS, TCH, LDL, HDL, VLDL at 3rd trimester were 187±56.4mg/dl, 219±41.5mg/dl, 139±38.9mg/dl, 38±5.1mg/dl, 31.6±8.08 mg/dl respectively. It was observed that there is physiological hyperlipidemia of pregnancy and all lipid parameters were increased with increasing gestational age except for HDL cholesterol that decreased with increasing gestational age. These values were statistically highly significant (p-value 0.0001). Lippi G et al (2007) they studied lipid and lipid profile in physiological pregnancy and in pre eclamptic women, observed that all the lipid parameters tested were significantly modified by the gestational age. Significant increase in total cholesterol, LDL cholesterol, HDL cholesterol was displayed in normal pregnancy. These findings were held true with our finding except for HDL cholesterol.

On further analysing data, the mean lipid profile of various parameters i.e. TGS, TCH, HDL, LDL & VLDL at or below < 20weeks of gestation among healthy pregnant women and women developing PIH were 150.42±52.21mg/dl, 192.70±37.96mg/dl, 40.75±5.25mg/dl, 120.24±35.72mg/dl and 23.58±8.16mg/dl respectively. Mean lipid concentration of various parameters i.e. TGS, TCH, HDL, LDL & VLDL at III trimester of gestation among healthy pregnant women and women developing PIH were 211.83±45.02mg/dl, 218.16±48.53mg/dl, 39.33±8.45mg/dl, 126.83±33.11mg/dl and 31.5±11.52mg/dl respectively. A study conducted by Demiceri et al (2008), they concluded that women who subsequently developed preeclampsia had higher concentration of fasting plasma TCH, LDL, VLDL, TGS than in normotensive patients.

In present study, the mean value of lipid profile of various parameters i.e. TGS, TCH, HDL, LDL & VLDL at or below < 20 weeks of gestation among healthy pregnant women and women developing IUGR were 154.38±54.52mg/dl, 194.81±39.07mg/dl, 40.74±5.50mg/dl, 120.74±36.36 mg/dl and 24.09±8.65mg/dl respectively. Mean lipid profile of various parameters i.e. TGS, TCH, HDL, LDL & VLDL at III trimester of gestation among healthy pregnant women and women developing IUGR were 180.0±54.16mg/dl, 196.14±55.09mg/dl, 38.57±7.89mg/dl, 121.85±19.97mg/dl and 27.42±11.87mg/dl respectively.

Munoz et al (1995) in their study observed that plasma TGS, LDL, TCH increases progressively throughout pregnancy with significantly higher values after 25th weeks of gestation. They concluded that apolipoprotein A and TGS concentrations were significantly lower in the IUGR group than healthy pregnant women. But in our study no statistically significant difference between lipids profile in IUGR pregnant women as compared to that healthy pregnant women was observed.

CONCLUSIONS:

The study shows that there is physiological hyperlipidemia of pregnancy. Elevated serum triglycerides level at early gestation is an important risk factor for development of PIH. With onset of IUGR and severity of PIH, the increase in TGS is hampered. The study shows that the women who develop preeclampsia had disturbed lipid profile due

to abnormal lipid metabolism. Increased TGS and delayed TGS clearance and high BP are the reasons for the development of preeclampsia. Thus serum lipid profile in early pregnancy can predict development of PIH in later pregnancy and does have a role in causing foetal growth retardation. However further evaluation with large sample sizes needs recommendation.

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