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Impact of Lipid Profile on Pregnancy Outcomes in Urban Population

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Abstract:

Pregnancy is a period that is characterized by increased nutritional requirement in order to meet the need of the growing foetus and placenta. The total gestation related energy cost has been estimated at approximately 83000 kcal. The major change in energy expenditure and in the accumulation of fat occurs at different times during pregnancy. A lipid values in normal pregnancies changes with gestational age not depends whether the pregnant women is belongs from rural of urban areas. So in this study we report changes in serum lipids and lipoprotein in urban pregnant women. The study was conducted on 100 pregnant women from urban populations. Biochemical investigations for accessing serum lipids were done on a fully automatic analyser (EM-360) using system packs. Serum triglycerides, low density lipoprotein and very low density lipoprotein were found to be increased highly significantly in 100pregnant women as compared to 50 non pregnant women from urban areas in Jaipur. This preliminary study underlines the need for investigating serum lipid changes in pregnancy in bigger urban sample in different parts of the country.

Key words: Dyslipidemia, triglycerides, high density lipoproteins, low density lipoproteins, cholesterol, urban pregnant women, cardiovascular diseases

Introduction

Pregnancy is accompanied by significant variations in maternal lipid metabolism (1, 2). In early pregnancy , there is increased body fat accumulation associated with both hyperphagia and increased lipogenesis while in late pregnancy there is an accelerated breakdown of fat depots, which plays an important role in foetal development (3). A review of literature has revealed conflicting observations on normal and abnormal pregnancies (4, 5). Increase in maternal lipid profile during pregnancy differs with trimester. It has been observed that the concentration of serum total cholesterol, serum triglyceride, high density lipoprotein cholesterol and low density lipoprotein cholesterol in normal pregnant women increased with increasing gestational age (6, 7). (8) observed that the increase in the maternal lipid profile in the third trimester is in response to the maternal switch from carbohydrate to fat metabolism which is an alternative pathway for energy generation due to high energy demand. The present study was undertaken to elucidate any significant variation in the lipid profile during normal pregnancy in the different trimesters, to establish if pregnancy affects the lipid profile and to evaluate the clinical significance of the lipid profile level in pregnancy. Blood lipid concentrations, lipoproteins and apolipoproteins in the plasma increase significantly during pregnancy (9) Hypercholesterolemia is an important cause of early atherosclerosis (10) Nevertheless, there is conflicting evidence for an association between parity and the risk of cardiovascular disease in women (11,12).

We undertook to evaluate the lipid profile prior to, during and pregnancy, in single pregnancy, over a period, and to specifically examine the effect of lipid profile on pregnancy.

Material and Methods

Study Design

The present cross-sectional, comparative study was conducted in the Department of Biochemistry, in association with the Department of Obstetrics and Gynaecology, S.M.S Medical College and attached group of Hospitals, Jaipur, India

Inclusion and Exclusion Criteria:

1. Experimental group:

To assure the quality of analysis only healthy pregnant women and their new born infants were included in the analysis. The exclusion criteria were set based on multiple criteria, including:

a) Medical and obstetric complication that effect intrauterine foetal growth.
b) Acute and chronic complication in babies is excluding.

Inclusion criteria involve:

a) Anthropometry
b) Demography
c) Obstetric
d) Diet
e) Physical Activity
f) Maternal morbidity
g) Laboratory Test.

2. Control group:

a) Age between 20-28 years.
b) Those are willing to participate in the study.
c) Able to understand the nature of study.
d) Non pregnant.

Ethical Approval:

The study was approved by the Ethical Committee of the S.M.S Medical College before implementation. The objectives of the study were explained to the women willing to participate and were enrolled for the study. Written consent was obtained from all the pregnant women participate and their husbands in the study.

The identity of participants were kept confidential and used only for research purpose.

Study Settings and Sample:

The study was conducted among 100 consecutive women ranging in age from 20 to 28 years. Attending the antenatal clinic of the Department of Obstetrics and Gynaecology S.M.S Medical College and attached group of Hospitals, Jaipur. 28 weeks or more were enrolled for the study the selected subjects were all non-smoker lacto vegetarian, normotensive, with in ideal body weight and not taking any drug for preceding one month except iron and folic acid. 50 aged matched non pregnant premenopausal healthy women were studied as controls. Pregnant women in labor were requested to participate in this study and nonfasting 5 ml sample of venous blood from anti cubital vein was drawn at the time of delivery.

The following biochemical investigations on serum:

1. Cholesterol - Enzymatic method [13]
2. Triglyceride – Enzymatic method [14]
3 HDL – PEG precipitation method [15]
4.. VLDL & LDL by Friedwald`s formula

LDL (mg/dl) = Total cholesterol–(HDL+VLDL)

VLDL (mg/dl) = Triglyceride/5

Analyses of Data:

All the anthropometric and biochemical parameters were subjected to essential statistical evaluations (like mean,

standard deviation, student 't' test, 'p' value and coefficient of correlation(r) etc.) to find out the inter parameter correlation among the different groups, if any exist. Data were expressed either as Mean and Standard Deviation (S.D) or proportion/percentage. The statistical significance was setup at the p value of ≤ 0.05. Data was done by unpaired student't' test and correlation coefficient(r).

Statistical Analysis:

Results were presented in mean ± S.D and in suitable table. The paired sample' t' test was used to test the level of significance and $P < 0.05$ was considered significant.

VARIABLE	GROUP	N	MEAN	S.D	p VALUE
S.Chole-sterol Mg/dl	case	100	199.02	13.62	0.069
	control	50	189.38	35.55	
S. TG Mg/dl	case	100	161.93	16.63	0.00
	control	50	127.92	29.63	
S. LDL Mg/dl	case	100	106.42	18.08	0.00
	control	50	42.30	20.03	
S.HDL Mg/dl	case	100	60.21	15.05	0.943
	control	50	60.04	13.06	
S.VLDL Mg/dl	case	100	32.39	3.33	0.00
	control	50	25.58	5.95	

Result

The mean values of lipid profile parameters are given in **Table Figure .** There was a non significant relationship between case and control of TC and HDL level. TC of case was (199.02 ± 13.62mg/dl), whereas of control is (189.38 ± 35.55mg/dl) whose[('p' =0.069)] and of HDL case is (60.21 ± 15.05) and of control is (60.04 ± 13.06) [('p' =0.943)] which shows non significant relation. Mean and SD of TG are (161.93 ± 16.63mg/dl) of case and (127.92 ± 29.73mg/dl) of control [('p'

=0.000)] respectively and LDL of case subjects was (106.42 ± 18.08mg/dl) and of control is (42.30 ± 20.08) where [('p'=0.000)]. Whereas VLDL in case subjects is (32.39 ± 3.33mg/dl) and of control is (25.58 ± 5.95mg/dl) [('p' =0.000)].which shows significant relationship. Serum TG, LDL and VLDL shows a highly significant relationship between both the groups. Whereas TC and HDL level shows non significant relationship between both the groups.

Serum TG, LDL, VLDL level shows a highly significant relationship whereas TC and HDL Level shows non significant relationship between both the groups

Two consistent manifestations of altered maternal lipid metabolism associated with gestation are the accumulation of lipids in maternal tissues and the development of maternal hyperlipidaemia. This is reflected in the results obtained from this research work. Studies in recent past have incriminated abnormal lipid metabolism during pregnancy in the pathogenesis of atherosclerosis, ischaemic heart disease, intrauterine growth disease intrauterine growth retardation and hypertension. Hence estimation of lipid profile is strongly recommended as part of the laboratory investigations during pregnancy so as to institute prompt management strategies to prevent deleterious effect of hyperlipidaemia associated with pregnancy in urban population.

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