

Effective Study of Lipid Profile during Pregnancy

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Abstract

Pregnancy greatly increases demand for metabolic fuels that are needed for growth and development of the fetus and its support structures. The major change in energy expenditure and in the accumulation of fat occurs at different times during pregnancy. Altered metabolic and hormonal status of the body in pregnancy leads to changes in lipid profile. High Lipid profile level is the major factor behind atherosclerosis may leads to unconsciousness. To avoid such problems during pregnancy study was done to investigate the effect of pregnancy on lipid profile changes during all three trimesters.

In this study, Lipid profile changes were estimated in a total number of 75 subjects between ages 24-35 years during each trimester of pregnancy against control group of 70 subjects of non pregnant women. All subjects were made to fast overnight at least for a minimum of 8 hrs. Blood samples were taken and analyzed by enzymatic colorimetric kit method in the Ayurvedic Research Laboratory at Shri Gajanan Invention & Advanced Research Center, Shegaon. The average results were analyzed with respect to each pregnancy for the whole group. The study proves that in case of lipid profile serum Total cholesterol, Triglyceride, LDL (Low Density Lipoprotein) cholesterol and VLDL (Very Low Density Lipoprotein) cholesterol increased from trimester to trimester while HDL (High density lipoprotein) cholesterol decreased as compare to control group. Pregnancy has being found to be associated with changes in lipid profile and this differs with each trimester. The result reveals metabolic changes in lipid profile during pregnancy.

Conclusively, increase in susceptibility to the development of coronary heart disease and other foetal/maternal diseases. Therefore, lipid profile estimation and monitoring should be made a part of routine investigation during antenatal period. Further studies are needed to determine if certain women are at

increased risk of cardiovascular disease in later life because of effects on their lipid profile during pregnancy.

KEYWORDS Lipid Profile, Pregnancy, Trimester, Atherosclerosis.

INTRODUCTION

Pregnancy is a new sequence of events after fertilization of ovum. It is accompanied by changes in maternal lipoprotein which may serve for satisfying a fetus nutritional demand [3]. A review of literature has revealed conflicting observations on normal and abnormal pregnancies.

In pregnant woman, Lipid profile changes during pregnancy are a result of physiological adaptation to the state of pregnancy. There are increases in the blood concentration of Cholesterol, Triglycerides, LDL cholesterol, VLDL cholesterol and decreases in HDL cholesterol. [1].

Cholesterol belongs to the sterol group of fats and is present in the egg yolk, dairy products, fatty meals and meat. It has a good side because it performs number of vital functions in the body such as providing an essential component of membranes and serving as a precursor of bile acids, steroid hormones and Vit.D [2]. The blood stream carries cholesterol in particles called lipoprotein. But too much of circulating cholesterol can injure arteries especially coronary arteries that supply blood to the heart. This leads to the accumulation of cholesterol laden "Plaque" in vessel linings a condition called Atherosclerosis. When blood flow to the heart is impeded the heart muscle becomes starved of oxygen causing chest pain (angina). If a blood clot completely obstructs a coronary artery affected by atherosclerosis, heart attack (myocardial infarction) or death can occur [4], lipid profile is a group of tests that are used to determine risk of coronary heart diseases. The lipid profile tests include Total cholesterol, Triglycerides, HDL cholesterol, LDL cholesterol, VLDL cholesterol.

The main objective of this study is to investigate whether lipid profile during pregnancy differs from non-pregnant women of similar reproductive life. This study is based upon the effect of pregnancy on serum lipid profile and so that steps may be minimized to solve cardiovascular and other complications, which may help to promote and preserve women's reproductive health.

STUDY AREA

Clinical biochemistry is that branch of laboratory medicine in which chemical and biochemical methods are applied to the study of disease. Biochemical investigations are involved, to varying degrees, in every branch of clinical medicine.

The Clinical Biochemistry Department uses biochemical knowledge and techniques to understand human health and to assist in the detection, diagnosis and treatment of disease. I have been used kit method to study lipid profile which is part of clinical biochemistry. By using this kit method, analysts can confidently differentiate between apparent laboratory analytical error and a genuine trend represented by continuously increasing or declining values of an analyte. Many health

professionals nowadays feel the need to carry out every investigation to make sure that 100% of disease possibilities are ruled out and this leads to a very definite overuse of technology.

MATERIALS & METHODS

A total number of 75 cases of 1st, 2nd and 3rd trimester of pregnancy were participated as study group in the age between 24-35 yrs. 70 cases of non-pregnant women matched on reproductive age were considered as control group.

Fasting blood samples were collected from all subjects and biochemical analysis of serum was carried out for estimation of Total cholesterol, HDL cholesterol, Triglycerides, LDL cholesterol and VLDL cholesterol by using kit method in the Ayurvedic Research Laboratory, *Shri Gajanan Invention & Advanced Research Center Shegaon*. Following kits were used for the estimation:

For Lipid profile : Total cholesterol – CHOD-POD method (Life chem.kit)
HDL cholesterol – CHOD-POD method (Life chem.kit)
Triglyceride – GPO/POD method (Liquizyme kit)

RESULT

A review of literature has revealed conflicting observations on normal pregnancy. Increase in maternal lipid profile during pregnancy differs with trimester. Women with an uncomplicated course of pregnancy were investigated during routine check-up in all trimester of pregnancy. The 75 cases with 1st, 2nd and 3rd trimester of pregnancy and 70 cases matched on reproductive age were participated. Data were expressed as mean in tables. All the results were expressed in mg/dl.

DISCUSSION

Some previous study showed that the most dramatic damage in the lipid profile in normal pregnancy is serum hyperlipidemia, which may be high as two to three folds in the third trimester over the levels in non pregnant women [6]. In our study also this observation holds true.

Pregnancy has being found to be associated with changes in lipid profile and this differs with each trimester. The finding of this study shows that there is progressive increase in concentration of Total cholesterol, Triglyceride, LDL, VLDL and slightly decrease in HDL cholesterol during the course of 2nd trimester but significantly increase and decrease respectively during the course of 3rd trimester of pregnancy than control. But the above concentrations were found to be near about control group in 1st trimester.

In this study documents, Total cholesterol shows about 11.6%, 58% and 61% in 1st, 2nd and 3rd trimester during pregnancy respectively. Triglyceride shows about 44%, 66% and 98% in 1st, 2nd and 3rd trimester respectively LDL cholesterol shows 14%, 85% and 95% in 1st, 2nd and 3rd trimester respectively. VLDL cholesterol shows 45%, 72% and 90% in 1st, 2nd and 3rd trimester respectively. HDL cholesterol shows

about 86%, 76% and 63% in 1st, 2nd and 3rd trimester respectively. Elzen *et.al* analyzed 300 pregnant women during 1st, 2nd and 3rd trimester all aged 35 years and concluded that an altered lipid profile during trimester increased the risk of atherosclerosis, restricted fetal growth and risk of uncomplicated pregnancy [5].

It is difficult to explain how pregnancy hormones increased the serum total cholesterol level. Estrogen seems to be responsible for most of the alteration in lipoprotein metabolism during pregnancy. Pregnancy is associated with hyperestrogenaemia. Estrogen induces hepatic biosynthesis of endogenous triglycerides, which is carried by VLDL [6]. Progesterone has been shown to oppose the action of estrogens on lipoprotein metabolism leading to increased concentration of LDL cholesterol and decreased concentration of HDL cholesterol [1].

It had been observed that the increase in the maternal lipid profile in the third trimester is an alternative pathway for energy generation due to high energy demand. From above result, study proves that lipid profile gets disturbed during pregnancy that may result into heart attack. The present study was undertaken to elucidate any significant variation in the lipid profile during normal pregnancy in different trimesters to establish if pregnancy affects the lipid profile and to evaluate the clinical significance of the lipid profile level in pregnancy [6].

Studies in recent past have incriminated abnormal lipid metabolism during pregnancy in the pathogenesis of atherosclerosis, ischemic heart disease, intrauterine growth retardation and hypertension [6]. 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 hyperlipidemia associated with pregnancy.

CONCLUSION

Generally Gynecologist does not refer to check lipid profile during pregnancy, to overcome critical problem of heart diseases during the same. Gynecologist should suggest doing lipid profile at proper stage of pregnancy as well as advice them for suitable intake of diet to avoid such problem.

Table 1: Mean values of TC, TG, HDL, LDL, VLDL, in pregnant women aged between 24-35 years in the first, second and third trimester against control group of same age. (Unit: mg/dl)

Tests used	Control group	1st trimester	2nd trimester	3 rd trimester	Normal values
TC	158.2	180.7	255.1	270	130-250
TG	102.9	150.6	178.4	198.8	60-170
HDL cholesterol	46.8	38.6	32.8	27.6	36-60
LDL cholesterol	91.4	118.5	170.9	195.7	< 130
VLDL cholesterol	19.8	28.9	40.2	45.7	2-38

* Significant different from control, TC=Total Cholesterol, TG=Triglyceride, HDL=High Density Lipoprotein cholesterol, LDL=Low Density Lipoprotein cholesterol, VLDL=Very Low Density Lipoprotein cholesterol.

Figure: Graph shows the comparison between mean values of lipid profile level in pregnant women against control group. All biochemical tests had been done by enzymatic kit method which shows quite changes in 1st trimester but within normal range but towards higher side, the method also shows the progressive and significant changes during 2nd and 3rd trimester of pregnancy respectively.

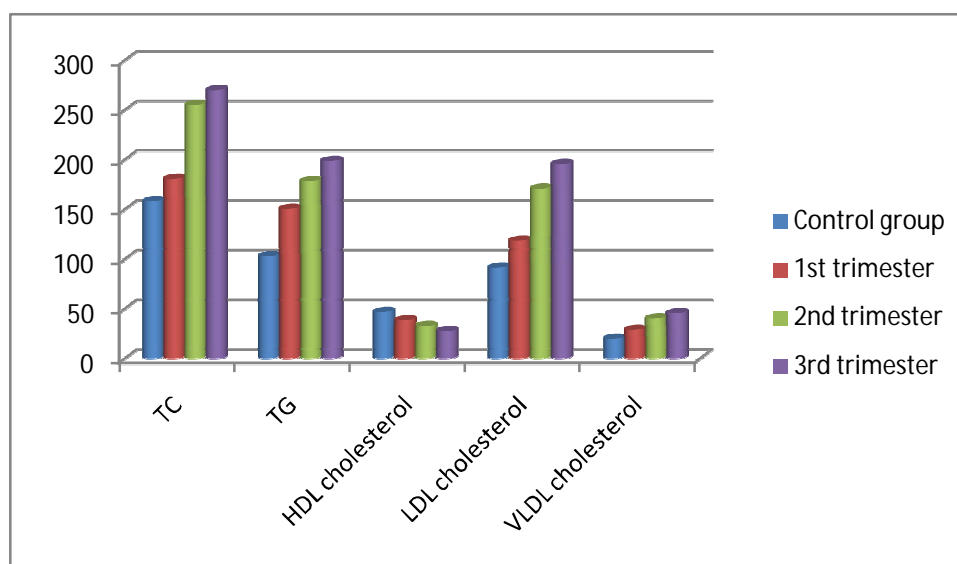


Fig. 1: Comparison of Lipid Profile in gestational women against Control Group

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