

Estimation of Cholesterol Level During Pregnancy

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(Received 25/12/2001 , Accepted 26/1/2002)

ABSTRACT

Normally pregnancy especially at late gestation associated with metabolic changes, like changes in maternal storage of adipose tissue, hormonal secretions and lipoproteins concentrations. Cholesterol level is one of these maternal modifications during pregnancy, this maternal adaptation is to ensure fetal growth. 131 pregnant women aged (20- more than 40) years were chosen randomly, to estimate their fasting blood cholesterol every month of gestation. Total cholesterol was determined by colorimetric method which depends on extracting cholesterol by ethyl alcohol and producing coloured compound, which measured by spectrophotometer.

Elevation of blood total cholesterol was noticed during pregnancy. This increase of total cholesterol started from 3rd month up to term.

131

(40 -20)

560

INTRODUCTION

Cholesterol has many physiological functions, it is the precursor of steroid hormones and bile acids, and one of the cell membrane components.

Cholesterol is present in plasma in the form of lipoprotein particles as free cholesterol or cholesteryl ester (Murray et al., 1988). The lipoprotein is the way of transportation of cholesterol in the blood with other lipid components (free fatty acids, triglycerides, phospholipids).

Cholesterol that is released from the tissues as a result of cell death and membrane turnover in living cells is picked up by the HDL. The HDL particles interact with a plasma enzyme called Lecithin-cholesterol acyl transferase (LCAT). LCAT transfers fatty acids from lecithin, the major phospholipid in the plasma to the cholesterol, converting the cholesterol to cholesteryl esters. The cholesteryl esters are then transferred from HDL to LDL and to chylomicrons (Pesce and Kaplan, 1987; Muir, 1988; Nicoll et al., 1980).

Cholesterol in HDL is usually higher in women than men, and there are fluctuations in HDL-cholesterol during the menstrual cycle (Nicoll et al., 1980).

Flow ever, few studies of the cholesteremia have been carried out in the Middle East countries in general and such data are not available for Iraqi pregnant women during pregnancy period.

MATERIALS AND METHODS

131 pregnant women were selected while attending the consultant of Saddam General Hospital in Mosul.

The women were at different age groups from less than 20 years to more than 40 years and at different gestational ages. The pregnant women were selected of primiparous multiparous pregnant women.

Serum cholesterol was determined by a colourimetric method (Iron salt-acid reaction) (Pesce and Kaplan, 1987) by using spectrophotometer device, (Spectronic-20), at wave length 560 nm.

RESULTS

Table (1) shows the distribution of age of pregnant women according to their month of pregnancy, which shows the variation from less than 20 years old to more than 40 years old.

Table 1: Means, SD and ranges of age for pregnant women in each month of pregnancy.

Month of pregnancy	Mean \pm SD (year)	Range (year)
2 (n = 15)	28.73 \pm 5.48	21-40
3 (n = 14)	27.61 \pm 6.17	17-40
4 (n = 15)	29.70 \pm 5.61	20-35
5 (n = 15)	30.50 \pm 5.95	21-42
6 (n = 15)	30.20 \pm 5.00	23-41
7 (n = 18)	30.72 \pm 7.06	21-42
8 (n = 19)	29.26 \pm 6.36	23-44
9 (n = 20)	31.77 \pm 7.84	18-34

The total cholesterol (TC) of fasting pregnant women was shown in table (2). In the 2nd month of pregnancy, the TC was (172.86 \pm 17.5) mg/dl, the range of TC concentration was (168-220) mg/dl.

At the 3rd month, the TC was (185.95 ± 20.16) mg/dl with range (170-270) mg/dl. Only one case with hypercholesteremia was noticed. At 4th month of pregnancy, the TC was (209.64 ± 23.54) mg/dl, the range was (175-300) mg/dl. Three cases of hypercholesteremia were noticed.

At the 5th month of pregnancy, the TC was (227.30 ± 27.05) mg/dl, the range was (180-300) mg/dl, four cases of hypercholesteremia were shown.

The mean of TC at 6th month of pregnancy was (240.70 ± 30.72) mg/dl, the range was (210-305) mg/dl, the hypercholesteremia in this month were noticed on five cases only.

In 7th month of pregnancy, the TC was (249.93 ± 35.12) mg/dl, the range was (210-364) mg/dl. Five cases of hypercholesteremia were estimated only.

Table 2: Levels of total cholesterol during pregnancy.

Month of pregnancy	Mean ± SD (mg/dl)	Range (mg/dl)
2 (n = 15)	172.86 ± 17.50	168-220
3 (n = 14)	185.95 ± 20.16	170-270
4 (n = 15)	209.64 ± 23.54	175-300
5 (n = 15)	227.30 ± 27.05	180-300
6 (n = 15)	240.70 ± 30.72*	210-305
7 (n = 18)	249.53 ± 35.12*	210-364
8 (n = 19)	260.12 ± 32.35**	200-310
9 (n = 20)	286.11 ± 37.72**	210-336

n: Number of subjects

* p > 0.05, between 2nd and 6th months

** p > 0.01, between 2nd and 8th and 9th months

During 8th month of pregnancy the TC was estimated (260.12 ± 32.35) mg/dl, the range was (200-310) mg/dl. The hypercholesteremia in this month was (8) cases.

At the last month of pregnancy, the TC was (286.11 ± 37.72) mg/dl, the range (210-336) mg/dl. The number of pregnant in this month were (20), while the hypercholesteremia was (14).

DISCUSSION

There are different factors that affect the cholesteremia during pregnancy, like style, economic status, and diseases. The assessment of the cholesteremia of the pregnant women is important, since the dietary requirement increases during pregnancy for both the pregnant mother and her fetus.

The pregnant mother almost in a new person during the 9 months of pregnancy. Every system undergoes some changes. The hormones will change during the period, also nutritional demands of the fetus.

There are adaptations for mother's metabolism especially energetic, to supply the requirement of the fetus, one of these adaptation is the metabolism of lipid. The

hypercholesteremia during pregnancy is shown in our study is normal for the adaptation of the mother to supply the fetal requirement, estrogen is increase during the gestation (Wallentin and Fahraeus, 1986). This hormone at mid gestation increases the cholesterol in HDL (Knopp et al., 1981).

In the present study, the total cholesterol increases from the third month of gestation up to the 9th month. Same results were shown by (Wallentin and Fahraeus, 1986), that HDL increase during pregnancy as well as VLDL. The decrease of LCAT, its activity will decrease from fourteenth until the twenty-eighth week of gestation, simultaneous with a progressive rise of the cholesterol and LDL concentration, in addition placenta and liver secrete VLDL during late pregnancy (Wallentin and Fahraeus, 1986). This rise of LDL-cholesterol during pregnancy can be completely eliminated by feeding a cholesterol-free diet (Knopp et al., 1981), while the efficiency of cholesterol absorption during this period is increased (Winked et al., 1980). Fat storage is greatly accelerated in early gestation but almost completely shuts off in late gestation. Lipoprotein lipase activity in adipose tissue, which in above normal in mid gestation, declines to subnormal level by term.

HDL concentration reach a minimum level in mid gestation and decline as term approaches (Wallentin and Fahraeus, 1986) as well as LDL increase and TG levels increase, these changes increase the risk of atherosclerosis.

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