

ANTEPARTUM AND POSTPARTUM CHOLESTEROL AND LIPOPROTEIN LEVELS IN NORMAL PARTURATING WOMEN

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Large amount of data are available on the cholesterol levels of both plasma and serum in different pathological conditions. It is a known fact that cholesterol levels in blood continue to rise as pregnancy advances and that beta lipoproteins fraction carries with it a certain amount of cholesterol (Anderson and Keys, 1956).

The etiology of elevation of cholesterol has been referred to many factors which are affected by the overall changes brought about during pregnancy. However, one of these factors held responsible was the placenta. It was therefore very interesting to note whether the placenta could have any effect on lipid parameters, namely cholesterol and lipoproteins. And this could be achieved only by antepartum and postpartum studies.

Material and Methods

All subjects were selected from the patients who were admitted for delivery in Nowrosjee Wadia Maternity Hospital, Bombay. These subjects were normal in all respects and had full term delivery. They were belonging to either lower or middle socio-economic class. All of them

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had normal menstrual cycles before the conception and had no evident hormonal deficiency.

Blood samples were withdrawn during the first labour stage. At the time of delivery cord blood alone was collected. In order to draw a comparison, postpartum blood collection was done before the completion of 24 hours from the parturition time, thereby the same patient could be studied in antepartum and postpartum stage.

Total cholesterol from sera was estimated according to the method of Gupte (1968). The method for analyzing free cholesterol was adopted from Varley (1969). Esterified cholesterol was found out as a difference between total and free cholesterol. Paper electrophoresis was performed in order to fractionate lipoproteins (Gradwhol).

Results

Table I denotes the mean levels of serum total, free and esterified cholesterol in different groups of subjects with standard deviation. All differences between the groups are statistically significant to the extent of $P < 0.001$. Mean serum total cholesterol level at the first labour stage is 52.4 per cent higher than that of normal non-pregnants. However, puerperal level of serum total cholesterol is 39 per

TABLE I
Mean Levels of Serum Total, Free and Esterified Cholesterol

Groups	Esterified Cholesterol				Total Cholesterol				Free Cholesterol			
	NP	AP	PP	Cord	NP	AP	PP	Cord	NP	AP	PP	Cord
No. of subjects	40	76	75	59	40	76	75	59	40	76	75	59
Mean												
Mg % ± S.D.	189±23	288±27	259 ±28	78±10	53±7	70±8	58±10	23±4	136±16	218±22	200±24	58±9

NP: Normal nonpregnant

AP: Antepartum

PP: Postpartum

cent higher than the control level. Free cholesterol is 28 per cent of the total cholesterol in normal non-pregnants. Its percentage decreases to 24.3 per cent in first stage of labour. It further diminishes to 22.8 per cent in puerperium. A reverse of free cholesterol has been observed in case of the percentage of esterified cholesterol in total cholesterol.

Table II describes the mean percentage of Alpha and beta lipoproteins in different groups of subjects with standard deviation. All differences between the groups are statistically significant to the extent of $P < 0.001$. It is observed that at the first stage of labour percentage concentration of alpha lipoproteins diminishes with a concomitant elevation of percentage of beta lipoproteins. In puerperium alterations towards normal non-pregnant levels are also seen.

Discussion

A significant fall ($P < 0.001$) has been noted from antepartum to postpartum stage. This denotes that placenta is the principal organ responsible for the elevation of cholesterol during pregnancy. It is also true that the hormonal levels which are affected during pregnancy are changed with the eviction of placenta. Therefore, these levels may be indirectly responsible for the diminishing of lipid parameters. Another etiological reason appears to be true as the excretion of cholesterol in the milk takes place. It has been stated by Berzin and von Studnitz (1957) that estrogens cause rise in circulating lipid levels. Both, estrogens and progesterones are of placental origin. Therefore, the placenta itself is the primary cause for the elevation of lipids which slowly return to the pregestational levels after the expulsion of placenta. The activity of Lecithin-cholesterol acyltransferase en-

TABLE II
Mean Percentage of Alpha and Beta lipoproteins

	Normal Nonpregnant	Antepartum	Postpartum	Cord blood
Number of subjects	40	75	69	54
Percentage of				
Alpha lipoprotein \pm S.D.	42.41 \pm 2.5	31.30 \pm 2.7	34.91 \pm 2.4	45.38 \pm 3.0
Percentage of beta lipoprotein \pm S.D.	57.59 \pm 2.5	68.70 \pm 2.7	65.09 \pm 2.4	54.62 \pm 3.0

zyme, found in plasma and possibly in liver, which is considered to be responsible for much of the cholesterol ester in plasma, seems to be slightly increased as seen from the percentage of esterified cholesterol in total cholesterol at the first labour stage. The relationship of cholesterol and beta lipoproteins is expressed in Table III. The rise ($P < 0.001$) in beta

TABLE III
Coefficient of Correlation Between Beta lipoproteins and Cholesterol

	CHOLESTEROL		
	Total	Esterified	Free
Normal nonpregnant	+ 0.7370*	+0.2507	+0.0038
Beta Lipoprotein			
Antepartum	+0.2906*	+0.1797*	+0.0943
Postpartum	+0.2941*	+0.2481*	+0.1364

For statistical significance * $P < 0.05$

lipoprotein, both antepartum and postpartum, is due to rise in esterified cholesterol level. A fall ($P < 0.001$) in esterified cholesterol is also accompanied by the subsequent fall in beta lipoprotein at the post partum stage.

Summary

1. The study comprises of 75 cases of antepartum and 69 cases of postpartum patients. The lipid parameters namely cholesterol and beta lipoprotein have been studied. Along with this cord blood has also been analyzed and the values of cholesterol and beta lipoproteins have been stated.

2. Serum total cholesterol levels as well as percentage of beta lipoproteins in antepartum stage were significantly higher than in postpartum stage ($P < 0.001$).

3. The effect of placenta on this lipid parameter has been described.

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