

STUDY OF ANTE-PARTUM AND POST-PARTUM SERUM CHOLESTEROL LEVEL IN NORMAL AND TOXAEMIA OF PREGNANCY

by

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Introduction

The incidence of heart disease and hypertension has increased in recent years. We have also observed, that there is association of hypertension in 10 to 15 per cent of cases, who attend G.O.P.D. for various gynaecological disorders. At a random survey in Bombay there was an incidence of hypertension in 10 per cent of cases in a group of persons over 20 years of age. The very fact that the W.H.O. chose "Down with hypertension" as its slogan for 1978, lays stress on the bearing this malady has on health and longevity. Elevation of blood cholesterol is found in most of the cases of hypertension and heart disease. That the blood cholesterol level plays an important role in the causation of atheromatous changes in blood vessels is now more or less an established fact. These changes in the wall of blood vessels appear to play an important role in the elevation of blood pressure.

Pregnancy brings about significant changes in the metabolic processes. The metabolism of carbohydrate, protein and fat are altered in the presence of placen-

tal hormones. These metabolic changes are rather exaggerated in toxæmia of pregnancy, and is accompanied by maternal and foetal hypercholesterolaemia.

In the background of all these information, it was decided to study the level of blood cholesterol in cases of toxæmia of pregnancy to enable us to find out whether there is a correlation between the level of blood cholesterol and degree of hypertension. We further wanted to observe whether there is any change in cholesterol level after the withdrawal of placental hormones in postpartum period.

Material and Methods

In present study, a total number of 100 cases (40 normal pregnancy as control and 60 toxæmia of pregnancy) were taken from the department of Obstetrics and Gynaecology, Patna Medical College Hospital, Patna. The patients selected for study were from antenatal wards, antenatal clinics, gynaecological O.P.D. and from labour room directly.

A complete clinical history especially regarding age, parity, dietetic habits, socio-economical status and a thorough clinical examination and necessary investigations were done to exclude other conditions affecting serum cholesterol level e.g., coronary heart disease, kidney disease, liver disease, diabetes mellitus

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etc. Cases included in this study had had no systemic disease and were in the last trimester of pregnancy nearing term.

Five ml of blood was withdrawn during antepartum period (from 28th to 40th week of gestation) and in early postpartum period (e.g. 6 days after delivery) and in late postpartum period (e.g. 6 weeks after delivery) separately in fasting state.

Total serum cholesterol level was estimated according to "Sachet's method—1925 with Liebermann—Burchard reaction".

Observation

From the analysis of the result it was evident that there is a definite increase in values for serum cholesterol in the normal as well as in cases of toxæmia of pregnancy in antepartum period.

The percentage rise in serum choleste-

rol level in pre-eclampsia over normal pregnancy is 9.09 per cent and in eclampsia over normal pregnancy is 14.29 per cent as shown in Table I.

On statistical analysis the mean value for pre-eclampsia is significantly elevated above the average value of normal pregnant woman ($P < 0.05$); however, in eclamptic women; values for serum cholesterol level seems much higher than in normal pregnant women and statistically highly significant in the antepartum period ($P < 0.01$)—Table II.

The serum cholesterol level falls gradually in the early postpartum period in normal and toxæmia of pregnancy cases. But in late postpartum period the serum cholesterol level further falls gradually reaching to normal in cases of normal pregnancy. However, in cases of toxæmia of pregnancy the level of postpartum cholesterol does not return to same level

TABLE I
The Range, Mean and Standard Deviation Serum Cholesterol Level in Control, Pre-eclampsia, Eclampsia in Antepartum Period

Categories	No. of cases	Range	Mean	S.D. \pm
Serum cholesterol level in mg/100 ml in control cases	40	203-316	254.13	27.89
Serum cholesterol level in mg/100 ml in pre-eclampsia cases	40	172-358	277.25	50.11
Serum cholesterol level in mg/100 ml in eclampsia cases	20	183-395	290.45	52.14

TABLE II
Statistical Analysis of the Total Serum Cholesterol Level in Antepartum Period

Groups compared	t	P	Remarks
Control Vs. Pre-eclampsia	2.55	< 0.05	Significant
Control Vs. Eclampsia	2.91	< 0.01	Highly significant

as that of normal. In the first 6 postpartum days a decline of minimal degree was observed, but during sixth postpartum week serum cholesterol level further decreased in both normal and toxæmia of pregnancy cases; but the level remained above the normal control level in cases of toxæmia. This observation was statistically significant ($P < 0.05$)—Table III.

arteriolar thickening, the deposition of atheromatous plaque in vessels and eventual production of hypertension.

Elevation of the blood cholesterol is found in most of the cases of hypertension and heart disease. From the review of literature during last 50 years and analysis of our own results it is evident

TABLE III

Statistical Analysis of the Total Serum Cholesterol Levels in Late Postpartum Period

Groups compared	t	P	Remarks
Control Vs. Pre-eclampsia	1.87	> 0.05	Not significant
Control Vs. Eclampsia	2.08	< 0.05	Significant

Discussion

The occurrence of hyperlipaemia during normal pregnancy was known as early as 1845 (Bequral and Rodier) and even in cases of toxæmia of pregnancy hyperlipaemia was reported by (Chaufford *et al*, 1911). In the beginning many workers believed that the hyperlipaemia of pregnancy was due to increased fat absorption, poorly assimilated chyle or from the mixing of milk with blood for the nourishment of the foetus. Since then many workers like Pontis and Purandare (1972), Hytten and Lind (1973) have demonstrated that there is increase in circulating lipids in normal and toxæmia of pregnancy. This increase is a gradual one and more marked in third trimester of pregnancy. Elevation of serum cholesterol and a raised beta/alpha lipoprotein ratio are characteristic changes in conditions associated with atheroma of large vessels. The hypercholesterolaemia predisposes to atherosclerosis by the production of arterial and

that pregnancy plays a role in the elevation of serum cholesterol level.

The persistence of raised cholesterol level upto sixth postpartum period in cases of toxæmia of pregnancy, is a significant observation.

Thus we feel that estimation of blood cholesterol level in cases of toxæmia of pregnancy in postpartum period up to 6 weeks or beyond should be done regularly. This will help us to pick up cases at risk to develop hypertension and heart disease in later life. This routine of blood cholesterol and its fraction (high density and low density lipoprotein) estimation in postpartum period may give us an opportunity to detect and treat this dreadful disease in an embryonic stage and before its birth in the form of an established hypertension.

Summary

1. Serum cholesterol level of 40 normal and 60 toxæmic patients were estimated during antepartum, early postpartum and late postpartum period.

2. There was a significant rise of serum cholesterol level in toxæmic patients (9.09 per cent in pre-eclampsia and 14.29 per cent in eclampsia) in the ante-partum period.

3. There was minimal fall of serum cholesterol level in early postpartum period and a further fall during the late postpartum period in both normal and toxæmic pregnancies.

4. Most of the cases lay between the range of 201-350 mg/100 ml in normal pregnancy, but in toxæmic patients the range was 251-350 mg/100 ml.

5. In cases of toxæmia of pregnancy, the serum cholesterol level did not return to the same level as it did in the normal pregnant cases in late postpartum period and this significant on statistical analysis ($P < 0.05$).

6. The level of cholesterol had no definite relationship with the degree of hypertension, in the antepartum period.

7. However, cases of toxæmia showing evidence of raised cholesterol level in their postpartum period, had had some

degree of hypertension as well.

8. Estimation of serum cholesterol level in toxæmia of pregnancy in the antepartum and postpartum period appears to be of value and an important investigation which could help us to detect cases at risk of developing hypertension and heart disease.

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References

1. Hytten, F. E. and Lind, T.: Diagnostic Indices of Pregnancy, Ciba-Geigy, Basle, p. 36, 1973.
2. Pontis, A. V. and Purandare, B. N.: J. Obstet. Gynec. India 22: 114, 1972.