

EFFECT OF ORAL AND INJECTABLE CONTRACEPTIVES ON LOW DENSITY AND HIGH DENSITY LIPOPROTEINS

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Abstract

Low density and high density lipoproteins (LDL) were measured in 50 women taking oral contraceptives and 40 women taking injectable contraceptives for the period of 2-12 months regularly. Compared with control group of 20 women, oral contraceptive users were found to have significantly higher serum levels of total LDL, LDL - cholesterol and significantly lower levels of HDL-cholesterol. However, the mean values of these parameters in group of women on injectable contraceptive, were almost identical with the controls (JPMA 36 : 267, 1986).

INTRODUCTION

The use of oral contraceptives has been shown to be associated with increased levels of serum lipids^{1,2,3} Fayyaz et al.⁴ documented increased but non-significant levels of serum cholesterol and triglycerides while Shafique and Majeed reported significantly raised levels of serum cholesterol, triglycerides and blood pressure in women on oral contraceptives. Oral contraceptives also appeared to increase LDL-cholesterol and decrease HDL-cholesterol^{6,7} Some studies reported unchanged LDL-cholesterol⁸ and low HDL-cholesterol⁷ while Gustafson and Svanborg⁹ showed a rise in both LDL-cholesterol and HDL cholesterol in oral contraceptive users.

The survey of available literature regarding the effects of oral contraceptives on lipoproteins, has revealed conflicting reports in various countries. Also serum lipoproteins in women receiving injectable contraceptives have not been reported. Our study aims to evaluate appropriate lipoprotein fractions (LDL & HDL) in women taking oral as well as injectable contraceptives, because LDL and HDL are the subject of increasing interest mainly due to the finding that hypercholesteremia commonly present in coronary heart disease, is correlated with an increased LDL-cholesterol and decreased HDL-cholesterol concentrations.

MATERIALS AND METHODS

Healthy women for the study were randomly selected from those attending the Family Planning Unit of Bahawal Victoria Hospital, Bahawalpur. They comprised of 50 women receiving oral contraceptives (group A) and 40 women receiving injectable contraceptive (group B) for a period of 2-12 months regularly. The group A was further divided into group A-1 (20 women), group A-2 (18 women) and group A-3 (12 women). Groups A-1 and A-2 received 'Norinyl' and 'Ovral' pills respectively for 2-6 months. The group A-3 received either of these pills for 6-12 months. Group B was also further divided into group B-1 (20 women) and group B-2 (20 women). Both these groups received medroxyprogesterone acetate 150 mg/ml intramuscularly at 3 months interval for 2-6 months and 6-12 months respectively.

All the subjects were married and multipara, ranged between 25 and 45 years. Control group consisting of 20 women was age-matched and comparable. Blood samples were collected from all these cases after an overnight fast. The serum was separated and analysed for the Samaille's method¹⁰ and HDL-

cholesterol by Lopes - Virella technique¹¹. Statistical significance of results was assessed by student's t test.

RESULTS

TABLE-I

Serum Lipoproteins in Controls and in Women on Oral Contraceptives (group A) and on Injectable Contraceptive (group B). Values represent mean \pm s.e.m. Number of cases are given in parenthesis.

Groups	Duration of drug (months)	Total LDL (mg/dl)	LDL- Cholesterol (mg/dl)	HDL- Cholesterol (mg/dl)
Controls (20)	—	440.11 \pm 15.57	155.67 \pm 5.48	62.20 \pm 1.63
Group A (50)	5.97 \pm 0.38	487.11* \pm 11.61	171.93** \pm 4.07	55.41*** \pm 1.07
Group B (40)	6.15 \pm 0.42	450.86 \pm 12.74	159.64 \pm 4.47	60.47 \pm 1.64

The difference is statistically significant, P* < 0.05, P** < 0.02 and P*** < 0.01 as compared to control group.

Table I indicates that the group of women using oral contraceptives (group A), was found to have significantly higher levels of total LDL (P < 0.02), LDL-cholesterol (P < 0.05) and significantly lower

levels of HDL cholesterol ($P < 0.01$) than that of controls. On the contrary, no significant difference in these values, was observed in women on injectable contraceptive (group-B).

TABLE - II

Serum Lipoprotein Levels in various Groups of Women taking different Oral Contraceptives for variable Periods. Values are expressed as mean \pm s.e.m.

Groups	Duration of drug (months)	Total LDL (mg/dl)	LDL-Cholesterol (mg/dl)	HDL-Cholesterol (mg/dl)
Controls (20)	—	440.11 ± 15.56	155.67 ± 5.48	62.20 ± 1.63
Group A-1 (20) 'On Norinyl'	4.80 ± 0.31	472.47 ± 19.31	166.95 ± 6.76	57.03* ± 1.83
Group A-2 (18) 'On Ovral'	4.76 ± 0.33	488.10 ± 23.87	172.60 ± 7.23	55.18** ± 1.88
Group A-3 (12) 'Either of these drugs!'	9.74 ± 0.57	** 501.02 ± 20.43	** 178.33 ± 7.16	*** 53.04 ± 2.07

The difference is statistically significant $P^* < 0.05$, $P^{**} < 0.02$ and $P^{***} < 0.01$ as compared to that of non-users.

Table II shows the serum lipoprotein alterations associated with the use of different oral contraceptives

for a variable period of time. The group of women on 'Norinyl' pills (group A-i) and on 'Ovral' pills (group A-2) revealed a significant decrease in HDL-Cholesterol ($P < 0.05$ & $P < 0.02$ respectively) but total LDL and LDL cholesterol did not change significantly in these groups as compared to that of controls. Long- term use of these contraceptive pills by women (group A-3) however, resulted in a significant elevation of total LDL, LDL-cholesterol and a significant fall in HDL-cholesterol ($P < 0.01$) as compared to that of non-users.

Results shown in Table - III

TABLE - III
Lipoprotein levels in short-term (group B-1) and long-term (group B-2) Injectable Contraceptive Groups of Women. Values represent as mean \pm s.e.m.

Groups	Duration of drug (months)	Total LDL (mg/dl)	LDL- Cholesterol (mg/dl)	HDL- Cholesterol (mg/dl)
Controls (20)	—	440.11 ± 15.57	155.67 ± 5.48	62.20 ± 1.63
Group B-1 (20)	4.02 ± 0.25	439.24 ± 17.18	155.20 ± 6.02	61.44 ± 2.47
Group B-2 (20)	8.81 ± 0.41	462.47 ± 18.84	165.20 ± 6.61	59.25 ± 2.07

The difference in these parameters, is not significant statistically as compared to control group.

indicate no significant disturbances in low density and high density lipoprotein levels in both the groups of women (groups B-i and B-2) receiving injectable contraceptive for variable durations as compared to controls.

DISCUSSION

Metabolic alterations and side effects of oral and injectable contraceptives are only beginning to be studied in Pakistan. In this study, changes of low density and high density lipoprotein levels found in women taking oral contraceptives, are in conformity with the reported values of Wynn et al.⁶ and Wallace et al.⁷ This study has also demonstrated that the levels were more affected in women on long-term oral contraceptive therapy than in women on short-term therapy. So far it has not been possible to identify those women who are likely to develop lipoprotein abnormalities or clinical diseases like hypertension and coronary heart disease. Long-term prospective studies are likely to be more informative, though such studies will encounter numerous problems in long-term follow up. The administration of injectable contraceptive in women, was not found to be associated with significant changes in serum lipoproteins. This data is the first of its kind to be available in our country. Comments and comparison about the difference can not be made with the result of others because the study of serum lipoproteins in women receiving injectable contraceptives, has not been reported by any other research worker.

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