

# Lipid Profile in Females of Reproductive Age Group Using Injectable Contraceptives (Progestogen-only)

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## ABSTRACT

**Objective:** To determine and compare the values of lipid profile in married fertile females of reproductive age group using injectable contraceptives.

**Study Design:** Comparative cross sectional study.

**Place and Duration of Study:** This study was carried out in the Department of Biochemistry, Postgraduate Medical Institute, Lahore and Lahore General Hospital, Lahore from July 2010 to Dec 2010.

**Materials and Methods:** A total of 250 married fertile women in their reproductive age were selected. They were divided in two groups: Group 1 (controls) and Group 2 (injectable contraceptive users). Levels of serum total cholesterol, serum triglycerides, high density lipoprotein-cholesterol were measured using standard kits. Low density lipoprotein-cholesterol was calculated with Fried Wald equation. Results were analyzed by using student's t test. Informed consent was taken from each patient and control subject for this study.

**Results:** Injectable contraceptives cause significant decrease in HDL-C and significant increase in serum triglycerides and LDL-C.

**Conclusion:** It is suggested that Lipid profile should be estimated before starting every course (the course may be 3-6months) of injectable contraceptives to the subjects.

**Key Words:** lipid profile, injectable contraceptives, progestogens

## INTRODUCTION

There are two main types of hormonal contraceptive formulations: these are combined methods which contain both estrogens and progestin, and progestogen only methods which contain only progesterone or one of its synthetic analogues that is progestins<sup>1</sup>. More than 12 million women worldwide use injectable, progestin-only formulation over long intervals because of their efficacy and less side effects<sup>2</sup>. Before starting hormonal contraceptives, measurement of lipid profile is recommended in women with dyslipaemias and alternative non hormonal contraceptive should be sought out if LDL-C is not below 160 mg/dl<sup>3</sup>.

Injectable contraceptives are convenient and highly effective methods for fertility regulation, being simple to administer and long acting. Injectable contraceptives affect lipids by increasing triglycerides and total cholesterol. A small decrease in serum HDL-C and a nominal increase in LDL-C have been reported by both of injectable contraceptives<sup>4</sup>. Both type of progestogen only injectables may induce changes in lipid metabolism, reducing HDL cholesterol and increasing the HDL:LDL cholesterol ratio<sup>5</sup>. The major health risks of injectables are cardiovascular diseases (CVD) particularly heart attacks (myocardial infarction), stroke and venous thromboembolism<sup>6</sup>. Clinical data showed that estrogen, progestins and androgens influenced lipoprotein metabolism, the study of the effects of steroidal contraceptives on lipid metabolism had

generated great interest<sup>7</sup>. There is increased risk of coronary heart disease (CHD) associated with elevated concentrations of plasma total cholesterol (TC) and low density lipoprotein (LDL), decreased plasma concentration of high density lipoprotein (HDL) and, in some circumstances, high levels of total triglycerides<sup>8</sup>. It is very important and essential when prescribing steroidal contraception that a careful medical history is taken to exclude either a personal or family history of thromboembolic disease and risk factors for venous thromboembolism<sup>9</sup>. As low dose progestins are not associated with thrombosis, WHO recommends initiation of progestin only contraceptives during postpartum period<sup>10</sup>. To rule out contraindications to use of hormones, physician should obtain thorough medical history, including cardiovascular risk factors, concurrent medications, allergies and health problems (past and current)<sup>10</sup>.

Progestin-only contraceptives may be preferable in some situations, in women having absolute or relative contraindications to estrogen, side-effects to estrogen containing hormonal contraception, lactation, and comfort and feasibility of formulations for long-term use<sup>11</sup>. There are many types of progestins, each differing in its potency and affinity to the progesterone, estrogen and androgenic receptors<sup>12</sup>. The two main progestogen-only injectables are depot medroxyprogesterone acetate (DMPA) and norethisterone enantate. Depot medroxyprogesterone acetate is the most commonly used and thoroughly studied injectable

contraceptive<sup>13</sup>. DMPA may adversely affect cardiovascular health on the long run<sup>14</sup>. There are marked differences between countries in patterns of contraceptive use both in types and extent of use. These differences reflect availability and accessibility as well as social and cultural attitudes towards fertility control, sexuality and roles of women in society. What is important is that any contraceptive used should not adversely affect the health of the user.

## MATERIALS AND METHODS

This comparative cross sectional study was done at Lahore general hospital, Lahore. A total of 250 married fertile women in their reproductive age were selected. They were divided in two groups: Group 1 (controls) and Group 2 (injectable contraceptive users). Subjects included in group 1 (controls) were married fertile females in reproductive age group (15-49 yrs) have not used any kind of hormonal contraceptives and were non pregnant and non lactating. Subjects included in group 2 (injectable contraceptive users) were married fertile females in reproductive age group (15-49 yrs) using injectable contraceptive (progestogen only) at least for the last one year and were non pregnant and non lactating. Subjects with hypertension, cardio-vascular disease, diabetes mellitus, liver disease, abnormal nipple discharge and undiagnosed vaginal bleeding were excluded. Levels of serum total cholesterol, serum triglycerides, high density lipoprotein-cholesterol were measured using standard kits. Low density lipoprotein-cholesterol was calculated with Fried Wald equation. Results were analyzed by using student's t test. A 5% level of significance ( $p \leq 0.05$ ) was taken.

## RESULTS

The mean age of the patients in group 1 (control) was  $30.8 \pm 6.5$  years and in group 2 (injectable contraceptives) was  $32.6 \pm 7.1$  years. The majority of the patients in two groups were in age range from 20 to 40 years. For subjects in group 1 (control) and group 2 (injectable contraceptives), the mean $\pm$ SD concentration of serum total cholesterol was  $177.9 \pm 40.8$  mg/dl and  $171.6 \pm 26.1$  mg/dl, respectively. The mean $\pm$ SD concentration of serum total cholesterol was insignificantly ( $p \leq 0.1$ ) increased in group 1 (control) as compared to group 2 (injectable contraceptives). For subjects in group 1 (control) and group 2 (injectable contraceptives) the mean $\pm$ SD concentration of serum triglycerides was  $129.1 \pm 27.7$  mg/dl and  $140.7 \pm 53.8$  mg/dl, respectively. The mean $\pm$ SD concentration of serum triglycerides was significantly ( $p \leq 0.03$ ) increased in group 2 (injectable contraceptives) as compared to group 1 (control).

For subjects in group 1 (control) and group 2 (injectable contraceptives) the mean $\pm$ SD concentration of serum HDL-C was  $53.1 \pm 7.6$  mg/dl and  $45.2 \pm 3.0$  mg/dl, respectively. The mean $\pm$ SD concentration of serum

HDL-C was significantly ( $p \leq 0.001$ ) decreased in group 2 (injectable contraceptives) as compared to group 1 (control). For subjects in group 1 (control) and group 2 (injectable contraceptives) the mean $\pm$ SD concentration of serum LDL-C was  $130.0 \pm 14.9$  mg/dl and  $171.4 \pm 4.7$  mg/dl, respectively. The mean $\pm$ SD concentration of serum LDL-C was significantly ( $p \leq 0.001$ ) increased in group 2 (injectable contraceptives) as compared to group 1 (control).

**Table No. 1: Comparison of mean total cholesterol, mean total triglyceride, mean HDL-C and mean LDL-C between group 1(control) and group 2 (injectable contraceptives)**

Variables	*Group1 (n=125) (mean $\pm$ SD)	**Group2 (n=125) (mean $\pm$ SD)	t- value	p-value
Total cholesterol (mg/dl)	$177.9 \pm 40.8$	$171.6 \pm 26.1$	1.5	0.1
Total triglyceride (mg/dl)	$129.1 \pm 27.7$	$140.7 \pm 53.8$	2.2	***0.03
HDL-C (mg/dl)	$53.1 \pm 7.6$	$45.2 \pm 3.0$	11.3	***0.001
LDL-C (mg/dl)	$130.0 \pm 14.9$	$171.4 \pm 4.7$	29.4	***0.001

**Key:**

SD: Standard deviation

n: Number of patients

\*Group-1: Controls

\*\*Group-3: Subjects using Injectable Contraceptives (ICs)

\*\*\*Statistically Significant value

## DISCUSSION

All available contraception methods have both advantages and disadvantages, and it is up to the health provider and the patient to make a rational choice in each individual case. Present study included two groups: controls and injectable contraceptive users. There was insignificant decrease in TC and significant increase in TG in injectable contraceptive users as compared to control in our study. A study conducted by Ebele JI showed significant increase in TG and LDL-C while decrease in HDL-C which was in agreement with the results observed in the present study<sup>15</sup>. A significant decrease in HDL-C and significant increase in LDL-C in injectable contraceptive users as compared to control was seen in the present study. Similarly a small decrease in serum HDL-C and a nominal increase in LDL-C has been reported by progestogen only injectable contraceptives in another study<sup>16</sup>. Some workers found decrease in HDL-C and increase in LDL-C by injectable contraceptives which was in accordance to the present study<sup>17</sup>. Some authors reported beneficial effects of injectable contraceptives<sup>18</sup>.

Another study also showed that both type of progestogen only injectables may induce changes in lipid metabolism, reducing HDL cholesterol and

increasing the HDL:LDL cholesterol ratio<sup>19</sup>. HDL-C is involved in the reverse cholesterol transport from peripheral cells to the liver, prevents oxidation of LDL-C because of paraxonase in HDL-C. Paraxonase is synthesized in the liver and is HDL associated enzyme that inhibits oxidation of LDL-C<sup>20</sup>. These adverse effects of progestogen only injectables on serum lipids were temporary and levels improved over time even if DMPA was continued<sup>21</sup>. In the present study, although hormonal contraceptives produce changes in the concentrations of lipid profiles and liver function tests but these were in their normal ranges.

## CONCLUSION

Injectable contraceptive pills produced changes in lipid profile in the upper limits of the normal reference range. The normal reference range was not crossed. Based upon these conclusions, it is suggested that Lipid profile should be estimated before starting every course (the course may be 3-6months) of injectable contraceptives to the subjects.

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