

# The Effects of Subdermal Implanon on Lipid Profile on Sudanese Women

MK Khamiss<sup>1</sup>, GA Modawe<sup>2</sup> and AA Abdrabo<sup>1\*</sup>

<sup>1</sup>Department of Clinical Chemistry, Faculty of Medical Laboratory Sciences, Alneelain University, Khartoum, Sudan

<sup>2</sup> Department of Biochemistry, Faculty of Medicine, Omdurman Islamic University, Omdurman, Sudan

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**Background:** All available contraceptive methods have both advantages and disadvantages and it is up to the health provider to make a rational choice.

**Objective:** The aim of this study was to estimate the lipid profile [HDL, LDL, VLDL, cholesterol and triglyceride] on implantable Sudanese women and control.

**Methodology:** These studies were case control study, carried out at Omdurman Maternity Hospital, department of family planning center, Khartoum, Sudan, during the period January-May 2015. The blood sample was collected from 70 patients with age ranged between 18-40 year, and 70 from normal female as control groups.

Serum cholesterol, triglyceride and HDL were estimated by Mindray for chemistry analyzer. And LDL, VLDL was obtained through calculation.

**Result:** The (mean±SD) of serum cholesterol, triglyceride, HDL, VLDL and LDL in patient respectively, were (143.34±61.66), (100.01±22.42), (44.25±8.37), (20.00±4), (105.0±14.4). While the mean±SD of serum cholesterol, triglyceride, HDL, VLDL and LDL in control, respectively, were (146.2±37.4), (83.1±40.6), (37.4±15.7), (16.6±8.1), (83.4±37). The biochemical parameter triglyceride, HDL, VLDL and LDL in implantable women, respectively was significantly increased (P.value0.00) than in the control population. While serum cholesterol was insignificantly decrease (P.value 0.72).

**Conclusion:** This study concludes that serum triglyceride; HDL, VLDL and LDL were significantly increased when compared with normal, while serum cholesterol had non-significant decrease.

**Key words:** Implanon, serum lipid, Sudanese.

## INTRODUCTION

Hormonal contraception means birth control, it is method that acts on the endocrine system, the etonogestrel [ENG] containing implant for subdermal Implanon use is one of them, Implanon has recently been approved by the US FOOD and DRUG Administration to provide effective forgettable contraception for the last years<sup>[1]</sup>. Implanon consist of co- axial rods, placed inside an applicator. The rod consists of a core containing mixture of drug substance, etonogestrel, and ethylene vinyl acetate copolymer and skin consisting of ethylene vinyl acetate, each rod has 40mm long and 2mm in diameter containing Core of 68mg of etonogestrel [ENG]. Implanon is non-biodegradable etonogestrel. [ENG] containing implant for subdermal use, [ENG] is biologically active metabolite of desogestrel, the contraceptive effect of Implanon is achieved primarily by inhibition of ovulation which occurs within 1 day of insertion<sup>[1]</sup>.

It has also enjoyed excellent reversibility with return of fertility within 1 month after removal among those not using

other contraceptive, 14% become pregnant within 90 days of removal<sup>[2]</sup>. Additional advantages of Implanon include an estrogen-sparing effect, safety of breastfeeding mothers and preservation of bone mineral density<sup>[3-4]</sup>. It is a good choice for adolescent, diabetic mellitus, anemic and endometriosis. Bleeding problems are the most common side effect through direct and indirect effect of endometrium<sup>[5-6]</sup>. ENG is approximately 32% bound to sex hormone binding globulin [SHBG] and 66 % bound to albumin in blood, [ENG] is metabolized in the liver microsomes by the cytochrome p450 3A4 isoenzyme and rapidly transformed in the body to 3-keto-desogestrel, a low androgenic third generation progestin<sup>[7]</sup>.

The elimination half-life of ENG is approximately 25h<sup>[8]</sup>. Although The metabolic effect of Implanon induces mild insulin resistance without significant change in blood glucose level, Implanon was found to increase fasting levels of glycosylated hemoglobin [A1C] after 2 years<sup>[9]</sup>, Implanon is significantly less androgenic than Norplant and increase serum level of SHBG

<sup>[10]</sup>. Implanon affects liver functions through increase level of serum gamma –glutamyl transferase [GGT] and total bilirubin, also [AST] and [ALT] were found either to decrease or to remain unchanged <sup>[11-12]</sup>. The objective of these studies is to estimate the effecting of the Implanon on lipid profile [HDL, LDL, VLDL, triglyceride and cholesterol ] on implantable Sudanese women compare to the normal.

## Material and Method

### Study population

This is hospital based case control study was conducted at the Omdurman maternity hospital. This study carried in Omdurman during the period of January-May 2015. 70 healthy Sudanese women within age between 18-40 years who were using subdermal Implanon were recruited from among the attendees of the family planning center clinic of Omdurman maternity hospital, and 70 healthy women who do not use any contraceptive with the same range of age as control, after obtaining ethical clearance from an ethical review board and appropriate informed consent from the subject.

### Including criteria

Healthy Sudanese women within age between 18-40 years were used Implanon as sub-dermal contraceptive.

### Excluding criteria

Cardiovascular disease, hypertensive, thrombosis, hepatopathies, pregnant women, suspected cases of Breast carcinoma, or undiagnosed bleeding, patient answer questionnaire that aimed at obtaining information such as age, duration of contraceptive ,family history of thromboembolic ,diabetes, hypertension ,and other excluded disease.

### Blood samples

5ml Fasting venous blood samples were collected from implantable women and control, after collection, centrifugate at 5000rpm to obtain serum, the samples were placed in plain container, and stored at – 50 c for 2 months, after these period samples were thawed in water-bath at 37 c for development of laboratory assays, serum lipid profile was estimated by using Mindray for chemistry analyzer.

### Statistical analysis

SPSS for windows Version-21 (2013) was employed for statistical analysis. The independent-sample s, t, test procedure was used to compare the mean of cases and control. The result was presented as mean±SD

### Result and Discussion

The prospective study included 140 healthy women, among them 70 were implantable women [18-40] years, and 70 were normal as control, the mean age of patient was 30.15±5.67 compared to 31.2±3.2 years for control, [P value 0.61] the difference was statistically insignificant.

- There was a Significant increase in serum HDL, [44.25±8.37],[P value 0.001] when compared to the control (P>0.05).
- There was a significant increase in serum LDL, [105.00±14.40], [P value 0.000] when compared to the control group (P >0.05).
- There was a significant increase in serum VLDL [20.00±4.48], [P value 0.001] when compared to control group (P>0.05).
- There was a significant increase in serum triglyceride [83.10±40.67], [P value 0.001] when compared to control group (P>0.05).
- While there was insignificantly decrease in serum cholesterol. [143.3±61.6], [P value .728] when compared to the control group (P<0.05).

The result was shown in the table 1.

**Table 1:** (The mean  $\pm$ sd) of serum lipid profile in the study population

Parameter	Pation n=70	Pation n=70	P value
Total Cholesterol	(143.34 $\pm$ 61.66)	(146.27 $\pm$ 37.04)	(0.728)
HDL	(44.25 $\pm$ 8.379)	(37.45 $\pm$ 15.77)	(.001)
Triglyceride	(100.0 $\pm$ 22.42)	(83.100 $\pm$ 40.67)	(0.001)
LDL	(105.00 $\pm$ 14.4)	(83.48 $\pm$ 37.04)	(0.000)
VLDL	(20.00 $\pm$ 41)	(16.62 $\pm$ 8.134)	(0.001)

## Discussion

Implanon is long term implantable contraceptive containing ENG that is both safe and effective [5], the pharmacokinetics and pharmacodynamics of Implanon indicate that it has high contraceptive efficiency as reflected in the zero pregnancy rates over 5629 women years of used. And the reversibility makes Implanon a valuable addition to current contraceptive [9]. In Sudan the need for long term contraceptive was increased, although no studies carried out to determine the effects of it on lipid profile.

This study evaluated the level of Total Cholesterol, Triglyceride, LDL-C, HDL-C and VLDL in serum of Women who used Implanon

In this study the age groups (patient and control) insignificant (P-value =0.61) between them and meaning (30.1, 31.2) respectively, see table [1]. Higher levels of HDL-C were found in serum of Implanon users in comparison to control groups which show in the table 1 the meaning (44.3 and 37.4) respectively. And the t-test result was significant 0.001. This result similar to Rog et al; (2010) [15], total cholesterol and the HDL/LDL cholesterol showed very little change over time in both implant groups.

The level of HDL-C and VLDL-C in these studies are higher in patients how used Implanon in compression to control

groups. The meaning HDL-C (105) and the control (83), it significantly increased, the P-value = 0.000 and VLDL-C (20.0) and control of them (16.6), it is significant the P- value = 0.001. See table (3.6). The level of Triglyceride was also higher than in Implanon users than the control. Since very LDL is triglyceride rich lipoproteins. [11] Nerveless the increase in the production of VLDL and consequently Triglyceride contribute to increase the clearance of VLDL partial since these are rapidly converted into LDL [8] after been converted into LDL, HDL will promote the reflex the cholesterol from tissue to lever, where LDL can be converted into bile acid and secreted through the bile [11]. The level of total cholesterol was found significantly in groups using contraceptive IMPLANON, in relation to the control group, total cholesterol sums the lipoproteins, HDL, LDL, and VLDL, and probably present higher levels in the IMPLANON user due to increase observed off in the level of VLDL and HDL.

In the face of these findings, the authors conclude that the sub-dermal Implanon was affected lipid profile insignificantly, and it is unlikely to be clinically significant. It is hoped that this study could be regarded as an added piece of evidence fostering and substantiating the safety of Implanon among women.

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