
Iron Status in Hormonal Contraceptives and IUCDS Users

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Abstract:

Objective: To evaluate the effect of hormonal contraceptives (combined oral contraceptives pills (COCPs), Depot medroxyprogesterone acetate injection (DMPA)) & IUCDs uses on iron status of the body.

Design: Case control study.

Setting: Family Planning Center in AL-Batool Teaching Hospital, during the period from April 2002- August 2002.

Patients & Methods: One hundred women using contraceptives (39 of them using intrauterine contraceptive devices (IUCDs), 36 women of them using COCPs, and 25 of them using DMPA, age ranged between 19-42 years, and 100 healthy women who did not use neither hormonal contraceptives nor IUCDs as control, age ranged between 20-43 years, were investigated by measuring hemoglobin (Hb) level and PCV by Cyanomethaemoglobin method, serum iron and total iron binding capacity (TIBC) using Enzymatic Calorimetric method and percent iron saturation was calculated by the equation =

$$\text{Percent iron saturation} = \text{BC} = \frac{\text{Serum Iron}}{\text{TIBC}} \times 100$$

Results: There was a significant effect of COCPs on serum iron and percent of saturation. In addition, a significant effect was found on PCV and percent iron saturation by IUCDs usage.

Conclusion: It is recommended that iron supplementation, be a part of the IUCDs services provided in Family Planning Centers in the view of the high prevalence of anemia among women in child bearing age in Iraq.

Keywords: Contraceptive, hormonal, Hemoglobin, Ferritin.

Introduction

Hormonal contraceptives are medicines which contain artificially made form of two hormones naturally produced in the body, which are the estrogen and progesterone, which regulate a woman's menstrual cycle^[1]. They could be either **Combined hormonal contraceptive** (estrogen and progesterone) in the form of pills or injection or **Progestational agents**: Which include: Progesterone only pills (POPs), Depot medroxyprogesterone acetate injection (DMPA), Subdermal contraceptive implants and Progesterone releasing intrauterine devices^[2]

Anemia is one of the major public health problems among women belonging to the reproductive age group. Hemoglobin surveys indicate that a sizable proportion of women are anemic even in the non-pregnant state^[3]. Population studies have shown that when menstrual loss increased, there was an increased risk of anemia even among non-anemic women in developed countries^[4,5].

Irregularity in vaginal bleeding pattern is the most common clinical side effect causing discontinuation of the method reported by the users of the newer contraceptive method especially

hormonal ones^[6]. Several investigators^[7, 8, and 9] have reported persistent excessive menstrual loss among IUCDs wearers.

It has been suggested that continued excessive blood loss in long term IUCDs wearers were exacerbate the existing anemia among women in developing countries^[7] even though data available from developed countries have not revealed any alteration in hematological profile in IUCDs wearers^[10]

Well established gynecological benefits of oral contraceptives include a reduction in dysmenorrhea and menorrhagia, iron deficiency anemia, ectopic pregnancy, pelvic inflammatory disease and ovarian and endometrial cancers^[11, 12, 13, 14, and 15] and in countries where iron deficiency is common, COCPs use reduce the incidence through decreased menstrual blood loss^[16].

The aim of this study was to evaluate iron status in a group of women used contraception by three different methods (COCPs, DMPA and IUCDs).

Subjects & Method

This study was conducted from April to August 2002 in which 200 women who were attending the Center of Family Planning related to AL-Batool Hospital in Mosul City for receiving contraception were participated in this study. These women currently married, not pregnant nor infertile at the time of the study and 100 of them age ranged between 19-42 years used contraception (test group), either COCPs, DMPA or IUCDs, from 0.25-6 years (mean 1.151 ± 1.24) years and 100

women who were using condom as contraceptive, age ranged between 20-43 years, were considered as (control group).

Blood samples were collected from both the users and non-users of contraceptives. Hb was measured in the blood by cyanomethaemoglobin method, total iron binding capacity (TIBC) and Iron concentration were measured in the serum by calorimetric method (Randox kit, laboratories Ltd, UK). Percent iron saturation was calculated by the following equation^[17].

$$\text{Percent iron saturation} = \frac{\text{Serum Iron}}{\text{TIBC}} \times 100$$

For statistical analysis z test were used to examine the presence or absence of a significant association

Between the groups. P value > 0.05 was considered to be statistically significant.

Results

From the one hundred women using contraceptives, 39 women have been used Copper-T 380A IUCDs, 36.

Women have been used COCPs (14 of them used Microgynon pills which contains 30 µg ethinyl

Estradiol and 150 µg levonorgestrel and 22 of them used Neogynon pills which contains 50 µg ethinyl estradiol and 150 µg levonorgestrel (both of Schering AG Company, Germany)) and 25 women used DMPA injection which contains 150 mg medroxyprogesterone acetate (of Pharmacia NV/SA Puurs Belgium).

Statistical comparison among the means of parameters of contraceptive users and non users (controls) revealed that there was a statistical decrease in PCV and statistical increase in percent of saturation of iron among IUCDs users than control shown in table (1). Table (2): Shows that there was a significant increase in the serum iron and percent of iron saturation among COCPs users than the control.

Table (1): Comparison between IUCDs Users & Control.

Parameters	Mean ± SD		Z-value	p-value
	IUCDs users (n=39)	Control (n=100)		
Hb (g/dl)	10.89 ± 1.5	11.27 ± 15.1	1.69	>0.05
PCV %	33.0 ± 4.6	34.7 ± 3.9	2.43	<0.05*
Fe (µg/dl)	67.0 ± 25.4	68.4 ± 16.7	0.22	>0.05
TIBC(µg/dl)	226.4 ± 53.7	241.7 ± 46.3	1.74	>0.05
% Saturation	31.8 ± 7.5	28.7 ± 8.0	2.28	<0.05*

* Significant difference from control at p >0.05

Table (2): Comparison between COCPs Users & Control.

Parameters	Mean \pm SD		Z-value	P-value
	COCPs users (n=36)	Control (n=100)		
Hb (g/dl)	11.48 \pm 20.9	11.27 \pm 15.1	0.32	>0.05
PCV %	36.2 \pm 5.6	34.7 \pm 3.9	0.65	>0.05
Fe (μ g/dl)	83.9 \pm 30.0	68.4 \pm 16.7	2.2	<0.05*
TIBC(μ g/dl)	241.9 \pm 65.0	241.7 \pm 46.3	0.26	>0.05
% Saturation	33.3 \pm 7.5	28.7 \pm 8.0	2.09	<0.001**

* Significant difference from control at $p > 0.05$, ** at $p < 0.001$

While table (3) shows that there was no significant increase in the mean of Hb, PCV, Fe,

TIBC and percent of iron saturation among DMPA users and the control.

Table (3): Comparison between DMPA Users & Control.

Parameters	Mean \pm SD		Z-value	P-value
	DMPA users (n=25)	Control (n=100)		
Hb (g/dl)	12.5 \pm 61.3	11.27 \pm 15.1	0.54	>0.05
PCV %	33.3 \pm 6.2	34.7 \pm 3.9	1.20	>0.05
Fe (μ g/dl)	71.0 \pm 25.5	68.4 \pm 16.7	0.09	>0.05
TIBC (μ g/dl)	252.2 \pm 43.8	241.7 \pm 46.3	1.06	>0.05
% Saturation	28.7 \pm 7.7	28.7 \pm 8.0	0.38	>0.05

Overall results showed that statistical comparison between the mean of parameters of contraceptive users and control, revealed no significant difference except for

PCV and percent of iron saturation of IUCDs users, and for serum iron and percent of iron saturation of COCPs users' fig (1), fig (2), fig (3).

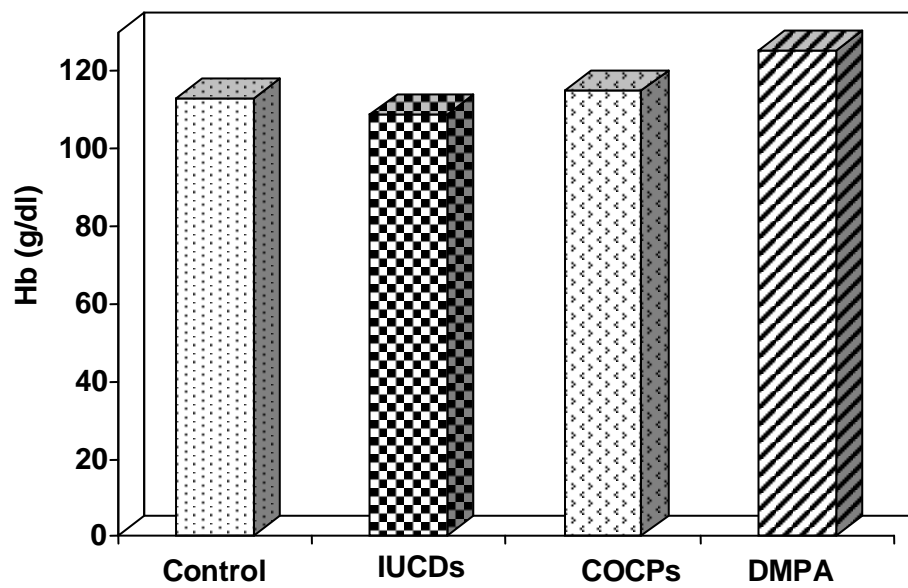


Fig 1: Comparison between Hb of Contraceptive users & the control

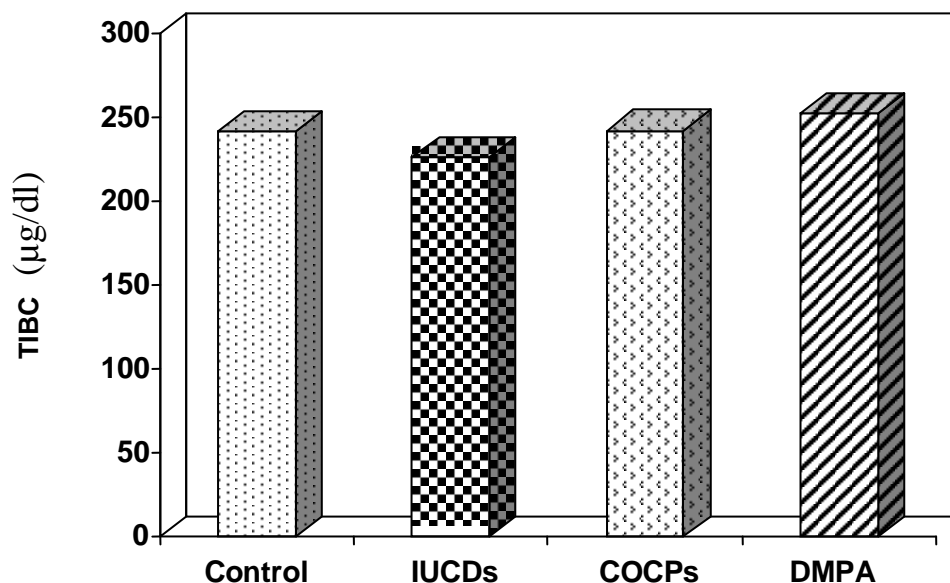


Fig 3: Comparison of TIBC between Contraceptive users & the control

Discussion

Irregular vaginal bleeding pattern is the most common clinical side effect causing discontinuation of the method reported by the users of the newer contraceptive methods, especially hormonal one [6]. IUCDs are safe contraceptive options regardless of parity provided that woman is carefully selected [18, 19]. It was reassuring to note that long term IUCDs use even beyond three years did not have any adverse effect on hemoglobin status. It is possible that women who had severe menorrhagia had the device removed earlier and such a removal parse served to protect women from the risk of developing anemia associated with IUCDs use [20].

No significant difference in Hb and iron blood concentration due to IUCDs use was found in this study between contraceptive users and non users but a significant reduction in PCV and a significant increase in percent iron saturation was obtained. These results are in contrast with a study done by Hassan *et al.*, [21], who found that the use of IUCDs for one year were significantly associated with the highest prevalence of anemia among all Contraceptive users (64.9 %) and IUCDs users had lowest level of Hb compared to non users or users of other methods.

In another study, Hassan *et al.*, [22] showed that the use of IUCDs produced a statistically significant drop in the Hb content and percent iron saturation levels after 12 months of use, as compared to the use of COCPs for the same period and the drop was greater with longer IUCDs use and recommended that iron supplementation be part

of the IUCDs sources provided in the family planning units.

On the other hand, our results are in agreement with the result obtained by Milsom *et al.*, [23] who studied the influence of the Gyno-T 380S IUCDs on menstrual blood loss and iron status and found that there were no significant changes recorded in iron status parameters during the 12 months observation period following IUCDs insertion indicating that women from developed countries apparently tolerate an increase menstrual blood loss of about 55% without developing iron deficiency anemia. Also iron stores were unchanged as in this study indicating an adequate increase in intestinal iron absorption.

In a study performed by Prema [20] showed that there is no detorious effect on Hb status after long term use of IUCDs even beyond 3 years and said that it is possible that these long term IUCDs users were those privileged individuals who had the least menstrual disturbance. It has also be shown [6, 24] that incidence of menorrhagea progressively decreases with increasing duration of use of IUCDs.

Regarding oral contraceptive, this study showed that there was a statistical increase in serum iron concentration and percent iron saturation. These results are in agreement with Frassinell-Gunderson *et al.*, [25] who compared iron status parameter of 46 women taking oral contraceptive agents (COCPs) for 2 or more years continuously and 71 women who never took (COCPs) and found that serum transferrin, serum iron, TIBC, MCH, and MCHC

level more significantly greater for COCPs users group. Also Larsson *et al.*,^[26] and Mooij *et al.*,^[27] found that the parameters of serum iron status all significantly increase for group of COCPs users.

In premenopausal women, serum ferritin levels were strongly dependent on the duration of menstrual bleeding ($p=0.0001$), which in turn was related to the method of contraception^[8]. It was found that menstrual bleeding in women using hormonal contraception was significantly shorter than in those using IUCDs and ferritin levels were highest in present and former users of oral contraceptives, lower in those who currently used other methods, and lowest in current IUCDs users^[8,28].

In contrast to this, Prema^[20], concluded that the observation of the use of hormonal contraceptive "either injectable or oral pills", was not associated with any improvement in hemoglobin status, is possibly that the extent of decrease in menstrual blood loss was too small to make any impact and it is also possible that some metabolic alterations, like changes in folic acid metabolism may have an adverse effect which neutralizes the possible beneficial effect of decreased menstrual blood loss, which is an important health benefit for undernourished anemic women in developing countries^[29].

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