The relationship of combined oral contraceptive pills with serum fat soluble antioxidant in reproductive aged women

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Abstract : The effect of combined oral contraceptive pills (COCP) on fat soluble antioxidant remain a dilemma. The aim of this study was to determine relationship between combined oral contraceptive pills (COCP) and fat soluble antioxidant (alpha tocopherol and beta carotene). This was a cross-sectional study which 31 COCP users and 31 non users recruited randomly in Ramhormoz Health Clinic No: 3 in Iran. COCP users should have taken low dose COCP for at least one year. A questionnaire for socio-demographic and a 50 items food frequency questionnaire were used for gathering data. Five ml fasting blood sample has taken and used for measuring fat soluble antioxidant using HPLC method. Results showed that the mean of alpha tocopherol was 7.48 µg/ml and 8.59 µg/ml and mean of serum beta carotene was 18.25 µg/dl and 20.41µg/dl in COCP users and non users ($p>0.05$). However in this study combinedoral contraceptive pills did not have any relationship with serum fat soluble antioxidant, further studies with bigger sample size is recommended .[Shahnaz Najar, Foruzan Sarafion, Parvin Abedi, Mohammadhossein Haghighizadeh. **The relationship of combined oral contraceptive pills with serum fat soluble antioxidant in reproductive aged women.** *Life Sci J* 2012;9(4):3215-3219]. (ISSN: 1097-8135). http://www.lifesciencesite.com. 473

Key words: Alpha tocopherol, Beta carotene, Combined oral contraceptive pill, Reproductive age

Introduction

Combined oral contraceptive pills (COCP) often referred to the birth-control pill are a very popular form of birth control. They are currently used by more than 100 million women worldwide and by almost 12 million women in the United States (Trussell, 2007). According to the latest statistics in Iran, 50% of women used birth control methods, which 40% of them are COCP users (Ministry of Health, Iran, Health Service. 2005). COCPs were developed to prevent ovulation by suppressing the release of gonadotropins. COCPs inhibit follicular development and prevent ovulation as their primary mechanism of action (Trussell, 2007). Beside of birth control,COCPs have some metabolic and nutritional effects (Webb, 2010). Some researchers showed that the level of trace minerals and biochemical change with taking COCP. The alteration reported in blood levels are generally believed to be related to changes in levels of specific transport proteins induced primarily by estrogen (Berkowitz et al., 2010, Mehta, 1989, Falah et al., 2009). Some fat soluble vitamins are potentiates to neutralize free radicals and reduce the risk of cancer, heart disease and many chronic diseases (Palan et al., 2006). Although oxidation reactions are crucial for life, they can also be damaging; hence, plants and animals maintain complex systems of multiple types of antioxidants, such as glutathione, vitamin C, and vitamin E as well as enzymes such as catalase, superoxide dismutase and various peroxidases (Baillie et al., 2009). The imbalance between reactive oxygen species and the defentic antioxidant can cause the oxidative stress condition. Oxidative stress is thought to contribute to the development of a wide range of diseases including; cancer, atherosclerosis, cardiovascular disease, cataract, arthritis, inflammation and some types of Alzheimers (Urban et al., 1995). Some researchers showed that estrogen can decrease reactive oxygen species and oxidative stress in vivo and vitro (Huber et al., 1989 and Bednarek- Tupikowska et al., 2004). In contrast some researchers showed that COCPs could reduce the serum beta carotene levels (Gal et al., 1971, Berg et al., 1997). Because antioxidants have protective role in some chronic diseases, assessment of effect of COCPs on antioxidant levels is an important mean to

recognizing women with reduced antioxidant who need supplement. The primary aim of this study was to assess the relationship between COCP and fat soluble antioxidant (alpha tocopherol and beta carotene) level in reproductive aged women in Ramhormoz- Iran.

Material and Methods

This was a cross-sectional study that carried in Ramhormoz-Iran on 2010. Samples included 62 women (31 COCP users and 31 non COCP users) who were recruited randomly among 200 women who had exclusion/inclusion criteria of the study. Inclusion criteria were including; age 18-40, using low dose COCP (contains 0.03mg ethinyl estradiol and 0.15mg levonorgestrel) for at least one year or using other non hormonal birth control (for control group), body mass index 20-25kg/m^2. The exclusion criteria were consisted of pregnancy, lactation, alcohol abuse, smoking, systemic diseases and using of supplements. This study approved by Ethics Committee of Ahvaz Jundishapur University of Medical Science. All participants signed an informed consent prior to the study. All participants completed a socio-demographic and a 50 items food frequency questionnaire according to the Iranian food composition table. Screening was done on 200 women according to inclusion/ exclusion criteria in Ramhormoze city (located in the Khuzestan province- Iran). One hundred ten women were eligible for study, which 100 of them had consent to participate in this study (50 COCP users and 50 non users). Sixty two women have chosen randomly, 31 who were COCP users and 31 who used other non hormonal birth control (condom or tubal ligation). Socio-demographic and food frequency consumption of participants gathered through interview. Five ml fasting blood sample was taken from every participant. Blood samples kept in the cold box and sent to the one reference laboratory for blood centrifuge. Alpha tocopherol and beta carotene were measured using the HPLC (HPLC Brand Yl9100, made by Younglin company) method. Data entering and analyzing were done using SPSS version 16. The descriptive statistics (mean, SD) and univariate statistics (Independent t-test, Chi-Square and Logistic Regression) were used for statistical purposes. The p-value less than 0.05 considered as significant.

Results

The mean age of two study groups was 29.8 and 31.3 in the COCP users and non users respectively. The mean BMI was 24.8 and 24.2 in two groups. There was not any significant difference between two groups regarding socio-demographic characteristics (Table 1). Two groups did not have any statistical difference regarding foods contains beta carotene and alpha tocopherol.

The mean of alpha tocopherol was 7.48 μg/ml and 8.59 μg/ml in two groups respectively.

The mean of serum beta carotene was 18.25 μg/dl and 20.41μg/dl in two groups.

According to the Independent t- test there was not any significant difference between two groups regarding beta carotene and alpha tocopherol ($p>0.05$) (Table 2). Table 3 is presenting results of Logistic Regression for some variables e.g. age, marriage age, alpha tocopherol, beta carotene and BMI with OCP. There was not any significant relationship between these variables and COCP.

Table 1: Socio-demographic characteristics of participants

Characteristics	COCP users n=31 Mean (SD)	COCP non users n=31 Mean (SD)	P value
Age	29.8(4.7)	31.3(4.9)	0.24
Marriage age	18.7(2.8)	19.8(3.1)	0.17
Number of children	2.1(1.1)	2.03(0.8)	0.52
Body mass index (Kg/m^2)	24.8(1.9)	24.2(2.2)	0.3
Use of birth control method (year)	6.77(3.8)	6.3 (4.09)	0.7
Education N(%)			
Illiterate	3(9.7)	2(6.5)	
Primary education	12(38.7)	15(48.4)	
High school	9(29)	2(6.5)	0.08
Secondaryhigh school	7(22.6)	9(29)	
University education	0	3(9.7)	

Table 2: The serum level of alpha tocopherol and beta carotene in two study groups

Characteristics	COCP users n=31 Mean (SD)	COCP non users n=31 Mean(SD)	P value
Alpha tocopherol (µg/ml)	7.48(3.9)	8.59(5.01)	0.33
Beta carotene (µg/dl)	18.2(7.05)	20.4(7.3)	0.24

Table 3: Correlation of some variables with COCP using Logistic Regression

Characteristics	Odds-Ratio	P value
Age	1.14	0.73
Marriage age	1.08	0.37
Alpha tocopherol	1.05	0.55
Beta carotene	1.04	0.41
Body mass index	0.76	0.09

Discussion

In this study we examined the relationship of OCP with serum fat soluble antioxidant. All women were in the reproductive age and had normal BMI. We excluded overweight and obese women. Some studies showed that serum alpha tocopherol is lower in people with higher BMI (White et al., 2001). In a study researcher found that with 10% increase in the BMI; alpha tocopherol will decrease by 1% (Rock et al., 1999). In the present study there was not any significant difference between two groups regarding serum alpha tocopherol. Results of other studies are in agreement with our study. In a study there was not any significant difference between OCP users and non users about alpha tocopherol (Geroot et al., 2009). A study has done by Wu et al, also showed that there was not any significant difference between postmenopausal women who used hormone replacement therapy and women who did not regarding serum level of vitamin E (Wu et al., 1996). Some researches propose that with taking COCP the serum lipoproteins will increase and it can cause increase in the serum level of vitamin E (Liehr, 1996, Yeung et al., 1975). In Mahdavi et al's study, they could not establish a relationship between serum vitamin E level and COCP (Mahdavi et al., 2006).

Although the serum beta carotene level in the COCP users was lower (18.25µg vs 20.41µg), it was not statistically different. Other studies are in agreement with the present study (Palan et al., 2006, Rafraf et al., 2006). Some studies showed that OCP can increase plasma level of vitamin A. In Yeung and Chan's study (1975), results showed that; in women who used COCP for at least one month, the plasma level of vitamin A was higher. In Ahmed's study (1975) also COCP users had significantly higher plasma level of vitamin A. Increase in the vitamin A level may because of increasing in the retinol binding protein level in the serum (Yeung, 1974). In the Geroot et al's study (2009) the beta carotene level in the COCP users was significantly lower compared to the non-users. This decrease may result from the effect of estrogen in the COCP that improve the retinol binding protein activity and change the ratio of beta carotene to retinol (Rock et al., 1999). Also the plasma level of retinol has increase with using COCP in some studies (Palan et al., 1989, Nonavinakereet al., 1981). In this study vegetable and fruit intake of all participants were enough according to the food frequency questionnaire, this may contribute to that why fat soluble antioxidant did not reduce significantly in the COCP users. Diets high in fruit and vegetables, which are high in antioxidants, promote health and reduce the effects of aging; however antioxidant vitamin supplementation has no detectable effect on the aging process (Thomas, 2004).

Conclusion

According to the findings of this study it appears that **o**ral contraceptive pills do not have any relationship with serum fat soluble antioxidant. Study in this area, particularly in our country is very few and further studies with bigger sample size are recommended.

Acknowledgement

This paper issued from a Master Thesis and supported by the Research Deputy of Ahvaz Jundishapur University of Medical Sciences. We would like thank the Health Clinic's staff in Ramhormoz, Iran to their co-operation during data collection.

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