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A STUDY ON CARDIOVASCULAR RISK FACTORS AMONG THE WOMEN TAKING LOW DOSE COMBINED ORAL CONTRACEPTIVE PILLS

Physiology

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ABSTRACT

The present study of one year duration was intended for assessment of cardiovascular risk factors among 50 women taking low dose combined oral contraceptive pill as birth control measure and their comparison with equal number of matched women not consuming any form of hormonal contraceptives. Their BMI, systolic and diastolic BP, Lipid profile, Fasting blood sugar were estimated and ECG was done in the Department of Physiology and Department of Gynecology and Obstetrics of North Bengal Medical College and Hospital. Results obtained; expressed as Mean + SD of women, taking OCP, were: BMI (24.98±3.02), SBP (117.76±6.97), DBP (78.04±7.8), FBS(96.66±10.37), total cholesterol (149.08±49.78), Triglyceride(122.72±67.42), HDL cholesterol (46.81±7.15), LDL cholesterol (77.65±34.68) VLDL cholesterol (38.74 ± 28.03) and those of women not taking any hormonal contraceptive pills, were BMI (23.74± 1.54), SBP(117.64 ± 7.50), DBP,(76.88 ± 9.4), FBS(97.36 ± 11.04), total cholesterol(139.484 ± 26.17), Triglyceride (98.16±22.84), HDL cholesterol (47.79 ± 7.28), LDL cholesterol(62.53±27.49),VLDL cholesterol(40.9 ± 24.14). 12 Lead ECG was done in both the groups.

On statistical analysis; no significant differences were found in any parameters among the groups , as p-value in every cases were > 0.05;except serum LDL cholesterol where LDL cholesterol was significantly higher among OCP users group, with p value < 0.05 (p value=0.018). No significant difference of ECG findings was found between the case and control groups.

From our study, an inference may be drawn that women using hormonal contraceptives pill for long time have a tendency of weight gain, increased BMI as well mildly deranged lipid profile and in the long run this may increase the risk of both cardiac and cerebro-vascular risks; which demands regular checkup.

KEYWORDS

Reproductive age group women, Birth control measure, Combined oral contraceptives, Glycemic outcome, Lipid profile, Cardiovascular and Cerebrovascular risks.

INTRODUCTION

Oral hormonal contraceptives (OCPs) were developed over 40 years ago as an effective, immediately reversible contraceptive measure which have been marketed in the United States since 1962. Gradually with the passage of time, the doses of estrogen and progestin decreased, thus lessening the potential risk while maintaining efficacy.Despite, cardiovascular risks have been a concern since combined oral contraceptives (OCs) were first introduced. The risks of using conventional combination of oral contraceptives include an increased risk of dose-related effect on blood pressure, blood clots, heart attack, stroke and the mortality from cardiovascular disease attributable to its' use is up to 10 times higher in women of 40 to 44 years age group than the women of 20 to 24 years of age group.[1] A man is at greater risk of heart disease than a pre-menopausal woman but after menopause of women, the risk is equal in both sexes. The relationship between oral contraceptive pills and cardiovascular disease has been extensively studied. The risk of ischemic stroke is 1.5 times higher in women with hypertension who are taking oral contraceptive pills.[2] OCP intake with higher estrogen doses; has greater risk for ischemic stroke. Women who are taking oral contraceptive pills have a three to six time greater risk of venous thromboembolism than women who do not use this contraceptive method.[3]

Frequently observed alterations of ECG in contraceptive users (40%) were compared to controls. A study in 1999 concluded that there was virtually no excess attributable risk of death from cardiovascular disease related to oral contraceptive use in young women.[4]

In view of all these difference in opinion in different research study we were tempted to do a study on effect of low dose OCP among women of reproductive age group on cardiovascular risk factors, in our region at North Bengal Medical College and Hospital.

AIMS AND OBJECTIVE

This study was done to evaluate the effect of low dose combined oral contraceptive pill intake for more than 6 months among women; assessing the cardiovascular risk factor such as Body mass index, Blood pressure, Lipid profile, FBS, ECG pattern in women of reproductive age group; if any.

MATERIAL AND METHODS:

This case control study was conducted in the Department of Physiology and Department of Gynecology and Obstetrics; North Bengal Medical College and Hospital. Total 100 women in reproductive age group between 18-44 years were studied over a period of one year. Out of 100 subjects 50 number of subjects who fulfilled all the inclusion and exclusion criteria were taken in the study group as cases and remaining 50 number of matched subject not taking any form of hormonal contraceptives pill were taken as control. Permission from the institutional ethical committee and written consent from every subject were taken before beginning of study.

INCLUSION CRITERIA: Women of reproductive age group between 18-44 years taking low dose combined oral contraceptive pill for > 6 months with no history of smoking or any other medical diseases were included in our study group.

EXCLUSION CRITERIA: Women; suffering from hypertension, Diabetes Mellitus, smoker, alcoholic, cardiovascular disease, cerebrovascular disease, hypothyroidism or hyperthyroidism was excluded from our study group.

Parameters Studied: Body Mass Index, Blood Pressure, Serum lipid profile, Fasting Blood Sugar, 12 lead electrocardiograms were studied. Body weight was measured and BMI was calculated from the formula. (BMI = Weight in kg / Height in m^2). A subject with BMI of< 25 has normal weight, between 25.0 - 29.9 kg/m^2, is defined as overweight and BMI more than 30.0 kg/m^2 is defined as obese.

After overnight fasting blood sample were collected in separate vials and fasting blood sugar, lipid profile including total cholesterol,

triglyceride, HDL, LDL and VLDL cholesterol were measured from semi automated analyzer machine. 12 leads electrocardiogram was taken by standard machine (BPL, CARDIART 108T DIGI)) and standard procedure, in supine position. All parameters were compared between low dose OCP users and non user control group.

Result and Analysis: Statistical analysis has been carried out by using Statistical Package for Social Sciences (SPSS) in the present study. Results on continuous measurements are presented on Mean ± SD .Student's t-test has been used to find the significance of study parameters between two groups of patients. Chi-square test has been used to find the significance of study parameters on categorical scale between two or more groups. Pearson or spearmen correlation test was used to find out correlation between the numerical results on continuous scale.

TABLE-1- OCP Usage According To Age

Oral Contraceptive Pill usage according to age			
AGE(in years)	Cohort		Total
	Case	Control	
20-24	10	10	20
25-29	23	20	43
30-34	16	15	31
35-40	1	5	6
Total	50	50	100

FIGURE-1 Bar diagram showing OCP usage.

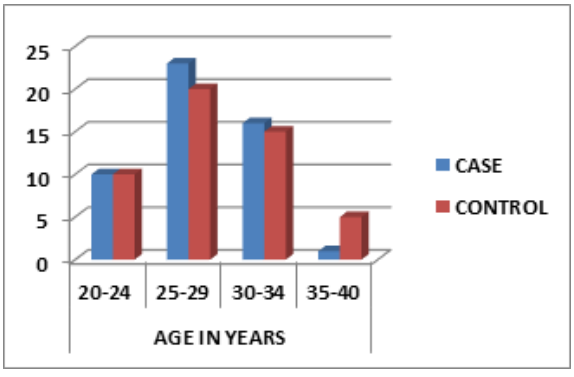

TABLE-1 Depicts the age wise distribution of number of cases and control group of women taking Hormonal OCP or not.

FIGURE-1 Shows this distribution in a BAR diagram.

It is seen from the **Table-2** where results of variable are shown in summary. Mean ± SD of those women taking OCP were: BMI (24.98±3.02), SBP (117.76±6.97), DBP (78.04±7.8), FBS (96.66±10.37), total cholesterol (149.08 ± 49.78), Triglyceride (122.72±67.42), HDL cholesterol (46.81±7.15), LDL cholesterol (77.65±34.68) VLDL cholesterol (38.74 ± 28.03). Among women who were not taking any hormonal contraceptive pills, all these parameters were: BMI(23.74±1.54), SBP(117.64±7.50), DBP,(76.88±9.4), FBS(97.36±11.04), totalcholesterol (139.484±26.17), Triglyceride (98.16±22.84), HDL cholesterol (47.79±7.28), LDL cholesterol (62.53±27.49), VLDL cholesterol (40.9 ± 24.14). On comparing both the groups; it is seen that in all the parameters p values are always > 0.05; statistically insignificant difference between case and control. There is only significant difference between the LDL level of the case and control (P=0.018) which is > 0.05; as determined by Student's t-test. The LDL level is significantly higher in the OCP users.

There is no significant difference between the ECG findings of the case and control cohort, (P=0.86) as determined by pooled chi-square test.

TABLE-2: Showing results of variable of case and control as Mean+SD and significance (p value)

Variable		Mean ± SD	P value	Significance
Body Mass Index	Case	24.98 ± 3.02	0.098	Not Significant
	Control	23.74 ± 1.54		
Systolic Blood Pressure	Case	117.76 ± 6.97	0.917	Not Significant
	Control	117.64 ± 7.50		
Diastolic Blood Pressure	Case	78.04 ± 7.8	0.561	Not Significant
	Control	76.88 ± 9.4		
Fasting Plasma Glucose	Case	96.66 ± 10.37	0.667	Not Significant
	Control	97.36 ± 11.04		
Total Cholesterol	Case	149.08 ± 49.78	0.68	Not Significant
	Control	139.484 ± 26.17		
Triglyceride Level	Case	122.72±67.42	0.80	Not Significant
	Control	98.16±22.84		
High Density Lipoprotein	Case	46.81 ± 7.15	0.61	Not Significant
	Control	47.79 ± 7.28		
Low Density Lipoprotein	Case	77.65±34.68	0.018	Significant
	Control	62.53±27.49		
Very Low Density Lipoprotein	Case	38.74 ± 28.03	0.42	Not Significant
	Control	40.9 ± 24.14		

FIGURE-2 Showing All The Variable Of Case And Contro As Mean+sd And Significance (p value)

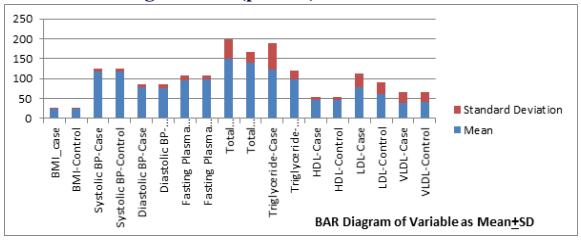

TABLE 3: Number Of Cases And Control With ECG Finding With Significance (p Value)

ECG Findings by OCP Usage (Cohort Wise)							P value
Cohort	ECG Findings					Total	
	Incomplete RBBB	Left Axis Deviation	Normal Study	Right Axis Deviation	Small Q in aVF		
Case	2	2	45	1	0	50	0.86
Control	1	2	45	1	1	50	
4	3		90	2	1	100	

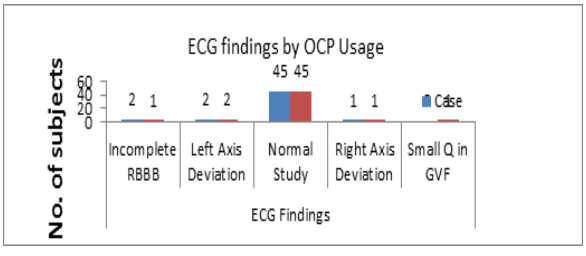

FIGURE-3: Distribution Of Ecg Finding In Cases And Control

It is seen from the **Table-4** that there is a significant positive correlation between duration of OCP usage with LDL level in the case cohort. r=0.355 and p= 0.0003, Triglyceride level in the case cohort. r=0.203 and p= 0.043, positively correlated with BMI .r=0.300 (p value-0.002, as determined by spearmen's correlation test. No significant correlation found between duration of OCP usage and SBP, DBP and Fasting Blood Sugar, VLDL, HDL and total Cholesterol level in case cohort, as determined by Spearmen's correlation test.

TABLE 4: Correlation of Risk Factors with Duration of OCP Usage:

DURATION OF OCP USAGE (in months)		BMI	SBP	DBP	FBS	Total Cholesterol	Triglyceride	VLDL	HDL	LDL
	r value	0.300	0.12756	0.07199	0.15085	0.187	0.203	0.075	-0.162	0.35461
	p value	0.002	0.206	0.4766	0.1341	0.061	0.043	0.4535	0.1063	0.0003

DISCUSSION:

In the present study, the effects of low dose oral contraceptives pills were evaluated as BMI, BP, FBS, Lipid profile and ECG pattern on female aged between 18-44 years, because women in this group were

sexually active, perfect and regular users of OCPs. Increasing age is itself a cardiovascular and cerebrovascular risk factor. The progressive change in the composition and dosages in the OCP and more careful selection of women who are to use these products have resulted in a lower risk of CVD associated with their use. Our results showed serum LDL level was significantly higher in OCPs users groups compared with non-users group but other lipid parameters like total Cholesterol, Triglyceride, and HDL & VLDL levels did not differ significantly between the two groups. High level of LDL Cholesterol are associated with an increased risk of Coronary Heart disease,[5] but the association is weaker in women than in men.[6] Oral estrogen reduces LDL Cholesterols levels,[7,8] and progestin may oppose this effect but combined OCP can increase LDL cholesterol level[9,10],which is consistent to our study. This study did not show any significant effect on BMI in contraceptive users group compared with non-users, which is consistent with one previous study reports also[11]

In our study, the systolic and diastolic BP remained unaffected among the subject using OCP as compared to non-users ; similar to finding of another study, which observed that blood pressure did not change subsequently in either ovulatory women or OC users throughout the menstrual cycle.[12] Some study observed that there were insignificant changes in the systolic and diastolic BP values recording at follow-up.[13] Effect of low dose OCPs on fasting blood sugar did not show significant variations between the two groups in our study; consistent with one study of a research worker.[14]**.** Impairment of glucose tolerance is seen with all combined OCs [15,16], in a dose-dependent manner which is contrast to our study [17]**.**

We observed that there were no changes in ECG pattern in OCP users as compared with non-user group. This result is supported by another studies[18]. Long term OCP use leads to an increase in both TGs and LDL-cholesterol which are an independent risk for cardiovascular disease**.** [19,20,21]

Serum total cholesterol levels did not differ between the groups nor change with age or length of contraceptive use which are consistent with some other studies [22,23] whereas one study reported a significant increase in serum total cholesterol levels associated with the use of low-dose combined contraceptive pills[24]. In our study, LDL-cholesterol increased with duration of OCP intake in the study group which is in agreement with other studies[25, 26, 27.] However, different observations are there; reported by other investigators.[28, 29, 30] who observed that serum triglyceride, LDL and VLDL cholesterol did not show significant variations.

Limitations of the study

The major weaknesses of our study are the small sample size, duration of study, case control design, and the number of different OCP preparations used. There was a selection bias in this case-control study. Selection bias may be present if the control group does not come from the same population as in this case.

CONCLUSION:

It is seen from the present study that- Serum LDL level was significantly higher in OCPs users groups compared with non-users group but other lipid parameters remained normal.

Women who take Low dose OCPs for long duration requires periodic check up and blood lipid parameters measurement in a regular interval. Prolonged exposure to low-dose OCs in a population at higher risk may significantly increase the incidence of cardiovascular outcomes .Women have the right to be informed of existence of the risks associated with using their chosen contraceptive method and of differences in risk between products. Studies involving larger population should be employed with consideration of the duration of study with sophisticated methods of analysis and with more specific tests to get a true picture in this regard.

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