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The Effect of Sunflower Oil Intake on Coagulating Factors in Healthy Males Individuals

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Abstract: The influence of nutritional factors on parameters of the hemostatic system has been investigated in various studies. The main purpose of this study was to determine the effect of sunflower oil intake on coagulating factors, serum cholesterol and triglgycerides. In 2006 with randomized clinical trial study, 21 healthy young men were selected for study (18-28 years old). After take of 24 recall hour, objectives consumes 30 g sunflower oil for 28 days and blood sample was taken for test before and after 2nd and 4th week. The results indicated that serum cholesterol decreases and Ptt increases significantly at the end of second and fourth week ($p<0.05$), but triglycerides and other coagulating factors was not different ($p>0.05$). This study indicat that high unsaturated fat diet intake may be decrease serum cholesterol and increase ptt in healthy individuals.

Key words: Unsaturated fat, coagulating factor, healthy individual, males, Iran

INTRODUCTION

The influence of nutritional factors on parameters of the hemostatic system has been investigated in various studies. Diets differing in their total fat content or lipid composition also differ in their effects on the hemostatic system and platelet function (Knapp, 1997; Mutanen *et al*., 1996). The hemostatic system is involved in the development of arteriosclerosis and acute thrombotic events. Elevated levels of fibrinogen, coagulation factor VIIc and plasminogen activator inhibitor-1 are associated with an increased risk of myocardial infarction, sudden cardiac death or myocardial reinfarction, respectively (Meade *et al*., 1986; Junker *et al*., 1997; Heinrich *et al*., 1994; Hamsten *et al*., 1987). The Polyunsaturated Fatty Acid (PUFA) such as linoleic acid, which is commonly found in vegetable seed oils (Mann *et al*., 1995). Sunflower oil has a high content of the n-6 polyunsaturated fatty acid of linoleic acid. Only a few earlier studies have compared the acute effects of different dietary fat qualities on FVII (Salomaa *et al*., 1993; Sanders *et al*., 1996; Miller *et al*., 1991; Mitropoulos *et al*., 1994; Freese and Mutanen, 1995; Tholstrup *et al*., 1996; Mennen *et al*., 1996; Roche and Gibney, 1997). Results from several experiments showed an increase of Factor VII Clotting activity (FVII:C) in subjects when they consumed a high fat diet, whereas a decrease was noted when subjects consumed a low fat diet (Miller *et al*., 1986). The effects of a high fat diet on total factor VII are less clear (Mennen *et al*., 1996). A variety of environmental factors are known to influence levels of factor VII and fibrinogen and therefore support their role in the development of coronary thrombosis. Factor VII is known to correlate with total cholesterol level and there is a relationship between dietary variability of fat intake and factor VII, which is likely to play an important role in the risk of CHD (Kelleher, 1992). Several reports have suggested that dietary fat intake or hypertriglyceridaemia are associated with elevated levels of FVII (Sanders *et al*., 1996). Several clinical studies have suggested that Factor VII Clotting (FVIIC) activity in middle-aged persons is directly associated with the risk for cardiovascular disease (Meade *et al*., 1986; Heinrich *et al*., 1994). The main purpose of this study was to determine the effect of sunflower oil (as polyunsaturated fat) intake on coagulating factors (such as Bt, pt, ptt, factorVII and fibrinogen), serum cholesterol and triglgycerides.

MATERIALS AND METHODS

In these clinical trial study, 21 males volunteers were selected from the student population of Ardebil university of Medical Sciences, Iran. None of them had a history of atherosclerotic disease and all were apparently healthy as

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judged by their responses to a standardized medical questionnaire. None of the subjects had hypertension or were taking medication of any kind. The protocol and the aim of the study were fully explained to the subjects, who gave their written consent. Mean age was 25 y (range: 18-28 y) and mean body mass index (in kg m^{-2}) was 24.8 (range: 20.7-29.1). Blood samples were obtained before starting sunflower oil intake and at the end of second and fourth week. To control for healthy subjects to be selected for study précised family history and heart examination were taken. Calorie and nutrients intake of them were taken by 24 h recall three days in week before starting study and duration of sunflower oil intake every week. After taking 24 h recall three days and clarification of calorie and nutrients intake, individuals' intake 30 gm sunflower oil daily for four weeks. Meals contained 105 gm of total fat intake plus 30 g sunflower oil that was 48% of total energy from fat. The nutrient composition of the meals was calculated from food tables and the processor of Iranian food information. Venous blood samples were collected into evacuated tubes with minimal compression necessary to display the vein. Blood samples were analyzed in Biochemistry Department of Ardebil University of Medical Sciences for serum cholesterol and triglycerides and coagulating factors including prothrombin time (pt), partial thromboplastin test (ptt), Bleeding Time (Bt), factorVII and fibrinogen. FactorVII, fibrinogen, cholesterol, triglyceride, pt and ptt were measured by commercial diagnostic kits; TECO (Germany) and Mahsa yaran, Pars Azomoon (Iran) and Difco (France), respectively. Bt was analyzed by rutin laboratory technique. Kolmogrov-smirinov test was used to check the normality of distribution of the variables. After normality was conformed, repeated-measures analysis of variance with SPSS PC version 13 was employed to analyze the changes across the time (weeks). Statistical significance was set at $p \leq 0.05$ for all statistical tests.

RESULTS

The results indicated that after sunflower oil intake serum cholesterol decreases significant at the end of second and fourth week ($p<0.05$). Ptt after sunflower oil intake increase significantly at the end of second and fourth week ($p<0.05$). There was not significant change of serum triglycerides, prothrombin time (pt), partial thromboplastin test (ptt), Bleeding Time (Bt), factorVII and fibrinogen after sunflower oil intake at the end of second and fourth week (Table 1). Calorie and other nutrients intake (exception fat) of sujects were same during study (Table 2).

Table 1: Coagulating factors at before and after sunflowers oil intake in male subjects

Variable	Baseline	2 weeks	4 weeks
Triglyceride (mg dL^{-1})	92.7± 23.6	91.6± 44.2	91.7± 22.3
Cholesterol (mg dL^{-1})	165.9± 21.1	159.9± 16.5	152.4±15.2*+
PT (second)	12.7± 0.4	12.8± 0.5	12.7±0.5
PTT (second)	31.8± 2.6	33.4±4.5	35.2± 3.1*+
Fibrinogen (mg dL^{-1})	227.4± 45.1	223.8± 49.7	232.1± 24.2
BT (second)	117.9± 31.2	133.9± 39.4	116.9± 24.9
Factor VII%	248.3± 85.6	232.8± 97.7	254.1± 75.1

Values are mean ±SD , n = 21, *p <0.05 vs basline, +p<0.05 vs 2 weeks

Table 2: The mean of calorie and other nutrients *(exception fat)* intake during study

Variables	Mean± SD	variables	Mean± SD
Calorie (Kcal)	2517±510	Folacin (µg)	98±81
Protein (g)	76.1±22.4	Vitamin B5 (mg)	3±2
carbohydrate (g)	315.1±93	Vitamin C (mg)	62±39
Fiber (g)	11.4±7.8	Vitamin E (mg)	3±2
Fat (g)	105.6±21.2	Calcium (mg)	526±320
Saturated fat (g)	27±10	Copper (mg)	0.7±0.3
Mono unsaturated fat (g)	31±9	Iron (mg)	23±8
Poly unsaturated fat (g)	10±3	Magnesium (mg)	128±76
Cholestrol (mg)	314±243	Phosphoros (mg)	740±306
Vitamin B1 (mg)	1.7±0.5	Potacium (mg)	1713±900
Vitamin B2 (mg)	1.2±0.4	Selenium (µg)	57±49
Vitamin B3 (mg)	22.2±8	Sodium (mg)	3267±1311
Vitamin B6 (mg)	0.8±0.4	Zinc (mg)	6±2
Vitamin B12 (µg)	6±3	p/s*	0.4±0.2

*poly unsaturated fatty acid/ saturated fatty acid

DISCUSSION

The results of this study showed that eating of sunflower oil decrease the levels of serum cholesterol at the end of the second and fourth week. Sunflower oil intake can effect on serum fibrinogen in healthy person. The content of total fats in the diet is known to influence the concentrations of FVII. In general, replacement of a fat-rich diet by a diet low in fat results in a reduction in FVIIc(Marckmann *et al*., 1990). Substitution of foods rich in saturated fat with foods rich in high-oleic-acid sunflower oil and margarine has favorable outcomes on blood lipids and factor VIIc. This oil presents another useful source of Mono Unsaturated Fatty Acid (MUFA) for diets aimed at prevention of heart disease (Allman-Farinelli *et al*., 2005). Hunter *et al*. (2002) showed short-term intake of diets with similar fat content (38% as energy) but with distinctly different fatty acid compositions have no influence on plasma concentration of FVII (Hunter *et al*., 2000) that was similar to prsent study, but in our study was 48% energy from fat. Fasting concentrations of factor VIIc were lower on the MUFA-rich diet. In humans, high fat meals cause postprandial activation of blood coagulation factor VII (FVII), but human studies have not provided definite evidence for a prothrombotic effect of dietary FVII activation (Olsen *et al*., 2002). Several dietary intervention studies have

shown that FVII is indeed influenced by diet (Marckmann, 1995; Mennen *et al*., 1996; Vorster *et al*.,1997; Marckmann *et al*., 1998). A dietary change of 4 weeks duration preceded the meal tests of this study, however, it is possible that their findings rather reflect differences in the background diet than different acute effects of the meal tests. Our results indicate that diets rich in sunflower oil may attenuate the cholesterol and increase of partial thromboplastin test effect of fatty meals, which might contribute to the low incidence of IHD in person, where sunflower oil is the predominant fat consumed. However, on the basis of the present results we cannot conclude how sunflower oil consumption affects other determinants of thrombosis. Fasting triglyceride concentrations are reported to be positively associated with factor VIIc (Scarabin *et al*., 1985; Mennen *et al*., 1996). The hypertriacylglycerolemia that occurs after the consumption of high-fat meals (Miller *et al*., 1991; Silveira *et al*., 1996) has been suggested to activate FVII. In the present study, fasting plasma triacylglycerol concentrations were not significant after the sunflower oil intake. The decline in fasting cholesterol from baseline that was seen with all 2 and 4 week after consumption of sunflower oil suggests that the sunflower oil intake with diet were use health and increase serum ptt that show unsaturated fat with diet were less thrombogenic. In spite of present study other study was showed increas intake of linoleic acid may raise plasma fibrinogen concentration. Plasma fibrinogen concentration was significantly greater following the n-6 diet than on the saturated diet (Sanders *et al*., 1997).

CONCLUSION

The present study confirmed "the consumption of sunflower oil", which indicates high-unsaturated fat meals decrease cholesterol and increase ptt of healthy person that may be useful for therapuetic trial in certain patients.

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