

A Study Of Lipid Profile On A Group Of Patients With Diabetes Mellitus And Coronary Heart Disease In Najaf.

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الخلاصة

ان اختلال مستويات الدهون شائعا عند مرضى السكري وهي عامل اساسي في ازدياد خطر الاصابه بامراض الشرايين التاجيه و مرض الشرايين التاجيه بدوره يعتبر من المشاكل الصحيه الكبيره التي تواجه العالم. تهدف الدراسه الى تقييم مستويات الدهون المختلفه عند المرضى العراقيين المصابين بالسكري ومرضى الشرايين التاجيه. شملت الدراسه 90 مريضا 50 مريضا مصابا بالسكري منهم (25 ذكر و 25 انثى) اما مرضى الشرايين التاجيه فكان عددهم 40 مريضا منهم (20 ذكر و 20 انثى). تم اختيار المرضى عشوائيا في مدينة النجف. وتم قياس مستويات الدهون لديهم ولدى مجموعة السيطره (الاصحاء) وبالطرق القياسيه. اظهرت النتائج ان مستويات Tg, TC عاليه بشكل معنوي HDL-Chol., واطنه وبشكل معنوي عند مرضى السكري و مرضى الشرايين التاجيه ولكلا الجنسين بالمقارنه مع الاشخاص الاصحاء, بينما كان مستوى LDL-Chol. عاليا وبشكل معنوي عند مرضى الشرايين التاجيه من الذكور والاناث. اظهرت الدراسه ازدياد معامل تصلب الشرايين بشكل معنوي عند مرضى الشرايين التاجيه من الذكور والاناث وحسب العمر. وجدت الدراسه زياده في مستويات الدهون عند مرضى السكري ومرضى الشرايين التاجيه و كان معامل تصلب الشرايين عند مرضى الشرايين التاجيه اعلى من مرضى السكري.

Abstract

Background: lipid abnormalities are common in patients with diabetes mellitus DM and undoubtedly contribute to increase in risk of coronary heart disease (CHD), CHD represent one of the most important health problems and remain the major cause of morbidity and mortality in many countries all over the world.

Objective: The aim of this study is to evaluate the lipid profile parameters level among patients with DM and patients with CHD.

Methods: A total of 90 patients (50 DM; 25 males and 25 females and 40 CHD; 20 males and 20 females), in comparison with 40 of healthy individuals (20 male and 20 female). The patients were randomly selected in Najaf region. The lipid profile parameters were measured for each patients and healthy individuals using Spainreact kits with standard procedure.

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Results:The results revealed that DM and CHD patients had higher level of TC and Tg, HDL-cholesterol was significantly lower in DM and CHD patients of both sexes when compared with normal individual, whereas LDL-cholesterol was significantly higher in CHD male and female patients. The atherogenic index was significantly increased in CHD male and female patients according to their age levels.

Conclusion:The present study indicate that lipid profile parameters level were elevated in two types of patients but the atherogenic index was higher in CHD patients more than in DM patients .

Introduction

The prevalence of dyslipidemia varies with the population being studied. The incidence is highest in patients with premature coronary disease, which can be defined as occurring before 55 to 60 years of age in men and before 65 years in women. In such patients, the prevalence of dyslipidemia as high as 80 to 88 percent compared to approximately 40 to 48 percent in age-matched controls without coronary disease[1].

Coronary heart disease and diabetes mellitus (DM) are both chronic metabolic diseases whose pathophysiology remains extremely complex and multi-factorial. Yet of the many risk factors to blame , much attention has focused on the elevated lipid profile and its atherogenic potential as a very powerful risk factor of the aggravation of these diseases [2].

It is apparent that atherosclerosis manifested by coronary heart disease (CHD) is not only the single most common cause of death among middle- aged people, but is also the major cause of morbidity and mortality among pepole suffering from diabetes mellitus [3]. Type 2 diabetic patients have two-fourfold increased relative risk of CHD in comparison with age matched non diabetic subjects [1,2]. The simultaneous presence of multiple classic risk factors in patients with type 2 diabetes mellitus partly accounts for the excessive risk of developing CHD in this population [4].

Patients with type 2 diabetes have an increased frequency of dyslipidemia, which is invariably linked to the presence of insulin resistance and obesity that associated with hypertriglyceridemia. The hypertriglyceridemia results both from increased substrate availability (glucose and free fatty acids) and from decreased lipolysis of very-low-density lipoprotein (VLDL) triglyceride [5].

Elevated concentrations of triglycerides rich lipoprotein specially very low density lipoprotein (VLDL), and decreased levels

of high density lipoprotein (HDL), measured as HDL-cholesterol, are the most characteristic lipoprotein abnormalities in type 2 diabetes [6]. Most patients with type 2 diabetes have total amount of LDL-cholesterol occasionally high or it is the same as in healthy people [7].

This investigation initiated with the aim of determining the serum levels of total cholesterol (TC), triglycerides (Tg), HDL-cholesterol, LDL-cholesterol, and VLDL- triglycerides as CHD primary risk factors in male and female patients with DM and CHD those where randomly selected from Iraqi population in Najaf region.

Methods

A total of 130 (65 males and 65 females) randomly selected from Iraqi population in Najaf region and representing age groups between 20-68 years were chosen to take part. The population was categorised into three main subdivision for both males and females, namely, normals, diabetics (DM) and persons with coronary heart diseases (CHD). In this study the lipid profile parameters were evaluated for each participant. The medical examinations for patients were carried out by experienced physicians.

Biochemical analysis

Subjects were fasting for 12 hours at the time of blood withdrawal. Blood specimens were taken by venipuncture using venous blood and either serum or plasma were used for analysis. Total cholesterol (TC), triglycerides (Tg), HDL- cholesterol were estimated with the use of Spinreact kits. According triglycerides divided by 5, VLDL- triglycerides was evaluated, LDL- cholesterol was calculated according to the formula of Friedwald et.al [8].

Statistical analysis

Statistical analysis of the data was carried out using the STATGRAPHICS computer program package the results are expressed as mean \pm SD, and comparison between two sets of data were made by using " student's t-test".

Results

In this study, a total of 130 subjects (65 males and 65 females) were examined. In the male group 20 individuals (30.8 %) were generally healthy suffering no major diseases and were considered to represent perfectly normal subjects. Among the remaining males 25 individuals (38.5 %) were diagnosed as diabetics (DM) and 20 individuals (30.8%) were suffering from coronary heart disease (CHD).

The female group considered of 65 individuals 20 (30.8 %) healthy volunteers, 25 (38.5 %) diabetic patients (DM), 20 (30.8%) cardiac patients (CHD).

Table (1 and fig;1,2) show the biochemical data of lipid profile in male and female groups. The highest levels of TC were observed in the CHD patients followed by DM patients since TC levels in both groups were significantly higher than those of the normal subjects ($P<0.01$) for DM and ($P<0.01$) for CHD. The levels of Tg and VLDL-triglycerides in CHD and DM patients of both sexes were significantly higher ($P<0.001$ and $P<0.01$, respectively) than those of the normal subjects of male and female groups.

HDL-cholesterol was significantly decreased in both sexes of two types of patients when compared with normal individuals. Whereas LDL-cholesterol significantly elevated in DM and CHD patients ($p<0.01$, $p<0.001$, respectively)

Atherogenic index (TC/ HDL-cholesterol) of male and female groups distributed by age levels is presented in table (2).

In both groups, the atherogenic index of the CHD patients was significantly higher ($P<0.001$) than normal subjects among all the age levels, and higher in males than females.

Table - 1: Biochemical data of male and female groups

	Males			Females		
	normal	D.M	CHD	normal	D.M	CHD
N	20	25	20	20	25	20
Total- Cholesterol	180±1.5	220±0.2*	257±0.7*	175±1.2	220±0.9*	260±1.8*
Triglycerides	135±0.4	214±2.3**	253±0.4**	128±2.1**	215±3.1**	248±1.6**
HDLCholesterol	52 ±1.7	36 ±0.2	26 ±0.1	55 ±0.8	35 ±1.3	30 ±1.4
LDLCholesterol	110±0.3	121±1.8*	197±1.9**	106±0.8	129±2.3*	174±2.4**
VLDL-Triglycerides	27 ±0.5	42 ±0.6	51 ±0.1	25 ±0.4	43 ±0.7	48 ±0.4

Results are presented as mean ± SD, where n is the number of subjects. Significant differences from normal subjects are indicated: *P< 0.01, **P< 0.001, DM: diabetes mellitus; CVD: cardio vascular disease.

Table -2: Atherogenic index of male and female groups distributed by age levels.

Age levels (years)	Males		females	
	normal	CHD	normal	CHD
20 – 29	3.6±0.13	5.8±0.2*	3.7±0.07	5.3±0.04*
30 – 39	3.7±0.03	5.9±0.7*	3.8±0.19	5.4±0.16*
40 – 49	3.8±0.08	6.2±0.3*	3.9±0.03	5.5±0.09*
50 – 59	3.9±0.06	6.7±0.16*	3.9±0.11	5.7±0.02*
60 and over	4.2±0.17	7.8±0.17*	4.1±0.3	6.3±0.18*

*Results are presented as mean±SD with number of subjects given in parantheses. Significant differences from normal subjects are indicated: *P< 0.001.

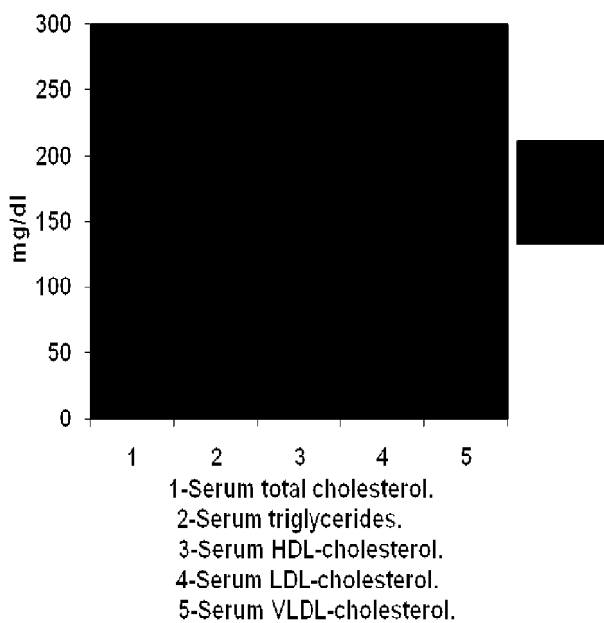


Figure -1: Distribution of lipid profile parameters in males

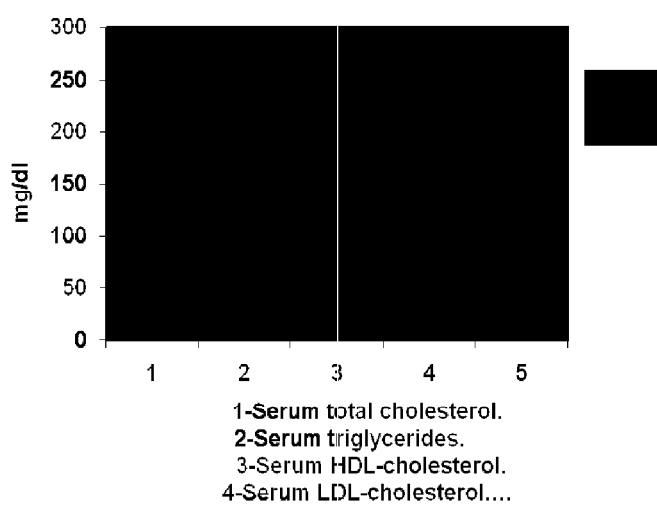


Figure -2: Distribution of lipid profile

Discussion

Hyperlipidemia has now been recognised as an important risk factor in the development of atherosclerotic vascular disease; the incidence of hyperlipidemia in diabetes mellitus is 30% to 40% [9] plasma cholesterol level is generally more accepted than triglycerides as independent associate of coronary heart disease but, its significance in diabetes mellitus is not precisely defined [10].

Plasma TC levels have been measured in several populations from Asia, Africa, America and Europe and when these results compared with the results of our investigation show that the mean value of TC levels of Iraqi population in Najaf region males is 180 mg/dl; which is considerably lower than those levels of European males (248 – 271 mg/dl in Finland; 209 – 236 mg/dl in the Netherland; 194 – 205 mg/dl in Italy; 205 – 213 mg/dl in Spain; 186 – 197 mg/dl in Poland). However, in African males, the mean levels of TC were found to be markedly lower than the levels of Iraqi males (151 – 166 mg/dl; in Ghana; 155 – 163 mg/dl in Ivory coast; 116 – 120 mg/ dl in Nigeria [10,11] and 160 mg/dl in Libya [12]. In Pakistan and Philippines TC levels (170 -197 mg/dl) were almost similar to those of our men. Iraqi males have HDL-cholesterol levels of 52 mg/dl, a value which is comparable with the values of 46-58 mg/dl in American males [13] ; 52-55 mg/dl in British, Italian and Swedish males [14]; 46- 50 mg/dl in Dutch males [15]; 43-50 mg/dl in Ghainian males [16]; 48 mg/dl in Libyan males [11]. However HDL-cholesterol levels for male groups from Nigeria, Pakistan, Philippines and Surinam were reported to be in the range of 27-42 mg/dl [17,18] which are in line with the findings of conner et.al [19]. For Tarahomara Indians (27 mg/dl) and those of Robinson et.al [20]. For Maasai men (41 mg/dl).

The levels of Tg for Iraqi males (135 mg/dl) are slightly lower than the levels of 148 mg/dl reported for Libyan males [21].

In the present study, the levels of TC, Tg and LDL- cholesterol were slightly lower in the normal females than in the normal males, where as HDL-cholesterol levels were slightly higher in the female subjects, but these differences were non significant in male and female groups, the levels of TC, Tg and LDL- cholesterol were significantly higher in the DM and CHD patients being higher in CHD patients, whereas only Tg were shown to be higher in DM patients. In contrast, HDL-cholesterol levels were found to be significantly lower in DM and CHD male and female patients. The result that HDL-cholesterol levels of male and female subjects are negatively related to the risk of CHD is in full agreement with the

reported data in a number of population [22-24]. With increase in age, a slight increase was seen in the atherogenic index in the normal males and females. In CHD patients, the atherogenic index was significantly higher than that of normal subjects in the male and female groups among all age levels. In the meantime, the atherogenic index was increased more in the male patients rather than female patients with increase age levels. This finding is considered to be in full agreement with other reports [12, 14].

The present results indicate that apart from TC, Tg and LDL-cholesterol, VLDL-triglycerides levels were increased in DM and CVD patients when compared with the normal subjects, in the meantime HDL-cholesterol was decreased in DM, CHD in Iraqi population when compared with other population.

References

1. Heyden S (1995). Dietary fat intake and atherosclerosis: In Vergosen AJ ed. The role of fat in human nutrition. New York: McGraw-Hill, 44-93.
2. Fredrickson DS, Goldstein JL, Brown MS(1998): The familial hyperlipoproteinemia: Metabolic basis of inherited disease. New York: McGraw-Hill, 604-655.
3. Goldstein JL, Schrott HG, Hazzard WR et al. (1998): Hyperlipidemia in coronary heart disease . II. Genetic analysis of lipid levels in 167 familial and delineation of a new inherited disorders, combined hyperlipidemia. . *lin invest.*; 52:1544-1568.
4. Kannel WB, Gastell WP, Gordon T (1993): Serum cholesterol , lipoproteins and the risk of coronary heart disease. *Ann Inter. Med*; 74: 1-12.
5. Steinberg D (1999): lipoprotein and atherosclerosis. A look back a look ahead . *Atherosclerosis* ; 3: 283-308.
6. Miller GJ, Miller NE (1995): Plasma high density lipoprotein concentration and development of ischemic heart disease. *Lancet* ; I: 18-23.
7. Miller NE, Fordi OH, et al. (2001): The tromso heart study. High density lipoprotein and coronary heart disease: A prospective case control study. *Lancet*; i: 975-987.
8. Friedewald WT, Levy RI, Fredrickson DS (1972): Estimation of the concentration of low density lipoprotein cholesterol in plasma. Without use of the preparative ultracentrifuge. *Clin. Chem.* 18:499-502.
9. Kannel WB (2003): High density lipoproteins: epidemiologic profile and risk of coronary heart disease. *Cardiology*: 52: 9-12.

10. AKnuiman J, West CE, Burema J (1998): Serum total and high density lipoprotein cholesterol concentrations in adult men from 13 countries. *AmJEpidemiol*; 116: 631-642. Rifkind BM, Tamer I, Heiss G et al. (1997): Distribution of high density and other lipoproteins in selected LRC prevalence study populations. *Lipids*; 14:105-112.
11. EL- Fakhri M, Ghwarsha K, Sheriff DS (1999) : Plasma lipid levels in a Libyan population. *Saudi Med J*; 9:493-502.
12. Tyroler HA, Glueck CJ, et al. (1995): Plasma high density lipoprotein cholesterol comparison in black and white population . *Circulation*; 62:99-107.
13. Lewis B, Chait A, Sigurdson G et al. (2001): Serum lipoproteins in four European communities : a quantitative comparison. *Eur J Clin Invest*; 18 : 165-173.
14. Baird DD, Tyroler HA, Heiss G et al. (2002): Menopausal change in serum cholesterol. Black/white differences in Evanscountry, Georgia. *Am J Epidem.*; 130: 911-924.
15. Folsom AR, Burke GL, Ballew E (1998): Relation of body fatness and its distribution to cardiovascular risk factor in young black and whites. *Am J Epidem.* ; 122 : 982-993.
16. Castelli WP, Doyle JT, Gordon T, (1990): HDL cholesterol and other lipids in coronary heart disease. *Circulation*; 55: 767-772.
17. Jensen G, Schanor PM, Faergman O (1993): HDL cholesterol and ischemic heart disease in the Copenhagen City heart study . *Dn Med Bull*; 27: 139-142.
18. Conner WE, Cerquera MT, Conner RW, et al (1997): The plasma lipids , lipoproteins and diet of the Tarahumara Indians of Mexico. *Am J Clin Nutr*; 31: 1131-1142.
19. Robinson D, Williams P, Day J, et al (1998): High density lipoprotein cholesterol in the Maasai of East Africa: *Br Med J*; 3:1249.
20. Kannel WB, Castell Wp, Gordon T (1998) Serum cholesterol, lipoproteins and the risk of coronary heart disease. *Ann Inter. Med*; 74: 1-12.
21. Heiss G, Johnson NJ, Reiland S (1995): The epidemiology of plasma high density lipoprotein cholesterol levels. *Circulation*; 62: 116-136.
22. Williams P, Robinson D, Bailey A (1997): A high density lipoprotein and coronary risk factor in normal men. *Lancet*; 11: 72-75.
23. Abbott RD, Garrison RJ, Wilson WF (1999): Joint distribution of lipoprotein cholesterol classes. *Atherosclerosis*; 3: 260-272.