

EVALUATION OF LIPID PROFILE IN TYPE 2 IRAQI DIABETIC PATIENTS AND IMPACT OF RELATED VARIABLES ⁺

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Abstract:

Diabetes mellitus had been known to be associated with lipid disorder and cardiovascular complications, the age of the patient; duration of diabetes, body mass index, sex and type of treatment has been variously believed to influence the lipid pattern.

The objective is to evaluate the lipid profile and the impact of age, duration of, BMI, sex and type of treatment on lipid profile in type 2 diabetic patients.

This study was conducted in the national center for treatment and research of diabetes, 515 type 2 diabetic patients were included in the study, the patients were clinically assessed and brief history taken, and the lipid parameters studied were TC, TG, HDL, LDL.

It was observed that the age group, disease duration, sex and type of treatment of subjects did not have significant effect on the values of the respective lipid where as there was significant effect of BMI on TG only and uses of lipid lowering agent on TC and LDL only.

Keywords : Diabetic, Lipid Profile

تقييم مستوى الدهون لدى المرضى العراقيين المصابين بداء السكري النوع الثاني وتأثير
بعض المتغيرات عليها

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المستخلص :

كما هو شائع ومعروف ان مرضى السكر تحدث لهم اضطرابات في مستوى الدهون ومضاعفات جهاز الدوران والقلب كما ان عمر المريض ، مدة المرض ، مؤشر كتلة الجسم ، جنس المريض ونوع العلاج الذي يتعاطاه قد تؤثر على مستوى الدهون في الدم.

الهدف من الدراسة هو تقييم مستوى الدهون لدى مرضى السكري (النوع الثاني) وتأثير كل من العمر ، مدة المرض ، مؤشر كتلة الجسم ، جنس المريض ، نوع العلاج للمرض على مستوى الدهون في الدم.

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اجريت الدراسة الحالية في المركز الوطني لعلاج وبحوث السكري/ الجامعة المستنصرية ، وقد اشتملت عينة الدراسة على 515 مصاب بداء السكري النوع الثاني ، وان جميع المرضى المشمولين بالدراسة تم معاينتهم واخذ بعض البيانات منهم ، كما اجريت لهم فحوصات مختبرية شملت مستوى الكوليسترول الكلي ، الدهون الثلاثية والدهون عالية الكثافة والدهون الواطئة الكثافة.

لوحظ ان العمر ، فترة المرض ، جنس المريض والعلاج الخاص بالسكر للمريض لم تؤثر هذه المتغيرات على كافة انواع الدهون في الدم ، في حين كان مؤشر كتلة الجسم له تأثير واضح وذو دلالة احصائية على مستوى الدهون الثلاثية كما ان استخدام المريض للأدوية والعقاقير الخاصة بخفض الدهون في الدم له تأثير معنوي وذو دلالة احصائية مهمة على نوعين فقط من الدهون وهما الكوليسترول الكلي والدهون واطئة الكثافة.

Abbreviations :

DM : diabetes mellitus
BMI : body mass index
TC : total cholesterol
TG : triglycerides
HDL : high density lipoprotein
LDL : low density lipoprotein

Introduction :

The World Health Organization (WHO) defines diabetes as a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat, and protein metabolism that results from defects in insulin secretion, insulin action, or both [1].

The total number of people worldwide with type 2 diabetes was expected to increase from 171 million in 2000 to 366 million in 2030 . Unfortunately, the prevalence worldwide already reached 366 by 2011 according to the international Diabetes Federation (IDF), and the projections are that prevalence of diabetes on a global scale could well reach 530 million people in 2030 [2].

Type 2 DM is the most common form of the disease, accounting for approximately 90% of all affected individuals and is caused by relatively impaired insulin secretion and peripheral insulin resistance [3].

Type II diabetes-related mortalities account for 4.6 million deaths in 2011 for people aged 20–79 years, accounting for 8.2% of global all-cause mortality for people in this age group with an estimated rate of one death every seven seconds. The number of deaths has increased by 13.3% from estimates for the year 2010 [4].

In type 2 diabetes mellitus lipid abnormalities are almost the rule. Typical finding are elevation of total and VLDL cholesterol, triglyceride concentration, lowering of HDL cholesterol and a predominance of small, dense LDL particles [5]. Insulin resistance is often involved in this process, [6] though the pathophysiology of lipid abnormalities in diabetes is not yet totally explained.

Atherosclerosis accounts for up to 80% of deaths in diabetic patients due to coronary heart disease (CHD) and cerebrovascular or peripheral vascular disease [7].

There is a growing body of evidence showing that hyperglycemia and Dyslipidemia are linked to increased cardiovascular risk [8].

The composition of lipid particles in diabetic dyslipidemia is more atherogenic than other types of dyslipidemia. This means that even normal lipid concentrations might be more atherogenic in diabetic than in non-diabetic people [9].

Triglyceridemia has been associated with increased risk of coronary heart disease both in non-diabetic and type 2 diabetic subjects [10].

Control of hyperglycemia and associated lipid abnormalities is very well identified as a modifiable risk factor among patients with type 2 diabetes and is also a very important primary Preventive measure for coronary artery disease [11].

Patient and methods :

This cross sectional study was done in the national center for treatment and research of diabetes in al Mustanserria University during the period from the first of April to the end of June 2013.

A convenience sample was used to enroll 515 type 2 diabetic patients {265males and 250 females) who met the following inclusion criteria.

Type 2 diabetic patient treated either by oral hypoglycemic agents with or without insulin.

The age of patient at time of diagnosis of diabetes was more than 40 years and was treated by oral hypoglycemic agents at time of diagnosis.

Each patient in the study group was interviewed directly and asked for the following:

age, duration of diabetes, type of treatment of diabetes and if he or she was receiving lipid lowering agents or not.

These measurements were done for each patient .weight, height, body mass index all patients were investigated for lipid profile assay comprising of TC, TG, HDL, LDL. Statistical method that has been used is T- test.

Results :

The mean age for the patients was 55 ± 10.2 years and the mean of disease duration and BMI were 8.2 ± 6.1 years, 30.7 ± 5.4 kg per meter square respectively.

The male and female constitute (51.4, 48.6) % respectively.

375 patients (72 .8) % were treated by oral hypoglycemic agents and the others 140 patients (27.2) % were treated by insulin.

(57.2)%295 patients were having hyperlipidemia and treated by lipid lowering agents. The means of TC, TG, HDL, LDL, were (181, 159, 44,104) mg/dl respectively. As shown in table (1).

Table (2) represents the lipid profile of the diabetic subjects on the basis of age groups comprise of adult aged 40 - 50 and elderly more than 51 years.

It was observed that the age group of the subjects did not have significant effect on the values of the respective lipids ($P > 0.05$)except for TG, it was higher in age group 40 -50 years ($p = 0.036$).

Table (2) shows the lipid profile of the patients on the basis of the duration of diabetes, the duration comprise of 0 – 5 years, 6 – 10 years and more than 20 years .it was observed that the duration of the diabetes did not have any significant effect on the values of the respective lipids profile for all groups .

Table (3) shows the lipid profile of the patients on the basis of BMI grades (19-25), (25.1-30), more than (30) kg per square meter, means of TC, TG, HDL, LDL were within normal limits

for all grades of BMI except the means of TG for patient who had BMI more than 30 is mildly elevated and it was significantly higher than the mean of TG for patients had BMI of (19-25). Whereas there was no significant effect of BMI grades on lipids for all groups.

Table (4) shows the lipid profile of the diabetic subjects for both sex (males, females) and type of treatment (oral hypoglycemic agents, insulin) respectively .it was observed that the gender and the type of treatment did not had significant effect on the values of the respective lipids ($p > 0.05$) respectively.

Table (4) shows the means of TC and LDL for patients not receiving lipid lowering agents which are mildly elevated but it is significantly higher than that for patients treated by lipid lowering agent ($p=0.032-0.044$).

This agent has no significant effect on means of TG, HDL for both groups ($p > 0.05$).

Table (1): Patients criteria and lipid profile of studied sample

Patient criteria and lipid profile	Mean $\pm$ SD		
Age (years)	55.2 $\pm$ 10.2		
Duration of DM (years)	8.2 $\pm$ 6.1		
BMI (kg/m ²)	30.7 $\pm$ 5.4		
WHR	0.95 $\pm$ 0.05		
TC (mg/dl)	181 $\pm$ 47		
TG (mg/dl)	159 $\pm$ 92		
HDL (mg/dl)	44 $\pm$ 7		
LDL (mg/dl)	104 $\pm$ 46		
Gender		(N)	(%)
	Male	265	51.4
	Female	250	48.6
Treatment			
	Oral	375	72.8
	Insulin	140	27.2
Lipid lowering agent			
	+ve	295	57.2
	-ve	220	42.8

Table (2): lipid profile of studied sample on the bases of age and duration of DM

Criteria of patient		TC	TG	HDL	LDL
Age (years)	40-50 N(155)	185 $\pm$ 40	188 $\pm$ 108	43 $\pm$ 8	104 $\pm$ 41
	>51N(360)	159 $\pm$ 50	147 $\pm$ 81	45 $\pm$ 7	104 $\pm$ 49
	P Value	0.54	*0.036	0.28	0.99
	t-test	0.611	2.1	1.08	0.006
Duration of DM (years)	0-5N(235)	176 $\pm$ 32	156 $\pm$ 28	44 $\pm$ 12	98 $\pm$ 25
	>5-10N(130)	189 $\pm$ 41	157 $\pm$ 39	45 $\pm$ 18	110 $\pm$ 18
	>10N(150)	183 $\pm$ 51	167 $\pm$ 31	44 $\pm$ 16	108 $\pm$ 23
	P Value	0.5	0.84	0.77	0.52
	F-test	0.682	0.165	0.25	0.65

* P-value = significant at 0.05

T= t- test

F= anova

Table (3): lipid profile of studied sample on the bases of BMI and WHR

Criteria of patient		TC	TG	HDL	LDL
BMI (kg/m ²)	18.5-24.9 N(30)	178±51	117±36	47±7	107±51
	25-29.9 N(245)	179±44	149±83	44±7	104±42
	>30 N(240)	184±51	176±102	45±8	104±51
	P Value	0.87	0.17	0.56	0.99
	F-test	0.13	1.7	0.57	0.18
Waist hip ratio	<0.95 for male and <0.88 for female N(125)	179±50	160±123	47±9	106±45
	>0.95 for male and 0.88 for female N(390)	182±47	158±80	44±7	104±47
	P Value	0.79	0.94	0.1	0.85
	t-test	2.1	0.16	0.71	2.1

T= t- test

F= anova

Table (4): lipid profile of studied sample on the bases of gender, type of treatment and lipid lowering agent.

Criteria of patient		TC	TG	HDL	LDL
Gender	Male N(265)	182±53	151±82	45±8	106±51
	Female N(250)	180±41	168±101	44±7	103±31
	P Value	0.88	0.35	0.42	0.74
	T-test	0.14	0.93	0.8	0.73
Type of Treatment	Oral N(375)	184±49	162±105	45±7	109±50
	Insulin N(140)	180±47	158±87	44±8	103±45
	P Value	0.71	0.84	0.88	0.56
	t-test	0.36	0.2	0.14	0.58
Lipid lowering agent	+ve n(295)	172±37	158±101	45±7	96±36
	-ve N(220)	193±57	161±78	44±8	116±56
	P value	0.032*	0.87	0.47	0.032*
	t-test	2.1	0.16	0.71	2.1

* P-value = significant at 0.05

T= t- test

Discussion :

Knowing that the target values recommended for type 2 diabetic patients are less than 200 ,150 ,100 for ,total cholesterol , triglycerides and LDL respectively, while HDL level should be more than 50 for females and more than 40 for males [12].

The values of lipid profile in study group were not bad in regard for the target values mentioned above.

This might be due to all those patients are on regular treatment for DM and most of them are on lipid lowering agents.

In addition all those patients are examined and treated on regular basis and follow up each three months in diabetic center.

In regards to the effect of the age of the patients , the only difference was in the triglycerides value were it becomes significantly different between both age groups ,the younger age group shows higher value indicating worse control of their triglycerides.

The duration of the DM in the 3 different groups show no significant difference in lipid profile, this results was also shown by other study [13].

Overall diabetes mellitus is closely associated with Dyslipidemia but age group and DM duration may not be strong indices for lipid profile prediction especially with respect to subjects under management [7].

The BMI effect on lipid profile in our study show no significant difference between the three categories of patient, for lipid profile , but the triglycerides was significantly increased in those who were having BMI more than 30 in comparison to those with less than 25.

Waist hip ratio didn't show any significant impact on lipid profile too.

May be because all the patients were treated at the time of the study both for diabetes and dyslipidemia [14].

In this study the gender impact show no significant effect on lipid profile, though it was expected that type 2 diabetic men had more unfavorable lipid profile than women[15], again this could be due to that all those patients were under treatment at the time of this study. and with good follow up each 3 months.

The effect of lipid lowering agents shows that there is significant difference in total cholesterol and LDL between those on treatment and those on no treatment in favor of treated patients but the triglyceride was not affected in both groups.

This might be due to that most of our patients were on statins drug which is directed toward the LDL and total cholesterol rather than the triglyceride ,and hence attention should be considered in treating hyperlipidemia in using drugs that are directed to lower triglycerides too. The type of treatment of the diabetes itself ,whether it was insulin and or oral hypoglycemic agents does not show any effect on the lipid profile or total cholesterol in both groups ,it is possible that glycemic control in well treated patients and regular visits to the doctor as our patients have, might be the reason for this insignificant effect.

Conclusion :

Over all diabetes mellitus is closely associated with dyslipidemia but the age group and the duration of the diabetes ,BMI ,sex, and type of treatment may not be strong indices for lipid profile prediction especially with respect to subjects under management.

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