Estimation of lipid profile in younger patients suffering from diabetic mellitus type 1

Ali Jasim Mhaimeed Alsultani[1] College of medicine, University of Babylon, Iraq. alialsultany81@yahoo.com
Ali Jaber Aboob Al-Mamoori[2] Ass. Prof. College of Medicine, University of Babylon/Iraq minaaligaber@gmail.com
Mushtaq Qahtan Ali[3] University of Babylon /college of medicine. Iraq, mushtaq.qahtan@uobabylon.edu.iq.
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Abstract

Background: Dyslipidemia and hyperglycemia are metabolic anomalies ordinarily found in youthful patients with Type 1 diabetes mellitus (T1DM) and both increment the danger of cardiovascular illness, objective: to estimated lipid profile in younger patients and effected of these lipids on DMT1. Methods: case control study of (75) younger patients were divided in to three groups according to HbA1C, (25) younger patients with high HbA1C (> 7.5 HbA1C) suffering from DMT1, (25) younger patients with moderate HbA1C (≤ 7.5 HbA1C) and (25) younger patients as control healthy, were with age range from 10 to 19 years who attended Changing Diabetes in Children. The younger patients were visit to clinical provides. All patients and control were from the same ethnic group (Arabic). Blood samples collected from each patients; lipid profile tests made for each blood sample to estimated Cholesterol, Triglyceride, HDL, LDL, and VLDL and compared them between study groups. Results: HbA1C, Glycemic control between groups compared and HbA1c was significantly (P = 0.001) higher in dyslipidemia group. The mean fasting blood glucose was also significantly higher in dyslipidemia group (P 0.0001). The mean differences of lipid profile (mg/dl) (Cholesterol Triglyceride, HDL, LDL, VLDL) according to study groups including (25 younger patients as Control group, younger patients with high HbA1C (> 7.5 HbA1C) suffering from DMT1, and (25) younger patients with moderate HbA1C (≤ 7.5 HbA1C) was investigated. significant differences between means of lipid profile according to study group (P 0.001). Conclusion: Adolescent patients, which have DMT1, have abnormal lipid profile level and abnormal lipoprotein building. Then after grown up glycemic control is a significant become abnormal.

Keywords: Diabetic mellitus type 1, Younger patients, Cholesterol, HbA1C, Triglyceride.

Resumen

Antecedentes: la dislipidemia y la hiperglucemia son anomalías metabólicas que se encuentran comúnmente en pacientes jóvenes con diabetes mellitus tipo 1 (DM1) y ambas aumentan el riesgo de enfermedad cardiovascular, objetivo: estimar el perfil lipídico en pacientes más jóvenes y la afectación de estos lípidos en DMT1. Métodos: estudio de casos y controles de (75) pacientes más jóvenes que se dividieron en tres grupos según la HbA1C, (25) pacientes más jóvenes con HbA1C alta (> 7,5 HbA1C) que padecían DMT1, (25) pacientes más jóvenes con HbA1C moderada (≤ 7,5 HbA1C) y (25) pacientes menores como control sanos, con rango de edad de 10 a 19 años que asistieron Cambiando Diabetes en Niños. Los pacientes más jóvenes fueron visita a proveedores clínicos. Todos los pacientes y el control eran del mismo grupo étnico (árabe). Muestras de sangre recolectadas de cada paciente; Se realizaron pruebas de perfil de lípidos para cada muestra de sangre para estimar el colesterol, los triglicéridos, HDL, LDL y VLDL y compararlos entre los grupos de estudio. Resultados: HbA1C, el control glucémico entre los grupos comparados y HbA1c fue significativamente (P = 0,001) mayor en el grupo de dislipidemia. La media de glucosa en sangre en ayunas también fue significativamente mayor en el grupo de dislipidemia (P 0,0001). Las diferencias medias del perfil lipídico (mg/dl) (triglicéridos de colesterol, HDL, LDL, VLDL) según los grupos de estudio incluidos (25 pacientes más jóvenes como grupo de control, pacientes más jóvenes con HbA1C alta (> 7,5 HbA1C) que padecen DMT1 y (25) Se investigó en pacientes más jóvenes con HbA1C moderada (≤ 7,5 HbA1C) diferencias significativas entre las medias del perfil lipídico según el grupo de estudio (P 0,001).Conclusión: Los pacientes adolescentes, que tienen DMT1, tienen un perfil lipídico anormal y una formación anormal de lipoproteínas. Luego, después de crecer, el control glucémico es un cambio significativo.

Palabras clave: Diabético mellitus tipo 1, Pacientes jóvenes, Colesterol, HbA1C, Triglicéridos.

Introduction

Diabetes mellitus is a non-irresistible sickness that has a high commonness around the world[1]. Changed degree of numerous hematological boundaries have been seen in patients with diabetes[2]. The degrees of lipids are likewise influenced in diabetes by numerous elements since sugar digestion influence lipid digestion. Diabetes is a significant risk factor for cardiovascular contagion (CVD)[3]. Patients have diabetes type 1, atherosclerosis happens prior throughout everyday life, prompting expanded bleakness and mortality contrasted and those in everyone[4]. In addition, investigations of the regular history of atherosclerosis advancement highlight a cause of the injuries in youth and pre-adulthood[5]. Lipid fixations are unequivocally identified with the risk of cardiac problems when DMT1 developed[6], patients have type 1 diabetes are documented to have a progressive danger for atherosclerotic illness[7,8]. It not known if the lipid profile "lipid fixations and lipoprotein piece" occur in adolescence they have type 1 diabetes is encourages atherogenic action when compared with nondiabetic childhood[9]. Patients with diabetes, lipoprotein relationship is additional atherogenic[10] and is knowingly distress by glycemic control[11,12]. Aim of study: To estimated lipid profile in younger patients and effected of these lipids on DMT1

Methods

Case control study done from January to June 2021, (75) patients arranged to 3 groups according HbA1C, (>7.5, ≤ 7.5 have DMT1 and normal healthy persons), with age 10-19 years old, from all take fasting blood sugar, lipid profile (Cholesterol, Triglyceride, HDL, LDL, VLDL). Statistical analysis done by SPSS version 23. Continuous variables presented as (Means ± SD). Student t-test used to compare means between two groups. ANOVA test used to compare means between three groups or more. Correlation coefficient (r) used to assess the relationship between two continuous variables. A p-value of ≤ 0.05 considered as significant.

Results

The groups of this study were divided according to HbA1C, Glycemic control between two groups compared and HbA1c was significantly (P = 0.001) higher in dyslipidemic group. The mean fasting blood glucose was also significantly higher in dyslipidemic group (P 0.0001). The different types of dyslipidemia were statistically significant while compared between good and poor glycemic control as shown in Table 1.

Table 1. Mean difference between study groups according to HbA1C.

marker	Study groups			P value
	High HbA1C > 7.5	Moderate HbA1C ≤ 7.5	Control healthy	
	Mean ± SD	Mean ± SD	Mean ± SD	
HbA1C	9.140 ± 2.0376	6.524 ± 0.2332	5.865 ± 0.4837	0.001*

In this study, the mean differences of lipid profile (mg/dl) (Cholesterol Triglyceride, HDL, LDL, VLDL) according to study groups including (25 younger patients as Control group, younger patients with high HbA1C (> 7.5 HbA1C) suffering from DMT1, and (25) younger patients with moderate HbA1C (≤ 7.5 HbA1C)) was investigated in Table 2. The results showed that there was significant differences between means of lipid profile according to study group (P 0.001). The mean of cholesterol in high HbA1C groups was increased (265.848±) when compared with Moderate HbA1C (±) and control healthy patients (172.155±19.4425). Triglyceride was increased in mean of high HbA1C (±) compared with moderate (±) and control (±). However, there were increased in mean of high HbA1C (±), (±) respectively according to HDL and LDL compared with other groups (±), (±), while decrease in VLDL (35.144±2.4850) compared with moderate HbA1C (137.264±16.7629), but increase compared with control healthy (16.295±2.3273).

The correlation between high HbA1C patients and lipid profile shown in table 3.

The correlation between moderate HbA1C patients and lipid profile were shown in table 4.

The correlation between control patients and lipid profile were shown in table 5.

Table 2. lipid profile (mg/dl) (Cholesterol Triglyceride, HDL, LDL, and VLDL) in younger patients with high HbA1C and compered with moderate HbA1C and control groups.

marker	Study groups			P value
	High HbA1C > 7.5	Moderate HbA1C ≤ 7.5	Control healthy	
	Mean ± SD	Mean ± SD	Mean ± SD	
Cholesterol (mg/dl)	265.848±12.4408	175.302±11.7579	172.155±19.4425	0.001*
Triglyceride (mg/dl)	430.068±72.2505	222.776±6.9082	129.860±11.4351	0.001*
HDL (mg/dl)	55.432±3.2290	43.372±1.1190	30.020±6.8592	0.001*
LDL (mg/dl)	126.928±10.5925	65.860±3.1595	51.455±8.8246	0.001*
VLDL (mg/dl)	35.144±2.4850	137.264±16.7629	16.295±2.3273	0.001*

Table 3. The correlation between high HbA1C patients and lipid profile

Correlations							
		Cholesterol	TG	HDL	LDL	VLDL	HbA1C
Cholesterol	Correlation	1	.179	-.239-	.098	.517**	.025
	significant		.392	.250	.642	.008	.907
TG	Correlation	.179	1	-.025-	.214	.134	.172
	significant	.392		.907	.305	.522	.411
HDL	Correlation	-.239-	-.025-	1	.029	-.178-	.352
	significant	.250	.907		.890	.395	.085
LDL	Correlation	.098	.214	.029	1	-.014-	-.020-
	significant	.642	.305	.890		.948	.926
VLDL	Correlation	.517**	.134	-.178-	-.014-	1	.010
	significant	.008	.522	.395	.948		.963
HbA1C	Correlation	.025	.172	.352	-.020-	.010	1
	significant	.907	.411	.085	.926	.963	

**. Correlation is significant ≤ 0.05.

Table 4. The correlation between moderate HbA1C patients and lipid profile

Correlations							
		Cholesterol	TG	HDL	LDL	VLDL	HbA1C
Cholesterol	Correlation	1	.088	.073	.029	.006	.047
	significant		.675	.727	.891	.977	.822
TG	Correlation	.088	1	.210	.005	.065	.257
	significant	.675		.313	.981	.759	.216
HDL	Correlation	.073	.210	1	-.044-	.123	-.117-
	significant	.727	.313		.836	.557	.577
LDL	Correlation	.029	.005	-.044-	1	.107	.427*
	significant	.891	.981	.836		.610	.033
VLDL	Correlation	.006	.065	.123	.107	1	.205
	significant	.977	.759	.557	.610		.325
HbA1C	Correlation	.047	.257	-.117-	.427*	.205	1
	significant	.822	.216	.577	.033	.325	

*. Correlation is significant ≤ 0.05.

Table 5. The correlation between control patients and lipid profile

Correlations							
		Cholesterol	TG	HDL	LDL	VLDL	HbA1C
Cholesterol	Correlation	1	.247	.128	-.135-	.269	.135
	significant		.234	.541	.519	.194	.520
TG	Correlation	.247	1	.110	-.230-	.062	-.016-
	significant	.234		.602	.270	.770	.939
HDL	Correlation	.128	.110	1	.131	.019	-.212-
	significant	.541	.602		.532	.928	.310
LDL	Correlation	-.135-	-.230-	.131	1	.016	-.002-
	significant	.519	.270	.532		.941	.991
VLDL	Correlation	.269	.062	.019	.016	1	.176
	significant	.194	.770	.928	.941		.400
HbA1C	Correlation	.135	-.016-	-.212-	-.002-	.176	1
	significant	.520	.939	.310	.991	.400	

*. Correlation is significant ≤ 0.05.

Discussion

In this study, the cholesterol, TG, HDL, LDL was increase in younger patients with DMT1 similar to results of[13] and decrease in VLDL as results of[14]. The pervasiveness of dyslipidemia in youngsters with T1DM fluctuates somewhere in the range of 29% and 66% in investigations from various countries[15]. The wide scope of commonness in different examinations might be because of numerous hereditary variables in various ethnic gatherings. The fundamental problem was hypertriglyceridemia in our examination. This finding is in harmony with the different studies[16], however the most regular dyslipidemia was high LDL in different studies[17]. Younger patients with type 1 diabetes and perfect HbA1c levels have less atherogenic "HDL cholesterol, fatty material, fatty/HDL amount"[18]. Similarly, childhood with type 1 diabetes and atypical glycemic control have better lipid levels and ubiquity of lipid anomalies[19]. Childhood with type 1 diabetes have general raised lipoprotein and great LDL than nondiabetic childhood, and unusual glycemic control[20,21]. Our awareness that adolescent with type 1 diabetes and perfect glycemic control have a fewer atherogenic lipid profile[22,23]. Nevertheless, the deficiency of uncommon lipid levels does not exclude the accidental of compositional changes that might be atherogenic, chiefly among those with poor glycemic control[24,25]. Critically, the evidently ordinary serum cholesterol fixations habitually saw in T1DM shroud an atherogenic lipid profile, with expanded transitional thickness lipoprotein and little thick low-thickness lipoprotein (sdLDL), and useless high-thickness lipoprotein (HDL)[26]. HDL cholesterol levels are frequently ordinary or even high except if glycaemic control is poor or nephropathy has created Hypertriglyceridaemia may likewise happen, and the danger related with it is more grounded than in everybody[27]. LDL molecule size, its glycation and oxidation are completely connected with endothelial brokenness and CVD[28]. sdLDL enters the blood vessel divider more effectively than enormous light LDL, is more helpless to oxidative pressure, has a delayed plasma half-life and has a decreased restricting fondness for LDL receptors[29]. These attributes would all be required to add to expanded atherogenicity. There is impressive proof involving lipid peroxidation and oxidative alteration of LDL in atherosclerotic sore turn of events[30], yet non-enzymatic glycation of LDL might be comparably significant. sdLDL is more promptly glycated than bigger more light LDL both in vivo and in vitro, potentially on the grounds that a higher extent of the apolipoprotein B (apoB) particle is presented to glucose[31].

Conclusions

Adolescent patients, which have DMT1, have abnormal lipid profile level and abnormal lipoprotein building. Then after grown up glycemic control is a significant become abnormal.

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