Comparative effect of Metformin and Glibenclamide on Lipid profile in type 2 Diabetic Patients

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Abstract

To evaluate and to compare the effect of metformin and glibenclamide therapy on lipid profile in type 2 diabetic patients. Cases comparative study. Al-wafaa center of Diabetes Management and Research in Mosul, during the period of 10th march 2010 and at the end of September 2010. Forty newly diagnosed diabetic patients participated in this study. Fasting blood sugar (FBS), and lipid profile were measured in the studied groups. lipid profile were repeated after 3 months of starting therapy. There were non significant improvement in lipid profile in the group received metformin, but a significant reduction in total cholesterol (TC), (P. value = 0.008) ,and low-density lipoprotein cholesterol (LDL-C) (P. value = 0.003) in the group received glibenclamide. Metformin could produce a non-significant favorable effect on all lipids profile parameters, while glibenclamide showed a significant reduction in TC and LDL-C

مقارنة فعالية عقاري الميتفورمين والكلبنكلامايد على هيئة الدهون لدى مرضى السكري النمط الثاني.

قاسم صالح عبدالله النعيمي

المستخلص

تمّ إجراء الدراسة على ٤٠ مريضاً حديثي التشخيص مصابين بداء السكري النمط الثاني ، تمّ تقسيمهم إلى مجموعتين،عشرون مريضاً لكل مجموعة، وتشمل مجموعة المرضى المعالجين بعقار الميتفورمين ومجموعة تشمل المرضى المعالجين بعقار الكليبنكلامايد . تتضمن المقاييس التي تمت دراستها: نسبة سكرالدم على الريق و مستوى الدهون. أظهرت حصيلة المعلومات من هذه الدراسة أن عقار الميتفورمين له تأثيرايجابي ولكن غيرمعنوي احصائيا على مستوى الدهون ، بينما كان تاثير عقارالكليبنكلامايد معنوي احصائيا على مستوى الكلسترول الكلي و الدهنيات ذات الكفائة الواطئ .

Introduction

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction and failure of various organs (1). Diabetes mellitus is a major public health problem in the developed as well as developing countries. It is ranked seventh among the leading causes of death, and third when all its fatal complications are taken into account (2). Dyslipidemia in addition to hyperglycemia has been thought to be a major risk factor for the development and progression of diabetic complications (3). Lipids are now believed to have a direct role in the pathogenesis of chronic kidney disease (CKD), and therefore probably contribute to the high risk of cardiovascular morbidity and mortality(4). The lipid profile of individuals with DM have been characterized to have higher plasma concentrations of very low density lipoprotein cholesterol (VLDL-C), low-density lipoprotein cholesterol (LDL-C), intermediate-density lipoprotein cholesterol, and triglycerides but lower levels of HDL-C, the mentioned lipid profile has been termed "diabetic dyslipidemia"(5). pidemiological surveys had shown that total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), triglyceride and high-density lipoprotein cholesterol (HDL-C) levels were useful in the assessment of cardiovascular risk in diabetic patients. Dyslipidemia is strongly associated with the glycemic control in which, TC, LDL-C, triglyceride and HDL-C levels are usually normal if glycemic control is adequate. Therefore, it is imperative to correct the glycemic status and dyslipidemia in order to reduce the morbidity and mortality rate due to cardiovascular complications (6). Efforts are continuously underway to find effective methods to treat diabetes , to slow and prevent its complications. Finding new or alternative routes to improve the overall health of diabetics is becoming more important as the prevalence of this disease, particularly the type 2(7). An ideal oral treatment for diabetes would be a drug that not only controls the glycemic level but also prevents the development of atherosclerosis and other complications of diabetes. Unfortunately, among the currently available drugs, the choice is very limited (2). Accordingly the aim of the present study is to evaluate the effect of glibenclamide and metformin on lipid profile in type 2 diabetic patients.

Subjects and methods

The study had approval from college of medicine ,department of pharmacology and performed during the period of 10th march 2010 and to the end of September 2010. Forty newly diagnosed cases of type 2 diabetes mellitus their age range between 45-56 years enrolled in this study, the patients were divided into two groups, every group consists of twenty patients and matched for age and sex. Group one was treated with (Metformin) Metforal manufactured by Menarini International Company , Florence- Italy. 500mg twice daily , and group two was treated with (Glibenclamide) Glibesyn manufactured by Medochemie LTD Company, Limassol- Cyprus Europe, 5mg twice daily, both groups were followed for three months, and were subjected to measurement of Fasting Blood Sugar (FBS), Total cholesterol (TC), Triglycerides (TG), High density cholesterol (HDL-C), and Low density cholesterol (LDL-C). Lipid profile

were repeated after 3 months of therapy. Paired t-test was used to compare the results of various parameters among the studied groups. All values were expressed as Mean ±SD and P value of <0.05 was considered to be statistically significant.

Results

Table (1) shows the fasting blood sugar of the studied groups, there is no significant difference between the two groups. Table (2) shows the changes in the lipid profile in both groups , there are non significant improvement in lipid profile in the group received metformin, and a significant reduction in total cholesterol (TC), and low-density lipoprotein cholesterol (LDL-C) in the other group, P. value : 0.008 and 0.003 respectively.

Table (1):- Fasting blood sugar of the studied groups

Parameter mmol/l	Metformin group N=20	Glibenclamide group N=20	P. value
FBS	8.92 ± 2.13	9.64 ± 2.38	0.317

Table (2):- The lipid profile in the both groups on baseline and after 3 months of therapy

Group	Parameters	Baseline	After 3 months	P. value
Metformin 500mg.twice daily	TC (mmol/L)	5.61 ± 1.46	5.04 ± 1.35	0.137
	TG (mmol/L)	2.32 ± 1.05	1.82 ± 0.86	0.062
	HDL(mmol/L)	1.21 ± 0.43	1.35 ± 0.59	0.310
	LDL(mmol/L)	3.35 ± 1.19	2.83 ± 1.17	0.105
Glibenclamide 5mg. twice daily	TC (mmol/L)	5.68 ± 1.05	5.10 ± 0.85	**0.008**
	TG (mmol/L)	2.21 ± 0.88	1.78 ± 1.01	0.068
	HDL(mmol/L)	1.30 ± 0.30	1.62 ± 0.49	0.036
	LDL (mmol/L)	3.36 ± 0.88	2.70 ± 0.90	**0.003**

Discussion

Treatment of DM must include pharmacological agents that are able to improve not only glycemic levels, but also blood pressure (BP), lipid levels, and body weight (8). The need for strict glycemic control in order to avoid or postpone the development of late complications in patients with type 2 diabetes mellitus (DM2) has been well established (9). Diabetes mellitus does not mean glycemic alterations alone since this disease is associated with cardiovascular risk factors such as dyslipidemia, systemic arterial hypertension , and obesity (10). As metformin was proved to be effective in reducing insulin resistance , several studies were undertaken to assess its effects on total cholesterol (TC), triglycerides (TG), and HDL-cholesterol (HDL-C) levels(11). However, there is no consensus about its beneficial effects on these parameters (12). The literature shows discrepant results about the influence of metformin on lipid profile . Some studies reported reduction only in TC levels (13), while others reported reduction of TC and TG with an increase of HDL-C (14). However other studies showed no changes in lipid profile (15). Another investigation showed an association of metformin with an improvement in the lipid profile even in non-diabetic patients(16). Santana et., al (17) have shown that treatment with metformin increased HDL level while serum total cholesterol and LDL levels reduced. However, analysis of 29 trials failed to demonstrate significant elevation in HDL levels with metformin (12). In our study there was an improvement in all lipid profile parameters by metformin therapy , but the improvement did not reach statistical significance ,could be due to the duration of follow-up and the number of patients included in this study, while in the group received the glinenclamide therapy, there were improvement in the lipid profile ,and specially a significant reduction in total cholesterol (TC), and low-density lipoprotein cholesterol (LDLC). Review of literatures provided limited information about the effect of glibenclamide on lipid profile in type 2 diabetic patients, although some studies demonstrated modest improvement in the lipid profile, the change with sulfonylurea therapy did not reach statistical significance (18).

Conclusion

Metformin produces a non-significant favorable effect on all lipids profile parameters, while glibenclamide shows a significant reduction in TC and LDL-C , and a non significant improvement on the others parameters.

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