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To Study the effect of Glibenclamide on biochemical profile of type 2 Diabetes Mellitus patients.

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ABSTRACT

Glibenclamide is a second-generation sulfonylurea that reduces blood glucose by increasing insulin secretion from pancreatic beta cells. It undergoes significant hepatic metabolism and renal and biliary excretion[3]. It has a long duration of action and metabolites with hypoglycemic activity that confer an increased risk of prolonged hypoglycemia[4]. Glibenclamide-induced hypoglycemia is more likely in the elderly, in patients with irregular eating habits, and in renal impairment[5]. We carried out this study to investigate the alterations in biochemical profile of type 2 diabetes mellites patients. In this record based observational study total 75 clinically diagnosed patients with type 2 diabetes mellitus were studied from Medicine OPD of Grant Govt. Medical College and Sir J.J. Group of Hospital, Mumbai in the time period of January 2017 to March 2017.The sample were drawn as per inclusion and exclusion criteria. Data was collected with the help of predesigned and pretested proforma. Data was entered in Microsoft excel 2010 and analysis was done with Open EPI- Info Version 3.01. In this study there was 38.26 % decrease in fasting blood glucose level and 21.68 % decrease in post prandial blood glucose levels with glibenclamide after 90 days. There was significant reduction in fasting, post prandial blood glucose levels and Serum Triglycerides in treated patients when compared with zero level values (before treatment). High density lipoprotein also shown significant increase. The insignificant decrease was observed with Glibenclamide therapy in Serum total cholesterol, Low density lipoproteins, Very low density lipoproteins.The present study, the Glibenclamide was found more effective in lowering both fasting and post prandial blood glucose levels in the patients of type 2 diabetes mellitus, showing cardio protective properties and also helps to reduce cholesterol by increasing High density lipoprotein.

Keywords: Type 2 Diabetes Mellitus, Glibenclamide, Biochemical Profile.

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INTRODUCTION

Good quality medicines are a prerequisite for a successful treatment. Drug quality is currently receiving a growing international attention. Over the past decade, there has been an increase in public awareness of the existence of counterfeit and substandard drugs which have been increasingly reported in developing countries where drug regulations are less effective or totally absent. Use of poor-quality products may lead to therapeutic failure, increased morbidity and mortality, erosion of public confidence in health care, unexpected side effects, and antimicrobial resistance [1].

Diabetes mellitus is a multifactorial disease, where complications and treatment of this lifestyle disease is under dispute. Current treatment for this metabolic disorder is focussed only to regulate the blood glucose level when it is abnormally increased. It is carried out either by controlling the mechanism of insulin release from the existing beta cells or via sensitization of insulin receptors [2]. Glibenclamide is a second-generation sulfonylurea that reduces blood glucose by increasing insulin secretion from pancreatic beta cells. It undergoes significant hepatic metabolism and renal and biliary excretion [3]. It has a long duration of action and metabolites with hypoglycemic activity that confer an increased risk of prolonged hypoglycemia [4]. Glibenclamide-induced hypoglycemia is more likely in the elderly, in patients with irregular eating habits, and in renal impairment [5]. Glibenclamide has contentious cardiovascular effects, including effects on ischemic preconditioning and blunting of ST elevation in acute coronary syndromes [6].

Insulin is not only responsible for helping glucose to enter into the cells, but it also helps fat get into fat cells for storage. Without the ability for the fat and sugar to enter the cells, it builds up in the blood leading to hyperlipidemia (high blood lipids) and hyperglycemia (high blood sugar). Glibenclamide has demonstrated lipid profile lowering efficacy in type 2 diabetic patients [7].

We carried out this study to investigate the alterations in biochemical profile of type 2 diabetes mellites patients.

MATERIALS AND METHODOLOGY

Study design: Hospital based follow up study.

Study setting: Medicine OPD of Grant Govt. Medical College and Sir J.J. Group of Hospital, Mumbai.

Ethical consideration: Ethical clearance obtained from institutional ethical committee**.**

Study duration: January 2017 to March 2017**.**

Sample size: 75 type 2 diabetic mellites patients**.**

Inclusion criteria

- Newly diagnosed Type 2 diabetes mellites patients**.**
- Patients on Glibenclamide 5mg medication.
- Age group 30 to 60 years.

Exclusion criteria

- Patients not willing to participate in the study.
- Patients with other comorbidities.

Sampling technique: Simple random sampling was used to include study samples.

Data collection: Predesigned and pretested proforma was used with respect to inclusion exclusion criteria for data collection.

Procedure: Biochemical parameters were performed by standard methods using internationally accepted techniques. Venous blood samples (10 ml from each patient) were collected into fluoride, plain

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and heparin bulbs. The samples were centrifuged at 3000 rpm for 10 minutes and plasma/serum was separated. Fluoride plasma was used for Glucose estimation. Serum was used for lipid profile, insulin, and other biochemical tests. 75 patients had their baseline, fasting and postprandial blood sugars, and lipid profiles done. They were advised to repeat their plasma glucose every three weeks and report for follow-up. Zero day readings were compared with 90th day reading. They were educated regarding hypoglycaemia and were to report it telephonically if they experienced it before their follow-up date. Fasting and postprandial plasma glucose level and biochemical measures of safety, including chemistry tests lipid profile (TC, TG, HDL), were performed at 3-week intervals throughout the study. Self-monitoring of blood glucose level was encouraged. Determination of blood glucose, lipids and lipoproteins Fasting blood glucose was determined by capillary blood with the Accutrend blood glucose (Boehringer Mannheim, Germany). Serum total cholesterol, triglycerides and high-density lipoprotein cholesterol were measured by the enzymatic colorimetric method by using kits Spinreact, S.A. Spain. Low-density lipoprotein cholesterol was calculated according to the Friedwald [8] and very-low-density lipoprotein cholesterol according to formula proposed [9].

Data compilation and analysis: Data compilation was done using Microsoft excel 2010 and analysis was done with Open EPI- Info Version 3.01updated on 2013/04/06. Mean ± SD and Percentage were used to describe data appropriately. P values were considered significant when <0.05.

RESULTS

In the present study the effect of Glibenclamide in 75 patients with type 2 diabetic mellitus were studied. Data collected was represented in tabular / graphical presentation.

Table 1/ Figure 1: Percentage decrease in fasting and post prandial blood glucose of diabetic Patients with Glibenclamide after 90 days of treatment.

Drug	Decrease in fasting blood glucose (Mg/dl) after 90 days	Decrease in post prandial blood glucose (Mg/dl) after 90 days
Glibenclamide	38.26 %	21.68 %

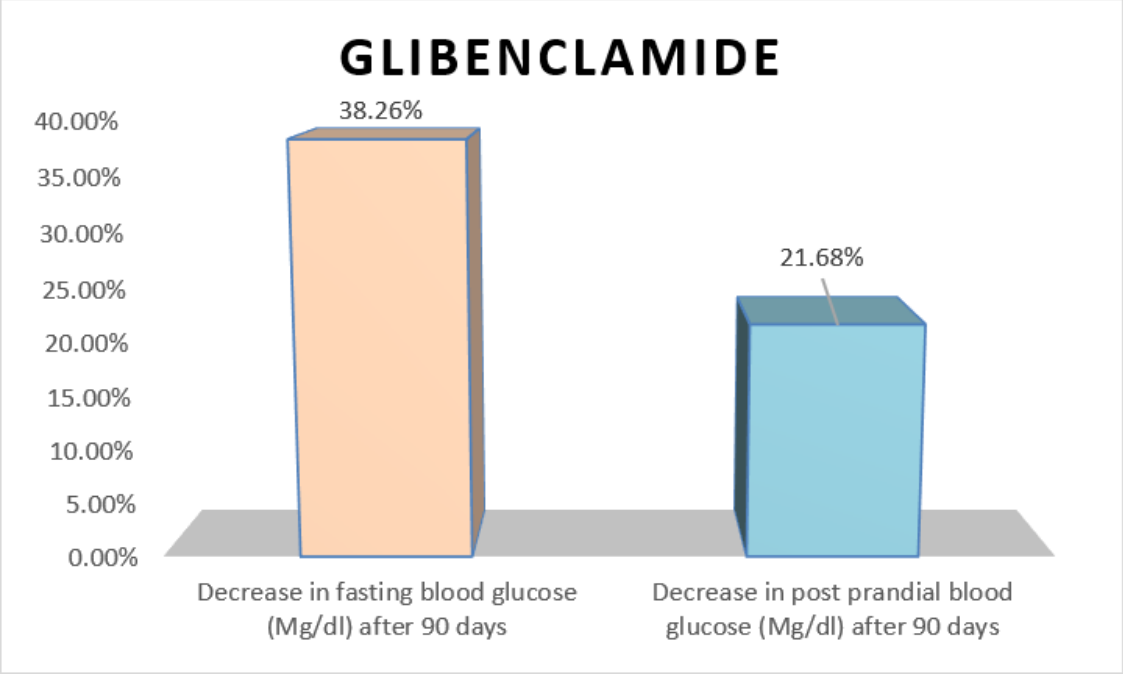

Table 1/ Figure 1 shows that there was 38.26 % decrease in fasting blood glucose level and 21.68 % decrease in post prandial blood glucose levels with glibenclamide after 90 days.

Table 2: Effect of Glibenclamide on following Biochemical Parameters.

Parameters	At day 0	At day 90	P value
Fasting blood glucose(mg/dl)	222.11±9.59	137.12±9.66	<0.05
2 hr post prandial glucose (mg/dl)	257.34±3.49	201.54±5.19	<0.05
Serum total cholesterol(mg/dl)	217.44±8.31	201.77±6.06	N.S
Serum Triglycerides (mg/dl)	188.69±5.64	168.31±5.61<0.05	<0.05
High density lipoprotein (mg/dl)	33.37±1.90	41.61±1.44	<0.05
Low density lipoproteins(mg/dl)	141.97±3.96	125.75±4.19	N.S.
Very low density lioprotiens(mg/dl)	37.04±3.10	33.15±1.41	N.S.

Table 2 shows effect of glibenclamide on different biochemical parameters. There was significant reduction in fasting, post prandial blood glucose levels and Serum Triglycerides in treated patients when compared with zero level values (before treatment). High density lipoprotein also shown significant increase. The insignificant decrease was observed with Glibenclamide therapy in Serum total cholesterol, Low density lipoproteins, very low-density lipoproteins.

DISCUSSION

Glibenclamide showed significant reduction in fasting and postprandial blood glucose after 4 and 8 weeks of treatment. This result is in agreement with the observation of Kolterman et.al 1984[11] and Rosak et.al 2002 [10] who found that glibenclamide significantly reduced blood glucose levels. Glibenclamide have the mechanism of action in lowering blood glucose. Like Sulfonylureas, acts by linide stimulating the release of insulin from the B cell of the pancreas by inhibiting ATP sensitive K channels, thereby activating the Ca++ channel with increase in intracellular calcium to release insulin [11].

Lipids and lipoprotein particles crucially contribute to atherosclerosis as underlying pathology of cardiovascular disease. High cholesterol with increased risk of cardiovascular events was related mainly to low-density lipoprotein. In contrast, high-density lipoprotein was shown to be inversely correlated to mortality from coronary heart disease [12]. Regarding lipid profile in type 2 diabetic patients treated with glibenclamide, these results were supported by Rosak et al study, where lipid profile changes as a result of improved glycaemic control are uniform findings associated with anti- diabetic therapy [10].

However, we attempted to study of the effect of Glibenclamide on lipids in type 2 diabetic patients with Glibenclamide significantly (<0.05) increased the high density lipoprotein cholesterol concentration. Similarly, Tamai et al [13] found no significant change in very low density lipoprotein cholesterol during Glibenclamide therapy. Although we observed a non-significant reduction in low density lipoprotein in Type 2 diabetes mellites patients**.** Clinically Glibenclamide was well tolerated. No gastrointestinal complains and no skin rashes or other side effects were noted or reported in the present study over 90 days treatment.

The purpose of present study was to provide the importance of effect of Glibenclamide drug in their mediation of biologic effect or on lipid and lipoprotein metabolism. However, in view of these observations, we do fell that we can safely say that Glibenclamide treatment did not have an adverse effect on either low-density lipoprotein or high-density lipoprotein metabolism.

CONCLUSION

The present study, the Glibenclamide was found more effective in lowering both fasting and post prandial blood glucose levels in the patients of type 2 diabetes mellitus, showing cardio protective properties and also helps to reduce cholesterol by increasing High density lipoprotein.

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