Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr ICV 2018= 82.06 UGC approved journal no. 63854

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

A comparative study of glimepiride plus metformin versus glibenclamide plus metformin in diabetes mellitus patients

Pratibha Lavania

Assistant Professor Department of Pharmacology, Major S D Singh Medical College, Uttar Pradesh, India

ABSTRACT:)

Background: The present study was conducted to compare the efficacy of glimepiride plus metformin versus glibenclamide plus metformin in patients with type 2 diabetes mellitus patients. **Materials & Methods:** The present study was conducted on 180 patients of type 2 diabetes mellitus. All were divided into 2 groups of 90 patients each. Group I received combination of glimepiride plus metformin and group II received combination of glibenclamide plus metformin. All were subjected to estimation of fasting plasma glucose, post prandial glucose and BMI before the treatment and 3 and 6 months after treatment. **Results:** Mean blood glucose level (mg/dl) in group I before treatment was 182.4 and in group II was 178.2, after 3 months was 132.9 in group I and 120.6 in group II, at 6th month was 108.1 and 118.5 in group I and group II respectively. The difference between groups was non- significant (P> 0.05). Mean post prandial blood glucose level (mg/dl) in group I before treatment was 230.4 and in group II was 221.7, after 3 months was 170.2 in group I and 164.5 in group II, at 6th month was 148.3 and 134.7 in group I and group II respectively. The difference between groups was significant (P< 0.05). **Conclusion:** Authors found that both combination of glimepiride plus metformin and glibenclamide plus metformin found to be equally effective in patients with type 2 diabetes mellitus.

Key words: Diabetes mellitus, Glucose, Metformin

Received: 15 November 2018 Revised: 27 December 2018 Accepted: 28 December 2018

Corresponding author: Dr. Pratibha Lavania, Assistant Professor Department of Pharmacology, Major S D Singh Medical College, Uttar Pradesh, India

This article may be cited as: Lavania P. A comparative study of glimepiride plus metformin versus glibenclamide plus metformin in diabetes mellitus patients. J Adv Med Dent Scie Res 2019;7(2): 157-160.

INTRODUCTION

Diabetes mellitus is a chronic condition and is characterized by hyperglycemia resulting from defect in insulin secretion, insulin action or both. Insulin resistance occurs early in type 2 diabetes disease process and may lead to progressive beta cell failure and overt diabetes. Due to this the amount of glucose in the blood increases and leads to hyperglycemia. It is of type 1 and type 2. Type 2 diabetes mellitus is the most common form of diabetes comprising of 90% to 95% of all diabetes cases.[1]

Sulfonylureas aim to reduce diabetes associated hyperglycemia by acting on the pancreatic beta-cell channels (ATP-K channel) to facilitate insulin secretion.[2] As compared to glipizide or glimepiride, glibenclamide has a higher affinity for pancreatic beta-cell SFU receptors, greater propensity for accumulation of active metabolites and greater penetration of pancreatic tissue.

Glibenclamide can also increase insulin sensitivity greater than other SFUs, particularly when compared to gliclazide.[3] Glimepiride is considered as a third-generation sulfonylurea agent—has several beneficial pharmacological effects over glibenclamide, a second-generation sulfonylurea. Glimepiride combined with metformin in a single dose presentation has proved to be effective and safe for type 2 diabetes patients who fail with monotherapy on oral antidiabetic agents.[4] The present study was conducted to compare the efficacy of glimepiride plus metformin versus glibenclamide plus metformin in patients with type 2 diabetes mellitus patients.

MATERIALS & METHODS

The present study was conducted in the department of Pharmacology. It comprised of 180 patients of type 2 diabetes mellitus. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained prior to the study.

General information such as name, age, gender etc. was recorded. All were divided into 2 groups of 90 patients each. Group I received combination of glimepiride plus metformin and group II received combination of glibenclamide plus metformin. All were subjected to estimation of fasting plasma glucose, post prandial glucose and BMI before the treatment and 3 and 6 months after treatment. Results were recorded and compared. P value less than 0.05 was considered significant (P< 0.05).

RESULTS

Table I Fasting blood glucose level in both groups

Blood glucose level	Group I	Group II	P value
Before treatment	182.4	178.2	0.09
At 3rd month	132.9	120.6	
At 6th month	108.1	118.5	

We found that mean blood glucose level (mg/dl) in group I before treatment was 182.4 and in group II was 178.2, after 3 months was 132.9 in group I and 120.6 in group II, at 6th month was 108.1 and 118.5 in group I and group II respectively. The difference between groups was non- significant (P> 0.05).

Graph I Fasting blood glucose level in both groups

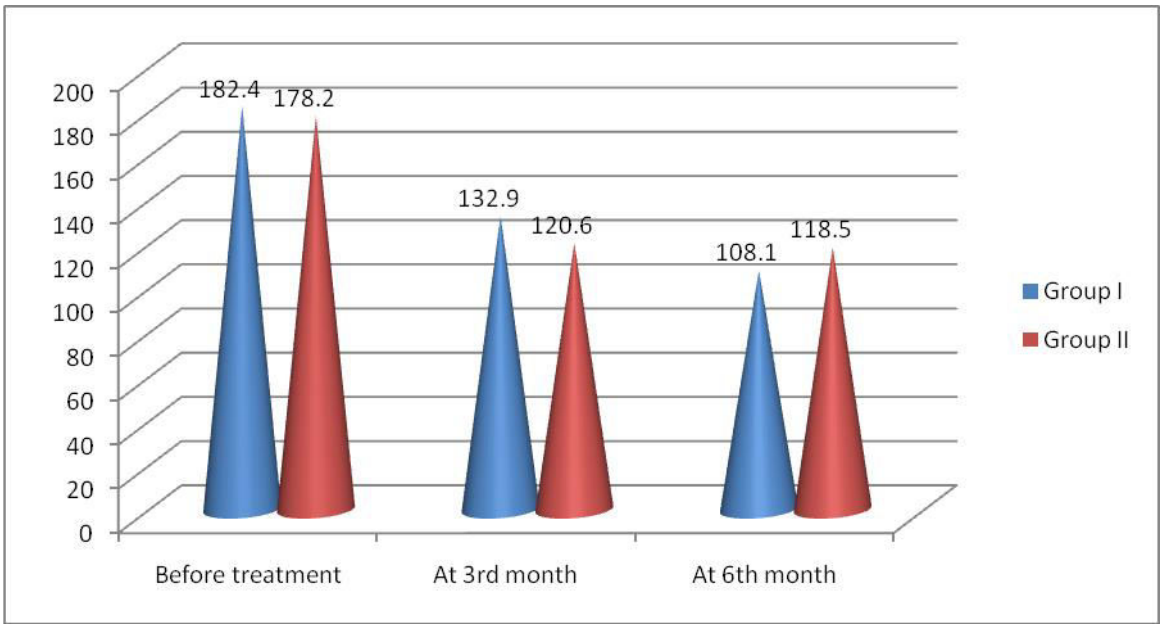
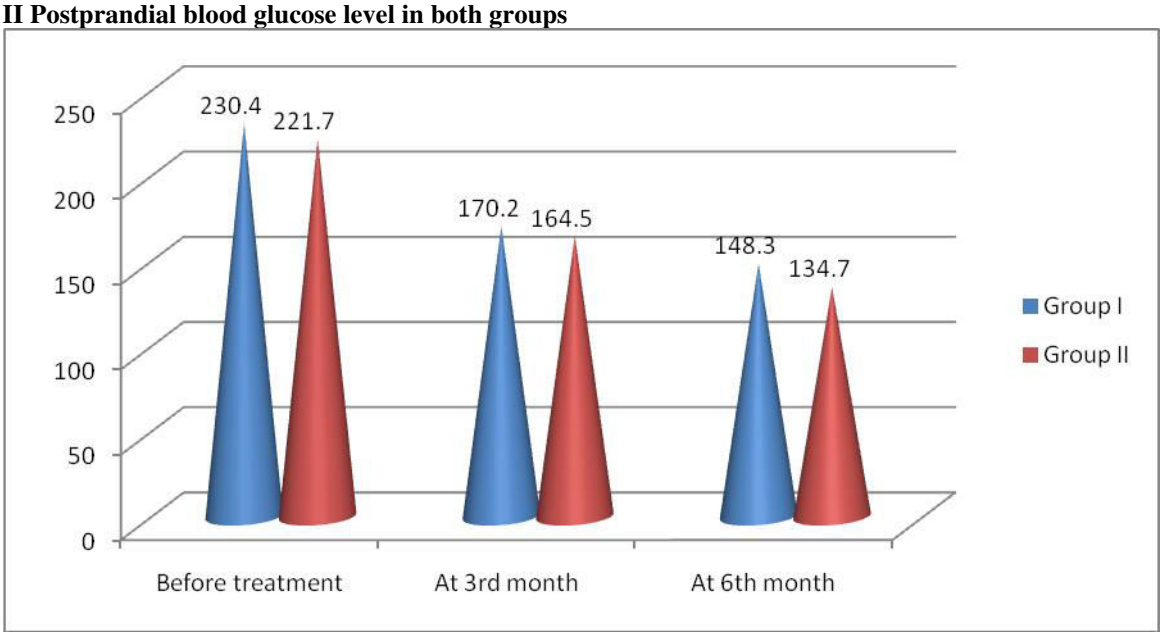


Table II Postprandial blood glucose level in both groups

Blood glucose level	Group I	Group II	P value
Before treatment	230.4	221.7	0.01
At 3rd month	170.2	164.5	
At 6th month	148.3	134.7	

Table II shows that mean post prandial blood glucose level (mg/dl) in group I before treatment was 230.4 and in group II was 221.7, after 3 months was 170.2 in group I and 164.5 in group II, at 6th month was 148.3 and 134.7 in group I and group II respectively. The difference between groups was significant (P< 0.05).

Graph II Postprandial blood glucose level in both groups



DISCUSSION

It has been clearly demonstrated that when the therapeutic treatment goals for diabetes are not reached, early progression to combination therapy can maintain adequate control of blood glucose in comparison to that achieved with single agent therapy.[5] Metformin is the first-line treatment for type 2 diabetes mellitus patients.[6] The mechanism of action of metformin and other biguanides is not completely understood, but recent in vitro and in vivo studies suggest that metformin may act in part by both increasing the binding of insulin to its receptor and potentiating insulin action.[7] The present study was conducted to compare the efficacy of glimepiride plus metformin versus glibenclamide plus metformin in patients with type 2 diabetes mellitus patients.

In this study, the mean blood glucose level (mg/dl) in group I before treatment was 182.4 and in group II was 178.2, after 3 months was 132.9 in group I and 120.6 in group II, at 6th month was 108.1 and 118.5 in group I and group II respectively. The mean post prandial blood glucose level (mg/dl) in group I before treatment was 230.4 and in group II was 221.7, after 3 months was 170.2 in group I and 164.5 in group II, at 6th month was 148.3 and 134.7 in group I and group II respectively. The difference between groups was significant (P< 0.05).

Glimepride is very effective in to stimulate insulin action through extrapancreatic effects that affect insulin-receptor binding and enhance tissue responsiveness to insulin; to favorably influence the principal pathophysiologic abnormalities, defective secretory dynamics, and target-cell resistance to insulin observed in noninsulin-dependent diabetes. Glibenclamide is one of the sulfonylureas widely used in the management of diabetes mellitus. It acts by stimulating insulin secretion by pancrease. In present study, we compared the efficacy of glimepiride plus metformin versus glibenclamide plus metformin in patients with type 2 diabetes mellitus patients.[8]

Mûller et al[9], in their study included 96 type 2 diabetic patients in which 52 patients were taking glimepiride plus metformin (group A) and 44 patients were taking glibenclamide plus metformin (group B). After 6 months of treatment the HbA1C value decreased more significantly in group A (1.6%) than group B (1.29%), PPBS and cholesterol level also reduced more significantly in group A patients. But FBS value was more significantly reduced in group B patients. Glimepiride plus metformin combination therapy can be considered as the best combination in patients with increased glycaemic control as compared to glibenclamide plus metformin therapy.

González-Ortiz et al[10] performed a study in 152 uncontrolled type 2 diabetic patients. Serum fasting and postprandial glucose, hemoglobin A1c (A1C), high-density lipoprotein cholesterol, and triglycerides were measured. Each study group included 76 patients. No significant differences in basal clinical and laboratory characteristics between groups were found. At the end of the study, A1C concentration was significantly lower in the glimepiride/metformin group (P=.025). A higher proportion of patients from the glimepiride group (44.6% vs. 26.8%) reached the goal of A1C b7% at 12 months of treatment. A higher proportion of hypoglycemic events were observed in the glibenclamide group (28.9% vs. 17.1%).

CONCLUSION

Authors found that both combination of glimepiride plus metformin and glibenclamide plus metformin found to be equally effective in patients with type 2 diabetes mellitus.

REFERENCES

1. Kobayashi, K.A., et al., Glipizide pharmacokinetics in young and elderly volunteers. Clin Pharm, 2008; 7(3): 224-8.
2. Kradjan, W.A., et al., Glipizide pharmacokinetics: effects of age, diabetes, and multiple dosing. J Clin Pharmacol, 1999; 29(12): 1121-7.
3. Diagnosis and classification of diabetes mellitus, American diabetes association, Diabetes care. 2001; 27 (1): 5- 10.
4. ICMR Guideline for management in of type 2 diabetes. Non pharmacological management of diabetes, 2005: 1-07.
5. Schwinghammer, T.L., et al., Pharmacokinetics and pharmacodynamics of glimepride in young and elderly nondiabetic adults. Clin Pharm 2001; 10(7): 532-8.
6. Burge, M.R., et al., A prospective trial of risk factors for sulfonylurea-induced hypoglycemia in type 2 diabetes mellitus. JAMA, 1998. 279(2): 137-43.
7. Raju, A.J., R.E. Ferner, and C.J. Bailey, Comparative tolerability profiles of oral antidiabetic agents. Drug Saf, 1994; 11(4): 223-41.
8. Siva Kumar., B.E. Wiholm, and F. Lithner, Glibenclamide-associated hypoglycaemia: A report on 57 cases. Diabetologia, 2003. 24(6): 412-7.
9. Mûller, G., Satoh, Y., & Geisen, K. Extrapancreatic effects of sulfonylureas—A comparison between glimepiride and conventional sulfonylureas. Diabetes Research and Clinical Practice 1995; 115−137.
10. González-Ortiz M, Guerrero-Romero JF, Violante-Ortiz R et al. Efficacy of glimepiride/metformin combination versus glibenclamide/metformin in patients with uncontrolled type 2 diabetes mellitus. Journal of Diabetes and its Complications. 2009 Nov 1;23(6):376-9.