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

ORIGINAL ARTICLE

Efficacy of combination of Glimepiride plus Metformin versus Glibenclamide plus Metformin in patients with type 2 Diabetes Mellitus- A Comparative Study

Vinita Bharti

Assistant Professor, Department of Pharmacology, Integral Institute of Medical Science & Research Lucknow, U.P., India

ABSTRACT:
Background: Diabetes mellitus is a chronic condition and is characterized by hyperglycemia resulting from defect in insulin secretion, insulin action or both. 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 280 patients (males- 150, females- 130) of type 2 diabetes mellitus. All were divided into 2 groups of 140 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 HbA1C, fasting plasma glucose, post prandial glucose and BMI before the treatment and 3 and 6 months after treatment. **Results:** Mean age in group I patients was 45.2 years and in group II was 46.3 years. Duration of illness was 12.5 years in group I and 16.7 years in group II. Mean blood glucose level (mg/dl) in group I before treatment was 180.4 and in group II was 176.2, after 3 months was 130.8 in group I and 128.4 in group II, at 6th month was 106.2 and 110.2 in group I and group II respectively. The difference between groups was non- significant (P> 0.05) while within the group was significant (P< 0.05). Mean post prandial blood glucose level (mg/dl) in group I before treatment was 224.4 and in group II was 228.2, after 3 months was 171.2 in group I and 168.4 in group II, at 6th month was 142.2 and 138.2 in group I and group II respectively. The difference between groups was non- significant (P> 0.05) while within the group was significant (P< 0.05). HbA_1C level % was 8.1 in group I and 8.2 in group before treatment, 7.2 and 7.4 after 3 months and 6.5 and 6.1 after 6 months in group I and group II respectively. The difference was significant (P< 0.05). **Conclusion:** 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, Glimepiride, Glibenclamide, Metformin

Corresponding author: Dr. Vinita Bharti, Assistant Professor, Department of Pharmacology, Integral Institute of Medical Science & Research Lucknow, U.P., India

This article may be cited as: Bharti V. Efficacy of combination of Glimepiride plus Metformin versus Glibenclamide plus Metformin in patients with type 2 Diabetes Mellitus- A Comparative Study. J Adv Med Dent Scie Res 2014;2(4):184-186.

INTRODUCTION

Diabetes mellitus is a chronic condition and is characterized by hyperglycemia resulting from defect in insulin secretion, insulin action or both. 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]

Diabetes is a chronic condition that requires continues medication and life style modification to prevent acute complication and to reduce long term complications. Blood sugar level cannot be controlled as β-cell function worses over time, independent of whether the treatment was diet alone, sulfonyl urea, metformin, or insulin.[2]

Sulfonylureas aim to reduce diabetes associated hyperglycemia by acting on the pancreatic beta-cell channels (ATP-K channel) to facilitate insulin secretion. All sulfonylureas are hepatically metabolized and renally cleared, therefore, are subject to slower elimination in the elderly due to the age-associated decrease in renal function. 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. These factors combined with the long half-life, can lead to increased insulin release for longer periods after cessation of the medication, especially in decreased renal functions, as can be case in the elderly.[3] 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

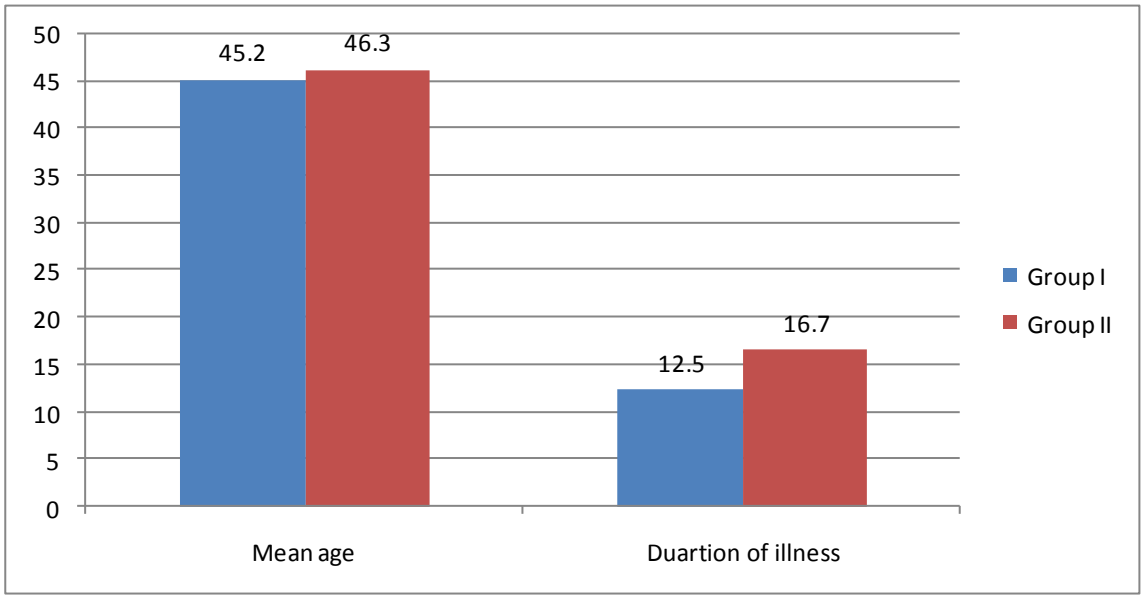
The present study was conducted on 280 patients (males- 150, females- 130) of type 2 diabetes mellitus. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained prior to the study. Patients with current insulin therapy or received insulin for more than 6 weeks in last three month, history of adverse reaction to sulfonylurea or metformin were excluded from the study.

General information such as name, age, gender etc. was recorded. All were divided into 2 groups of 140 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 HbA1C, 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

Graph I Demographic data in patients



Mean age in group I patients was 45.2 years and in group II was 46.3 years. Duration of illness was 12.5 years in group I and 16.7 years in group II (Graph I). The difference was non- significant (P> 0.05).

Table I Estimation of fasting blood glucose level in both groups

Blood glucose mg/dl (Mean)	Group I	Group II	P value
Before treatment	180.4	176.2	0.01
At 3rd month	130.8	128.4	
At 6th month	106.2	110.2	

We found that mean blood glucose level (mg/dl) in group I before treatment was 180.4 and in group II was 176.2, after 3 months was 130.8 in group I and 128.4 in group II, at 6th month was 106.2 and 110.2 in group I and group II respectively. The difference between groups was non- significant (P> 0.05) while within the group was significant (P< 0.05).

Table II Estimation of post prandial blood glucose level in both groups

Blood glucose mg/dl (Mean)	Group I	Group II	P value
Before treatment	224.4	228.2	0.01
At 3rd month	171.2	168.4	
At 6th month	142.2	138.2	

Table II shows that mean post prandial blood glucose level (mg/dl) in group I before treatment was 224.4 and in group II was 228.2, after 3 months was 171.2 in group I and 168.4 in group II, at 6th month was 142.2 and 138.2 in group I and group II respectively. The difference between groups was non- significant (P> 0.05) while within the group was significant (P< 0.05).

Table III HbA_1C level in both groups

HbA_1C level % (Mean)	Group I	Group II	P value
Before treatment	8.1	8.2	0.01
At 3rd month	7.2	7.4	
At 6th month	6.5	6.1	

Table III shows that HbA_1C level % was 8.1 in group I and 8.2 in group before treatment, 7.2 and 7.4 after 3 months and 6.5 and 6.1 after 6 months in group I and group II respectively. The difference was significant (P< 0.05).

DISCUSSION

An estimated 346 million people worldwide live with diabetes, resulting in 3.4 million deaths in 2004, with more than 80% of these deaths occurring in low and middle income countries. The fastest growing age group of people with diabetes is between 40 to 59 years. The worldwide 2011 estimated prevalence of diabetes is the elderly population is between 15% to 20%. The major complications are diabetic neuropathy and nephropathies, peripheral vascular disease, foot ulcers and limb amputations affecting 30% of those aged 40 or more. Symptoms of diabetes include polyuria, polydipsia, weight loss, sometimes with polyphagia, and blurred vision.[4]

Metformin is the first-line treatment for type 2 diabetes mellitus patients. 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. Metformin, because of its chemical structure, does not interact with the liver and has a short half-life. In addition to its antidiabetic actions, metformin causes weight loss in obese diabetic patients and may be useful in managing associated lipid disorders.[5] 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.[6]

We observed that the mean blood glucose level (mg/dl) in group I before treatment was 180.4 and in group II was 176.2, after 3 months was 130.8 in group I and 128.4 in group II, at 6th month was 106.2 and 110.2 in group I and group II respectively. This is in agreement with Raju et al.[7]

In present study, we found that mean post prandial blood glucose level (mg/dl) in group I before treatment was 224.4 and in group II was 228.2, after 3 months was 171.2 in group I and 168.4 in group II, at 6th month was 142.2 and 138.2 in group I and group II respectively. Similarly when we compared HbA_1C level in both groups we found that HbA_1C % was 8.1 in group I and 8.2 in group before treatment, 7.2 and 7.4 after 3 months and 6.5 and 6.1 after 6 months in group I and group II respectively.

Sivakumar et al[8], 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.

CONCLUSION

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

REFERENCES

1. Diagnosis and classification of diabetes mellitus, American diabetes association, Diabetes care. 2001; 27 (1): 5- 10.
2. ICMR Guideline for management in of type 2 diabetes. Non pharmacological management of diabetes, 2005: 1-07.
3. Kobayashi, K.A., et al., Glipizide pharmacokinetics in young and elderly volunteers. Clin Pharm, 2008; 7(3): 224-8.
4. Kradjan, W.A., et al., Glipizide pharmacokinetics: effects of age, diabetes, and multiple dosing. J Clin Pharmacol, 1999; 29(12): 1121-7.
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.