RESEARCH ARTICLE

A STUDY COMPARING THE EFFECT OF GLIMEPIRIDE AND GLIBENCLAMIDE ON GLYCOSYLATED HAEMOGLOBIN (HbA1c) IN TYPE II DIABETES MELLITUS PATIENTS

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ABSTRACT

Background: Diabetes mellitus is a major public health problem. It is worldwide & a major risk factor for cardiovascular diseases. Glibenclamide and Glimepiride are widely used second generation sulfonylurea antidiabetic drugs. Both Glibenclamide and Glimepiride stimulate release of insulin from pancreatic acinar cells, by blocking an ATP-sensitive potassium channel. Therefore we evaluated the effect of Glimepiride and Glibenclamide on glycosylated haemoglobin in patients of type II diabetes mellitus.

Aims & Objective: (1) To find out the demographic profile of type II diabetes mellitus. (2) To find out the effect of Glimepiride and Glibenclamide on glycosylated haemoglobin (HbA1c) in type II diabetes mellitus Patients. (3) To compare the effect of Glimepiride and Glibenclamide on glycosylated haemoglobin (HbA1c) among the two study groups.

Material and Methods: A prospective, randomized, open, parallel group study was carried out in patients attending OPD of Medicine department MM Institute of Medical Sciences and Research (MMIMSR), Mullana, Ambala. 50 patients were randomly assigned into groups A & group B. In Group A (n=25) Glibenclamide (5-15 mg/day) & in Group B (n=25) Glimepiride (1-6 mg/day) was administered for a period of 24 weeks. Data analyzed by Student's "t"- test.

Results: It was found that prevalence of type II diabetes mellitus is more common among the male patients There was a significant reduction in glycosylated haemoglobin score ($p<0.05$) in both the study groups after 24 weeks but glycosylated haemoglobin level did not differ significantly ($p>0.05$) between the two groups.

Conclusion: Glibenclamide and Glimepiride lowered glycosylated haemoglobin to a similar degree without significant difference between the two groups.

Key-Words: Glimepiride; Glibenclamide; Glycosylated Haemoglobin; Type II Diabetes Mellitus

Introduction

Diabetes is a chronic and slowly progressive disease which is presently reaching epidemic proportions in several parts of the world. Diabetes mellitus is a metabolic disorder characterized by impaired metabolism of glucose, which is associated with insulin deficiency and results hyperglycaemia, often accompanied by glucosuria and polyuria.[1] India has been declared as a diabetic capital of the world and every fifth diabetic in the world is an Indian.[2] There are two types of diabetes mellitus type 1 and type 2 in which type 1 diabetes accounts for only 5–10%.[3] Type 2 diabetes- This form of diabetes, which accounts for ~90–95% of those with diabetes, encompasses individuals who have insulin resistance and usually have relative (rather than absolute) insulin deficiency.[3] Characteristic symptoms of type 2 diabetes are excessive thirst and frequent urination (polyuria), leading to the intake of large volume of water (polydipsia) ("Diabetes Mellitus" means "excessive excretion of sweet urine").[4] Sulfonylureas have been used in diabetes mellitus for decades and are the most widely used oral hypoglycaemic drugs.[5] They are usually considered as second-line therapy after metformin because they are effective, can lower HbA1c by 1–2%, and are available in inexpensive generic forms.[6] Glibenclamide and Glimepiride are widely used second generation sulfonylurea antidiabetic drugs.[7] The oral, hypoglycaemic drug, Glibenclamide and Glimepiride stimulates release of insulin from pancreatic acinar cells, probably by blocking an ATP-sensitive potassium channel.

Materials and Methods

A prospective, randomized, open parallel group study of 24 weeks duration was conducted by the Department of Pharmacology in association with Department of Medicine in patients of type II diabetes mellitus at MM Institute of Medical Sciences and Research (MMIMSR), Mullana Ambala. The study protocol was approved by the Institutional Ethics Committee. 65 patients of both the sexes suffering from type 2 diabetes mellitus were selected for the study but only 50 patients completed the study. All the patients gave their written consent before enrolment

in the study. 50 patients of both the sexes after fulfilling the inclusion and exclusion criteria were enrolled and were divided into 2 groups. Group A (n=25) patients received Glibenclamide (5-15 mg/day) for 24 weeks and Group B patients received B (n=25) Glimepiride (1-6mg/day) for 24 weeks. Patients with history of drug allergy, alcohol intake, congestive cardiac failure, female patients who were pregnant, lactating were excluded. All the patients gave their written consent before enrolment in the study. Clinical evaluation of all the patients was done by measuring blood sugar before administration of drug. Efficacy of study drugs evaluated by measuring the glycosylated haemoglobin level at start of pharmaco-therapy, 2 weeks, 4 weeks and then every 4 weeks up to 24 weeks. Data were collected and analysis by using student's' test. A 'p' value less than or equal to 0.05 was considered statistically significant and p>0.05-non significant.

Results

All the patients completed the study (Table 1) depicts the demographic data of the patients. The mean age of the patients in both the groups did not differ significantly (p>0.05). The mean age and SD in group A was 52.00 ± 13.55 and in Group B 52.08 ± 11.69.

Table-1: Mean Baseline Scores

Characteristic	Group A	Group B
Age Range (years)	28-75	35-75
Mean Age	52.00 ± 13.55	52.08 ± 11.69
Sex (Male/Female)	14/11	15/10
Glycosylated Haemoglobin (%)	15.35±23.10	11.03±1.33

Table-2: Comparative Mean Scores of Glycosylated Haemoglobin in Group A & Group B Patients over 24 weeks

	Group A (Mean)	Group B (Mean)	p- value
Baseline	15.35 ± 23.10	11.03 ± 1.33	0.72
Week 2	11.17 ± 1.47	10.79 ± 1.29	0.33
Week 4	10.60 ± 1.55	10.45 ± 1.37	0.72
Week 8	10.37 ± 1.56	10.22 ± 1.32	0.70
Week 12	10.19 ± 1.52	9.99 ± 1.35	0.63
Week 16	10.06 ± 1.47	9.80 ± 1.38	0.52
Week 18	9.83 ± 1.45	9.54 ± 1.34	0.47
Week22	9.60 ± 1.43	9.32 ± 1.34	0.47
Week 24	9.34 ± 1.39	9.17 ± 1.34	0.66

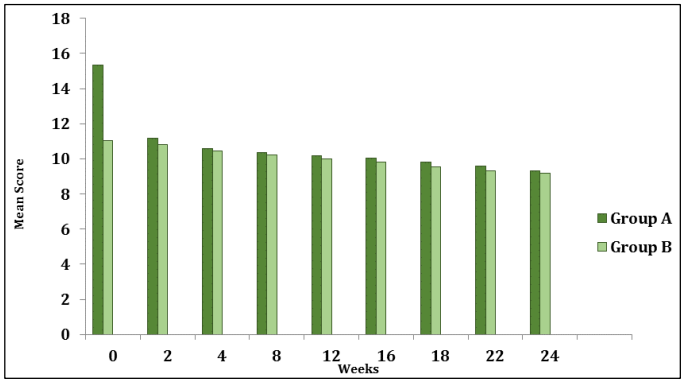

Figure-1: Comparative changes in Glycosylated Haemoglobin Scores

Table 1 shows that the mean baseline scores on various scales did not differ significantly (p>0.05) in two groups. The parameters were normally distributed and were comparable. Table 2 shows that change in Glycosylated Haemoglobin scores in both the groups and both the drugs reduced the scores of Glycosylated Haemoglobin in the respective groups & at the end of 24 week the level of Glycosylated Haemoglobin decreased to a significant level.

Discussion

Diabetes mellitus remains a major health problem; persons with diabetes mellitus have two to four times the risk of cardiovascular events compared with persons of same age and sex who do not have the disease. Coronary heart disease is responsible for more than two-thirds of deaths in persons with diabetes who are older than 65 years.[8] Glibenclamide and Glimepiride in addition to potentiating insulin secretion via the beta-cells, also exhibit their effects on cardiovascular and vascular smooth muscles.[9] This multi-factorial disease is hypothesized to damage cell membranes resulting in elevated oxidative stress. The major concern with diabetes clearly relates to marked increase of neuropathy and series morbidity and mortality related to the development of other complications.[10] The results of individual patients were compiled in each group, compared and statistically analysed by: (1) Student t –test (paired t-test); (2) Student t –test (unpaired t-test)

From the study, it was depicted that, the male patients outnumbered the female patients in the groups that is, 56% and 60% respectively in drug group A and B respectively while female subjects were 44% and 40% respectively (Table 1). It is in accordance with the fact that diabetes mellitus is more common among the male patients.[11] The parameter used to assess the efficacy of drug therapy was the glycosylated haemoglobin during the study. The results showed that, in group A, the mean score of glycosylated haemoglobin at baseline was 15.35 ± 23.10, at 4 weeks 10.60 ± 1.55and at 24 weeks it dropped to 9.34 ± 1.39. In group B, the mean score of glycosylated haemoglobin at baseline was 11.03 ± 1.33, at 4 weeks 10.45 ± 1.37 and at 24 weeks, it dropped to 9.17 ± 1.34. It was evident that there was a significant reduction in glycosylated haemoglobin score (p <0.05) in both the study groups after 24 weeks (Table 2 & fig 1). Studies done by Ibrahim RK et al.[12] & Burant CF et al.[13] showed comparable results which were similar to the present study. While comparing the mean scores of glycosylated haemoglobin in group A and group B patients over 24 weeks, change in glycosylated haemoglobin scores in both the groups did not differ significantly (p>0.05) and over

the time both the groups maintained improvement which was comparable throughout the study. The present study showed that both Glibenclamide and Glimepiride lowered glycosylated haemoglobin to a similar degree without significant difference between the two groups (Table 2 & figure 1). This result was similar with the study done by Draeger KE et al.[14]

Conclusion

The study showed that both Glibenclamide and Glimepiride are effective in controlling the glycosylated haemoglobin but both the drugs lowered glycosylated haemoglobin to a similar degree without significant difference between the two groups.

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