Original Research

A comparative analysis of different hypoglycemic agents in type II DM patients

Manohar Lal Verma[1], Vidhi Verma[2], Pankaj Kr Mishra[3]

[1]Associate professor, Department of General Medicine, [2]Assistant professor. Department of Pathology, Professor, Department of Community Medicine, Mayo Institute of Medical Sciences, Barabanki, Uttar Pradesh- 225001, India

ABSTRACT:

Background: Diabetes Mellitus (DM) is a syndrome characterized by a state of chronic hyperglycemia. The present study compared different hypoglycemic agents in type II DM patients. **Materials & Methods:** The present study was conducted on 90 patients of type II diabetes mellitus of both genders. Baseline investigations such as fasting blood sugar (FBS), post prandial blood sugar (PPBS) and HbA1c were noted. Patients were divided into three groups, Group I using biguanides + sulfonylureas (SU), Group II on biguanides+ thiazolidinediones and Group III using biguanides+ dipeptidyl peptidase inhibitors (DPI). **Results:** Mean fasting FBG (mg/dl) in group I was 178.2, in group II was 176.4 and in group III was 174.8, FBG after 6 months in group I was 126.4, in group II was 146.2 and in group III was 150.2. Post prandial blood sugar (PPBS) baseline in group I was 266.2, in group II was 260.4 and in group III was 264.2, PPBG after 6 months in group I was 184.6, in group II was 210.4 and in group III was 204.6. There was significant reduction in blood glucose level in group I compared to group II and group III (P< 0.05). The most common ADR was hypoglycemia seen 4 in group I, 1 in group II and 2 in group III followed by nausea 2 in group I, 1 in group II and 4 in group III and vomiting 3 in group I and 3 in group III. The difference was significant (P< 0.05). **Conclusion:** Authors found that combination of biguanides + sulfonylureas was effective in lowering down blood glucose level in type II DM patients.
Key words: blood glucose, diabetes, sulfonylureas.

INTRODUCTION

Diabetes Mellitus (DM) is a syndrome characterized by a state of chronic hyperglycemia causing disturbance of carbohydrate, fat and protein metabolism, associated with absolute or relative deficiency in insulin secretion or insulin action.[1] Diabetes occurs worldwide and incidence of both Type-I and Type-II are rising. It is estimated that in the year 2000, 171 million people had diabetes worldwide and it is expected to double by the year 2030 AD. Compared to Britain, prevalence of diabetes is higher in Indian subcontinent. It is estimated that 20% of global burden resides in South East Asia

Region (SEAR) area, which will be tripled to 228 million by the year 2025 from the current 84 million.[2] Defective insulin secretion and insulin resistance appear very too early in obese patients, and both worsen equally as diabetes progresses. An increase in overall fat tissue, especially in visceral as well as ectopic fat depots, is particularly associated with insulin resistance. The relationship between obesity and diabetes is of such interdependence that the term "diabesity" has been coined.[3] lifestyle modification to lose weight is recommended for diabetic patients to improve glycemic control and diminish-associated risk factors of microvascular and macrovascular

complications. Even modest weight loss can appreciably lessen glucose levels and decrease cardiometabolic risk factors.[4] It is important to evaluate the benefits of hypoglycemic agents in patients with various confounding risk factors, a comparative study is advantageous to choosing a right drug for the obese patient to reduce weight or put weight in control.[5] The present study compared different hypoglycemic agents in type II DM patients.

MATERIALS & METHODS

The present study was conducted in the department of General Medicine. It comprised of 90 patients of type II diabetes mellitus of both genders. All patients were informed regarding the study and written consent was obtained. Ethical clearance was taken from institute ethical committee. ata such as name, age, gender etc. was recorded. Baseline investigations such as fasting blood sugar (FBS), post prandial blood sugar (PPBS) and HbA1c were noted. Patients were divided into three groups, Group I using biguanides + sulfonylureas (SU), Group II on biguanides+ thiazolidinediones and Group III using biguanides+ dipeptidyl peptidase inhibitors (DPI). Efficacy parameters (FBS, PLBS, and HbA1c) and safety monitoring parameters are adverse drug reactions and body weight changes were compared. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Group I	Group II	Group III
Biguanides + sulfonylureas	Biguanides+ thiazolidinediones	Biguanides+dipeptidyl peptidase inhibitors
30	30	30

Table I shows that each group had 30 patients.

Table II Comparison of blood sugar in all groups

Blood sugar (mg/dl)	Group I	Group II	Group III	P value
FBG baseline	178.2	176.4	174.8	0.61
FBG after 6 months	126.4	146.2	150.2	0.01
PPBG baseline	266.2	260.4	264.2	0.51
PPBG after 6 months	184.6	210.4	204.6	0.02

Table II, graph I shows that fasting FBG (mg/dl) in group I was 178.2, in group II was 176.4 and in group III was 174.8, FBG after 6 months in group I was 126.4, in group II was 146.2 and in group III was 150.2. Post prandial blood sugar (PPBS) baseline in group I was 266.2, in group II was 260.4 and in group III was 264.2, PPBG after 6 months in group I was 184.6, in group II was 210.4 and in group III was 204.6. There was significant reduction in blood glucose level in group I compared to group II and group III ($P < 0.05$).

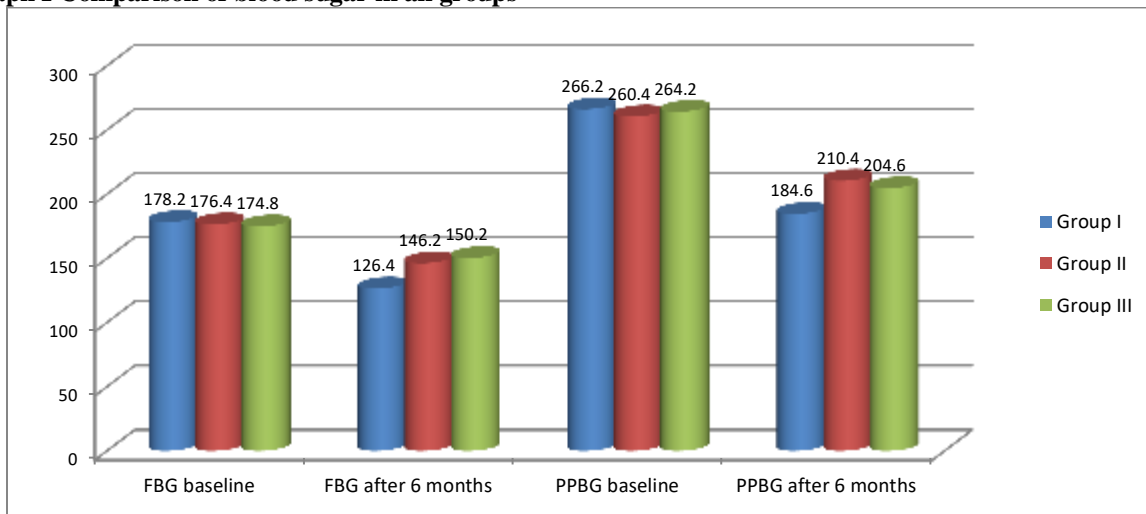**Graph I Comparison of blood sugar in all groups**

Table III Identification of acute drug reaction in all groups

ADR	Group I	Group II	Group III	P value
Hypoglycemia	4	1	2	0.01
Diarrhea	1	1	2	
Abdominal pain	1	2	1	
Itching	0	1	3	
Dizziness	1	0	2	
Nausea	2	1	4	
Vomiting	3	0	3	
Indigestion	1	0	1	

Table III shows that most common ADR was hypoglycemia seen 4 in group I, 1 in group II and 2 in group III followed by nausea 2 in group I, 1 in group II and 4 in group III and vomiting 3 in group I and 3 in group III. The difference was significant (P< 0.05).

DISCUSSION

The major determinants for projected increase in the number of Diabetes in SEAR countries are population growth, age structure, and urbanization.[6] Diabetes and its complications pose a major threat to public health resources and World Health Organization (WHO) has projected the maximum increase in Diabetes would occur in India. Prevalence of Diabetes is increasing day-by-day in our country.[7] In addition, prevalence of Impaired Glucose Tolerance (IGT) is also high indicating the potential for a further increase in the number of diabetic patients. The ratio between Diabetes and IGT is considered to be an index of epidemic state in the population.

The prevalence of Diabetes and IGT are high in urban Indian population. It is also rising in rural areas which indicate the presence of Genetic basis for Diabetes in ethnic group.[8] The present study compared different hypoglycemic agents in type II DM patients.

In present study, there were 90 patients which were divided into three groups, group I received biguanides + sulfonylureas (SU), group II biguanides + thiazolidinediones and group III received biguanides+ dipeptidyl peptidase inhibitors (DPI). Zaki et al[9] found conducted a prospective observational study in care diabetic center over a period of 1 year. All the patients those are receiving only oral hypoglycemic agents continuously over a period of 3 months and BMI ≥30 were enrolled. The patients receiving insulin were excluded. Patients were followed over a period of 3 months and were reviewed on visit basis (every 30 days). All the necessary information was collected into the data collection form that includes demographic details (age, gender, etc.), past medication history, current treatment charts, and their relevant laboratory reports (fasting blood sugar levels [mg/dl], PPBS levels [mg/dl], glycosylated hemoglobin A1c [HbA1c] (%), and BMI [kg/m^2]. A total of 395 patients were recruited into the study and the drugs received by the population were found to be metformin+ sulfonylureas (33%), metformin+ pioglitazone (26%),

and metformin+ dipeptidyl peptidase inhibitors (DPI) (23%). A significant reduction in HbA1c was seen in all groups of patients. Adverse drug reactions observed were hypoglycemia, pedal edema, and itching distributed to drugs metformin+ DPI, respectively. A significant reduction in BMI was seen in patients receiving DPI and BMI was found to be increased in other groups of patients.

We found that there was significant reduction in blood glucose level in group I compared to group II and group III (P< 0.05) following drug for 6 months. We found that most common ADR was hypoglycemia seen 4 in group I, 1 in group II and 2 in group III followed by nausea 2 in group I, 1 in group II and 4 in group III and vomiting 3 in group I and 3 in group III.

Malini et al[10] assessed general health condition and anthropological parameters of the working women. They identified prevalence of Type-II Diabetes among them, assessed risk factors associated with development of diabetes. During the two-month study period, Fasting Blood Sugar (FBS) was estimated to identify the diabetics and the Impaired Glucose Tolerance (IGT). Information from the study population was collected through pre-tested questionnaire using several anthropometric measurements. Out of 100 women, 24 were having FBS compatible with IGT or diabetes. The incidence was highest in 46 to 55 yr age group. 75% of women with diabetes or IGT were in higher income group. Body Mass Index was more than 25 kg/m 2 in maximum (75%) women having diabetes or IGT. 92% women with diabetes or IGT had their Waist Hip Ratio ≥0.85. Moreover, orientation towards healthy life style modification to control diabetes and its prevention was poor among the study population.

CONCLUSION

Authors found that combination of biguanides + sulfonylureas was effective in lowering down blood glucose level in type II DM patients.

REFERENCES

1. Zimmet PZ. The epidemiology of Diabetes mellitus and related conditions associated disorders. In: Alberti KG, Krall LP, editors. The Diabetes Annual No. 6. Amsterdam: Elsevier Science Publishers; p. 1-19.
2. King H, Rewers M. Global estimate for prevalence of diabetes mellitus and impaired glucose tolerance among adults. WHO Ad Hoc Diabetes Reporting Group. Diabetes Care 1993;16:157-76.
3. Ramachandran A, Snehalatha C, Dharmaraj D, Viswanathan M. Prevalence of glucose intolerance in Asian Indians. Urban-rural difference and significance of upper body adiposity. Diabetes Care 1992;15:1348-55.
4. Viswanathan M, McCarthy MI, Snehalatha C, Hitman GA, Ramachandran A. Familial aggregation of type 2 (non-insulindependent) diabetes mellitus in south India; absence of excess maternal transmission. Diab Med 1996;13:232-7.
5. Ramachandran A, Snehalatha C, Latha E, Vijay V, Viswanathan M. Rising prevalence of NIDDM in urban population of India. Diabetologia 1997;40:232-5.
6. Hollander P. Anti-diabetes and anti-obesity medications: Effects on weight in people with diabetes. Diabetes Spectrum 2007; 20:159-65.
7. Green J, Feinglos M. New combination treatments in the management of diabetes: Focus on sitagliptin-metformin. Vasc Health Risk Manag 2008;4:743-51.
8. Michael J, Fowler MD. Diabetes treatment, part2: Oral agents for glycemic management. Clin Diabetes 2007;25:131-4.
9. Zaki NM, Maghrabi I. Trends in therapeutic interventions in patients with diabetes mellitus in Saudi Arabia. Int J Pharm Pharm Sci 2013;5:171-7.
10. Malini D S, Sahu A, Mohapatro S, Tripathy R M. Assessment of risk factors for development of Type-II diabetes mellitus among working women in Berhampur, Orissa. Indian J Community Med 2009;34:232-6.