

Comparative Analysis of Sitagliptan vs Empagliflozin as an add on Therapy to Metformin in Pakistani Type 2 Diabetic Patients

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ABSTRACT

Introduction: Diabetes is a condition that impairs carbohydrate, fat, and protein metabolism in the body. At the point when we eat food, the food is separated into glucose and supplements and is invested in the blood.

Objective: The main objective of the study is to analyse the sitagliptan vs empagliflozin as an add-on therapy to metformin in Pakistani type 2 diabetic patients.

Material and methods: This comparative study was conducted with the collaboration of different hospitals of Pakistan in different regions during November 2020 to September 2021. Fasting blood sample was collected for the analysis of serum blood glucose levels and body weight, waist circumference, systolic blood pressure (SBP), and diastolic blood pressure (DBP) were also measured on daily basis.

Results: The data was collected from 200 patients. The basic demographic characteristics of all the patients were shown in table 01. There were 86 (43%) male and 114 (57%) female patients. The mean value of HbA1C was 10.07 and 112 patients suffering from hypertension and 46 from heart diseases.

Conclusion: It is concluded that empagliflozin is an effective agent in treating patients with type 2 diabetes, with good efficacy and safety profiles.

INTRODUCTION

Diabetes is a condition that impairs carbohydrate, fat, and protein metabolism in the body. At the point when we eat food, the food is separated into glucose and supplements and is invested in the blood. The hormone "insulin" that is delivered by the pancreas at that point ensures the glucose is retained from the blood into our cells and utilized as energy. On the off chance that you have insulin opposition, the cells of your body don't perceive insulin, henceforth the glucose isn't enough consumed by the cells [1]. Accordingly, glucose level in the blood continues rising and you feel dormant since the cells don't have the energy they need. It's a sickness which is straightforwardly liable for 1.5 million passings in a year and related with another 2.2 million passings in some structure. A sickness which is going to turn into the seventh driving reason for death [2]. Diabetes is a worldwide general health issue. The weight of diabetes is explicitly high in the South East-Asia (SEA) locale. The district is as of now home to in excess of 72 million patients with diabetes and the numbers are extended to increment to 123 million of every 2035. This can be clarified by the changing way of life in this locale given the development towards urbanization. T2DM is the prevalent sort (>95%) of diabetes in this district [3].

T2DM portrayed by high plasma glucose levels, has an ongoing and reformist course which can finish in end-organ harm. Novel treatments are persistently being assessed to help accomplish glycaemic focuses easily and comfort [4]. Situated at the proximal tangled tubules, SGLT-2 has a significant physiological function in renal glucose reabsorption. Pharmacological hindrance of SGLT-2 increments urinary glucose discharge and diminishes plasma glucose levels. Extra metabolic impacts including advancement of acalorie confined and ketogenic state, SGLT-1 hindrance, and improvement of insulin:glucagon proportion, can prompt glycaemic benefits with SGLT-2 inhibitors [5].

Among the different meds accessible for type 2 diabetes, oral glucose-bringing down specialists, for example, dipeptidyl peptidase 4 (DPP-4) inhibitors and sodium-glucose cotransporter-2 (SGLT2) inhibitors have as of late become the focal point of considerable exploration. Some SGLT2 inhibitors improved cardiovascular results in patients with type 2 diabetes [6].

The Empagliflozin Effect on Cardiovascular Events preliminary demonstrated the great impact of Empagliflozin, one of the SGLT2 inhibitors, contrasted with the impacts of fake treatment on concealment of hospitalization for cardiovascular breakdown with nonpartisan impact on the accompanying major unfriendly cardiovascular occasions: cardiovascular demise, non-deadly myocardial localized necrosis, or non-lethal ischemic stroke (MACE) [7]. Then again, the aftereffects of fake treatment controlled non-mediocrity randomized clinical preliminaries proposed that DPP-4 inhibitors have an impartial impact of cardiovascular occasions in patients with type 2 diabetes. In light of the discoveries of EMPA-REG OUTCOME, the part of empagliflozin in the treatment of T2DM is probably going to be assessed in a scope of treatment blends and considered for use in before phases of T2DM. Since metformin has likewise been related with upgrades in CV results, mix treatment with empagliflozin may likewise give CV advantages in patients with T2DM [8].

Objective: The main objective of the study is to analyse the sitagliptan vs empagliflozin as an add-on therapy to metformin in Pakistani type 2 diabetic patients.

MATERIAL AND METHODS

This comparative study was conducted with the collaboration of different hospitals of Pakistan in different regions during November 2020 to September 2021. We collected the data from four different cities of Pakistan, those hospitals which were participated in this study were as follows:

- Jinnah Hospital Lahore
- National Institute of Health Islamabad.

Data collection: The data was collected from 200 diabetic patients. Patients with type II DM were included in this study. These patients were used Metformin for the control of DM. The data were divided into three groups:

- Group A: Used only Metformin therapy
- Group B: Used sitagliptan with Metformin
- Group C: Used add-on therapy of empagliflozin with Metformin

Blood sample was collected in fasting for the analysis of serum blood glucose levels, BW, systolic and diastolic blood pressure. These parameters were measured on daily basis. The extents of patients who arrived at HbA1c <7% (<53 mmol/mol) were recorded over the expansion study. The standard for these examinations was characterized as the last noticed estimation before the primary organization of the review drugs. Adequacy examinations explored changes more than 9 weeks from pattern of the former preliminary to week 7 of the augmentation preliminary in HbA1c, FPG, body weight, SBP, and DBP in patients who were randomized to 10 or 25 mg empagliflozin, metformin, or sitagliptin.

SPSS is used for the data analysis by using version 19. All the values were expressed in mean and standard deviation.

RESULTS

The data was collected from 200 patients. The basic demographic characteristics of all the patients were shown in table 01. There were 86 (43%) male and 114 (57%) female patients. The mean value of HbA1C was 10.07 and 112 patients suffering from hypertension and 46 from heart diseases.

Table 1: Baseline characteristics of study population

Variable	Values
Age	45.6±5.8
DM duration	5.34±2.20
Gender	
Male	86 (43%)
Female	114 (57%)
HbA1C	10.07
Weight (kg)	77.07
SBP (mmHg)	136.38
DBP (mmHg), mean±SD	80.54
Hypertension, n	112
Heart diseases, n	46
Dyslipidemia, n	67
Empagliflozin dose, n	
5 mg	45
10 mg	155
Antihyperglycemic drugs, n	
None	3
Monotherapy	64
Dual therapy	45
Insulin	88

After add-on therapy the group C shows the accurate results as weight were increases as 87.98±3.03kg and HbA1C as 7.86±2.43. There were also difference is systolic and diastolic blood pressure (table 02).

Table 2: Changes in clinical outcomes after starting add-on therapy with metformin

Variable	Group A	Group B	Group C	P value
Weight (kg)	86.07±6.11	85.01±5.29	87.98±3.03	<0.001
HbA1C (%)	10.07±2.07	8.79±0.10	7.86±2.43	<0.001
SBP (mmHg)	136.83±10.97	126.5±6.57	121.80±7.67	0.047
DBP (mmHg)	89.34±10.61	82.34±5.12	81.02±7.68	<0.001

DISCUSSION

Diabetes mellitus (DM) is one of the most frequent pathologies that dentists encounter. Its clinical significance springs from the conceivable event of intense entanglements, whose seriousness could mean an impending danger for the diabetic patient's life and require dire finding and therapy. DM incorporates a gathering of illnesses described by weakened activity or discharge of insulin, or both. There are four etiologic kinds of diabetes, despite the fact that the most regular are type 1 (90%) [9]. Predominance of diabetes in grown-ups overall was assessed to be 4% in 1995, and is anticipated to ascend to 5.4% continuously 2025. In non-industrial nations, the lion's share are in the age scope of 45–64 years [10]. There are a larger number of ladies than men with diabetes. Other than that there was no measurably huge distinction in blood glucose levels of patients going through the two medicines recommending the clinical practicality of epinephrine or felypressin organization for patients with this profile [11]. There are a few investigations that evaluate Empagliflozin as extra treatment in nonfasting patients; in these examinations Empagliflozin was appeared to have tantamount adequacy to SU with lower hypoglycemic danger [12]. Until this point, there is just one examination that assesses Empagliflozin during Ramadan which was a 12-week, randomized, open-name concentrate for 110 patients with type 2 DM who were at that point utilizing metformin and SU [13]. Patients were isolated into two gatherings: in the first gathering 58 patients were changed from SU to Empagliflozin 10 mg once day by day while in the second gathering 52 patients were stayed on their pretrial treatment [14].

CONCLUSION

It is concluded that empagliflozin is an effective agent in treating patients with type 2 diabetes, with good efficacy and safety profiles. Empagliflozin use in patients with diabetes is related with improved glycemic control by controlled discharge of glucose through the pee and weight reduction as an optional, extra advantage. It is a compelling specialist in treating patients with type 2 diabetes, with great viability and security profiles. Empagliflozin use in patients with diabetes is related with improved glycemic control by controlled discharge of glucose through the pee and weight reduction as an optional, extra advantage.

REFERENCES

- Effects of dapagliflozin, an SGLT2 inhibitor, on HbA(1c), body weight, and hypoglycemia risk in patients with type 2 diabetes inadequately controlled on pioglitazone

- monotherapy. Rosenstock J, Vico M, Wei L, Salsali A, List JF. *Diabetes Care*. 2012;35:1473–1478.
2. Sodium-glucose cotransport inhibition with dapagliflozin in type 2 diabetes. List JF, Woo V, Morales E, Tang W, Fiedorek FT. *Diabetes Care*. 2009;32:650–657.
 3. Chamsi-Pasha H., Aljabri K. The diabetic patient in Ramadan. *Avicenna Journal of Medicine*. 2014;4(2):29–33. doi: 10.4103/2231-0770.130341
 4. Ahmad J., Pathan M. F., Jaleel M. A., et al. Diabetic emergencies including hypoglycemia during Ramadan. *Indian Journal of Endocrinology and Metabolism*. 2012;16(4):512–515. doi: 10.4103/2230-8210.97996.
 5. Jaleel M. A., Raza S. A., Fathima F. N., Jaleel B. N. Ramadan and diabetes: As-Saum (The fasting) *Indian Journal of Endocrinology and Metabolism*. 2011;15(4):268–273. doi: 10.4103/2230-8210.85578.
 6. Schweizer A., Halimi S., Dejager S. Experience with DPP-4 inhibitors in the management of patients with type 2 diabetes fasting during Ramadan. *Vascular Health and Risk Management*. 2014;10:15–24. doi: 10.2147/VHRM.S54585
 7. Scirica BM, Bhatt DL, Braunwald E, Steg PG, Davidson J, Hirshberg B, et al. Saxagliptin and cardiovascular outcomes in patients with type 2 diabetes mellitus. *N Engl J Med*. 2013;369:1317–26.
 8. Green JB, Bethel MA, Armstrong PW, Buse JB, Engel SS, Garg J, et al. Effect of sitagliptin on cardiovascular outcomes in type 2 diabetes. *N Engl J Med*. 2015;373:232–42.
 9. Scott R, Morgan J, Zimmer Z, Lam RLH, O'Neill EA, Kaufman KD, et al. A randomized clinical trial of the efficacy and safety of sitagliptin compared with dapagliflozin in patients with type 2 diabetes mellitus and mild renal insufficiency: the CompoSIT-R study. *Diabetes Obes Metab*. 2018;20:2876–84.
 10. Roden M, Weng J, Eilbracht J, Delafont B, Kim G, Woerle HJ, et al. Empagliflozin monotherapy with sitagliptin as an active comparator in patients with type 2 diabetes: a randomised, double-blind, placebo-controlled, phase 3 trial. *Lancet Diabetes Endocrinol*. 2013;1:208–19.
 11. Persson F, Nystrom T, Jorgensen ME, Carstensen B, Gulseth HL, Thuresson M, et al. Dapagliflozin is associated with lower risk of cardiovascular events and all-cause mortality in people with type 2 diabetes (CVD-REAL Nordic) when compared with dipeptidyl peptidase-4 inhibitor therapy: a multinational observational study. *Diabetes Obes Metab*. 2018;20:344–51.
 12. Lee AK, Warren B, Lee CJ, McEvoy JW, Matsushita K, Huang ES, et al. The association of severe hypoglycemia with incident cardiovascular events and mortality in adults with type 2 diabetes. *Diabetes Care*. 2018;41:104–11.
 13. Khan SS, Ning H, Wilkins JT, Allen N, Carnethon M, Berry JD, et al. Association of body mass index with lifetime risk of cardiovascular disease and compression of morbidity. *JAMA Cardiol*. 2018;3:280–7.
 14. Bianchi C, Daniele G, Dardano A, Miccoli R, Del Prato S. Early combination therapy with oral glucose-lowering agents in type 2 diabetes. *Drugs*. 2017;77:247–264.
 15. Cahn A, Cefalu WT. Clinical considerations for use of initial combination therapy in type 2 diabetes. *Diabetes Care*. 2016;39:S137–S145.