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Research Article

SAFETY AND EFFICACY OF ACARBOSE IN COMBINATION WITH INSULIN GLARGINE IN TREATMENT OF ELDER DIABETIC PATIENTS

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Abstract:

Objective: To interrogate the clinical safety and effectiveness of insulin glargine in combination with acarbose for the treatment of diabetes in the patients with elder age.

Methodology: Total 140 patients suffering from diabetes who obtained treatment from January 2019 to January 2020 at DHQ Teaching Hospital Gujranwala got selected and the separation of these patients was carried out in Control Group (CG) and Observation Group (OG) with 70 patients in each group with the help of random number method. We treated the patients of control group with the help of insulin glargine, whereas the treatment of the patients of Observation Group was carried out with the help of insulin glargine in combination with acarbose. We performed the comparison about the therapeutic impact, improvement of QoL (Quality of Life) and adverse reactions between the patients of both groups.

Results: After the completion of therapy, FBG (Fasting Blood Glucose), 2h PBG (Postprandial Blood Glucose) and HbA1c (Glycosylated Hemoglobin) of the patients of both groups were less before the start of the treatment and the degree of decrease was much larger in the patients of Observation Group as compared to the patients of control group ($P < 0.050$). The duration required for the blood glucose to reach at standard level and daily usage of insulin of the patients of Observation Group were much lower than the patients of control group and this difference was significant statistically ($P < 0.050$). Scores of SF-36 scales of the patients of Observation Group were much better as compared to the patients of control group and this difference was also significant statistically ($P < 0.050$). We found no statistical difference in the prevalence rate of adverse reactions between the patients of both groups ($P > 0.050$).

Conclusion: The combine treatment of insulin Glargine & Acarbose can significantly handle the glucose level of blood in the diabetics of elder age, improves the bio-chemical indicators and promote the QoL.

KEYWORDS: Diabetics, Glargine, Insulin, Acarbose, Therapeutic, Fasting Blood Glucose, Postprandial Blood Glucose.

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INTRODUCTION:

Diabetes is a chronic disease of endocrine and this disease has very high prevalence in the elder people as well as population of middle age. This disease is seriously affecting the QoL (Quality of Life) and physical health of the patients [1, 2]. In current era, with the advancement in the clinical condition and living standards, the proportion of the aging population has increased, and there is enhancement in the prevalence of diabetes. Pathogenic diabetes factors include physiological aging, genetic factors and environmental factors causing in secretion of insulin or utilization abnormalities [3]. This disorder of diabetes may cause different cardiovascular diseases because of long-term abnormality in metabolism of glucose and high level of blood glucose [4]. Additionally, adverse glycemic control for long-term often results in peripheral neuropathy. These complications can have impacts on important organs of body, which will intensify the deterioration of the patients of diabetes and even affect the safety of life [5].

In the past, insulin treatment was the main treatment to efficiently control the level of blood glucose and decrease the complications. Because of the requirement for the long-term utilization, application of single medicine may worsen the impact of treatment [6]. Patients of elder age have weak constitution and adverse immunity system and majority of the patients also suffer from different chronic complications like HTN (Hypertension) and hyperlipidemia. To control the level of blood glucose efficiently for long-term and decrease the complications as far as possible, there is combine treatment with two drugs usually [7]. In current years, combination of insulin with oral hypoglycemic medicines has been gradually utilized in medical treatment. In this research work, insulin glargine & acarbose were utilized in the patients of elder age suffering from diabetes and the analysis of the therapy was carried out.

METHODOLOGY:

In this current research work, we recruited 140 elder patients suffering from diabetes who obtained the treatment from DHQ Teaching Hospital Gujranwala from January 2019 to January 2020. The division of these patients carried out into two groups with 70 patients in each group with the utilization of the random number table. There were forty males and thirty females in the control group and the range of age of these patients was 62 to 75 years with an average age of 66.208 ± 2.240 years. The course of disease in these patients was from 2 to 12 years with an average course of duration as 6.640 ± 2.130 years. There were thirty-eight males and thirty-four females in the observation group (OG). The range of age of these patients was from 59 to 75 years with an average age of 66.720 ± 2.530 years. The range

of the course of disease was from 2 to 14 years with an average course duration of 7.020 ± 3.560 years. We found no significant difference between the patients of both groups regarding disease course, age, sex and other clinical information ($P > 0.050$). Ethical committee of the institute gave the permission to conduct this research work. We took the written consent from the patient after explaining them the purpose of this research work.

All the patients fulfilling the diagnostic criteria of Type-2 diabetes as formulated by the Diabetes Society, having more than 60 years of age and present with good mental condition were the part of this research work. All the patients suffering from liver or kidney diseases and severe complications of HTN and diabetes were not included in this research work. We gave the conventional treatment to the patients of both groups. We gave the insulin glargine to the patients of control group, 10U every time, once a day, and the adjustment of the dose was carried out according to the actual blood glucose level. We gave the insulin glargine in combination of acarbose in the patients of observation group. Dose of the insulin glargine was similar with the patients of control group.

We administered the acarbose 50.0 mg every time, 3 times in a day. We gradually increased the dose to 100.0 mg each time. We treated the patients of both groups for complete 3 months. We also recorded the clinical parameters of the patient as prescribed by ADA (American Diabetic Association) [8]. We formulated a diet plan in accordance with the weight of the patients and we also controlled the exercise. We controlled the intake of sugar. We provided the prescription of utilization of green vegetables and told them to amend their bad eating habits and give up habit of cigarette smoking and alcohol. There was also need of psychological nursing along with sports nursing. We recorded the level of blood glucose control of the patients of both groups before and after the therapy, pre and post treatment levels of FBG, 2 hours PBG (Postprandial Blood Glucose) and HbA1c (Glycosylated Hemoglobin), duration required to reach the standard glucose level and dose of insulin of the patients of both groups were under analysis.

SPSS V.23 was in use for the statistical analysis of the collected information. We expressed the measurement data in average and standard deviations and its processing carried out by T test. We expressed the enumeration data in percentages, its processing carried out by Chi-square test. P value of 0.050 was considered as statistically significant.

RESULTS:

The HbA1c, FBG and 2 hours PBG levels of both groups were present with no difference before the

therapy ($P > 0.050$) and these levels were reduced significantly after the therapy; there was more obvious reduction in the patients of observation

group. There were statistical differences between these values in the patients of both groups after the treatment ($P < 0.050$, Table-1).

Table-I: Blood Glucose Control Effect Between the Two Groups

Group		FBG (mmol/L)	2hPBG (mmol/L)	Hb Alc (%)
Observation Group	Before treatment	10.25±2.73	13.75±3.41	11.65±2.44
	After treatment	5.24±2.01*#	6.24±2.9*#	2.71±1.94*#
Control group	Before treatment	10.37±2.80	13.59±1.30	11.70±2.35
	After treatment	7.73±1.84*	8.77±2.31*	5.16±2.01*

Note: * indicated $P < 0.05$ comparing to before treatment; # Indicated $P < 0.05$ comparing to the control group.

The duration required to reach the standard level of glucose and the daily dose insulin was lower in the patients of observation group as compared to the patients of control group ($P < 0.050$, Table-2). We found no significant difference statistically in the scores of SF-36 between observation group & control group before treatment (51.130 ± 2.210 vs. 51.130 ± 2.210) ($t=0.7938$, $P > 0.050$). After the completion of treatment, SF-36 scores of observation group were 79.210 ± 3.420 , which were much higher as compared to the patients of control group (70.350 ± 3.130), and this difference was significant statistically ($t= 5.1968$, $P < 0.050$). After the treatment, SF-36 scores of observation group & control group were much higher than the scores before therapy and this difference was also significant statistically ($t_1= 24.3308$, $P_1 < 0.050$, $t_2= 17.5658$, $P_2 < 0.050$).

Table-II: Comparison of Time Needed for Reaching the Standard Level of Blood Glucose and Daily Dosage of Insulin Between the Two Groups

Group	Time Needed for Reaching the Standard Level of Blood Glucose (d)	Daily Dosage of Insulin (U)
Observation	4.5 ± 1.1	17.1 ± 5.3
Control group	9.4 ± 1.2	23.1 ± 6.2
T	3.645	3.510
P	<0.05	<0.05

There were 3 patients of hypoglycemia and 3 patients of gastro-intestinal reaction in patients of Observation Group (6.128%). There were 4 patients of hypoglycemia and three patients of gastro-intestinal reaction in the patients of control group (7.518%). We found no significant difference statistically in the prevalence of the adverse reactions between the patients of both groups ($P > 0.050$).

DISCUSSION:

This research work showed that the use of insulin glargine in combination with acarbose was much effective in the treatment of elder patients suffering from diabetes. On the basis of the analysis of the characteristics of elder patients suffering from Type-2 diabetes, it is decided that diabetes at elder age has very high rate of prevalence and mild onset; therefore, it is not taken much seriously by the patients. The course of the diabetes in elder age is long and majority of these patients are present with other cardiovascular diseases like HTN and CHD (Coronary Heart Disease) [9, 10]. There is not ideal effect of the drugs in the control of the blood sugar and there is no obvious impact of single drug treatment on these patients [11]. Insulin glargine has the ability to stimulate the human basic insulin secretion [12]. There is maintained concentration of the blood glucose in the duration of treatment and

there is no peak concentration of blood [13, 14]. Many research works have displayed that insulin glargine treatment could efficiently decrease the prevalence of hypoglycemic events as compared with intermediate acting insulin and premixed insulin [15, 16]. A new type of hypoglycemic drug is acarbose.

After its administration through oral way, it can hinder the formation of intestinal α -glucosidase and leads to prevention of the decomposition of food polysaccharides to reduce the absorption and use of glucose and decrease the postprandial glucose level in blood, particularly for patients present with the normal FBG but very high postprandial blood glucose level [17]. The findings of this research work displayed that the effect of the blood glucose control in the patients of Observation Group was much better than the patients of control group and

the duration required to reach the standard level of blood glucose, dosage of insulin and prevalence of adverse reactions of the patients of Observation Group were much lower than the patients of control group ($P < 0.050$), this finding was much consistent with the findings of the study conducted by Qin. The findings showed that the combine treatment through two medicines was more effectual and stable in the control of the level of blood glucose than the utilization of the single drug and it was much secure [18]. The most important reason is that insulin glargine focuses on stability of the level of blood glucose within 24 hours, acarbose focuses on inhibition of the absorption and use of the intestinal blood glucose after mealtimes, and there can be synergic role of the combine treatment from both of these drugs in reducing the blood glucose and in the control of the blood glucose level of patients at certain level throughout complete day.

CONCLUSION:

The treatment of elder patients with the use of acarbose in combination with the insulin glargine suffering from diabetes is much effective. It has the ability to decrease the sugar level of blood and leads to improvement in quality of life; hence it has full worth for promotion in medical field. The size of sample was much small in this research work. There was no exploration of the impacts of blood glucose or long terms which will be further studied by the research works with large size of samples.

REFERENCES:

- Jiang GR, Zhang LR, Ji QL, Wang F, Xu H, Huang F, et al. Accumulation of plasma 3-deoxyglucosone impaired glucose regulation in Chinese seniors: Implication for senile diabetes? *Diabetes Metab Syndr: Clin Res Rev.* 2012;6(3):140-145. doi: 10.1016/j.dsx.2012.09.010.
- Home PD, Bolli GB, Mathieu C, Deerochanawong C, Landgraf W, Candelas C, et al. Modulation of insulin dose titration using a hypoglycemia-sensitive algorithm: insulin glargine versus neutral protamine Hagedorn insulin in insulin-naïve people with type 2 diabetes. *Diabetes Obes Metab.* 2015;17(1):15-22. doi: 10.1111/dom.12329.
- Mou M. Analysis short-term effect of acarbose and metformin combined with in-sulin analogues in the treatment of obese type 2 diabetes. *Chin Mod Med.* 2015;8(22):112-114.
- Lu JM. Updated key points of 2013 China guideline for type 2 diabetes. *Chin J Diabet.* 2014;22(10):865-869. doi: 10.3969/j.issn.1006-6187.2014.10.001.
- Ghosh S, Maka S. A constrained sub-optimal controller for glucose regulation in type 1 diabetes mellitus. *Optim Control Appl Meth.* 2014;35(2):191-203.
- Vacante M, Malaguarnera M, Motta M. Revision of the ADA-classification of diabetes mellitus type 2 (DMT2): The importance of maturity onset diabetes (MOD), and senile diabetes (DS). *Arch Gerontol Geriatr.* 2010;53(1):113-119. doi: 10.1016/j.archger.2010.06.017.
- Bhattacharya R, Zhou S, Wei W, Ajmera M, Sambamoorthi U. A real-world study of the effect of timing of insulin initiation on outcomes in older medicare beneficiaries with type 2 diabetes mellitus. *J Am Geriatr Soc.* 2015;63(5):893-901. doi: 10.1111/jgs.13388.
- Liu M, Li YH, Li JQ, Lv XY, He Y. Elevated serum total bilirubin levels are negatively associated with major diabetic complications among Chinese senile diabetic patients. *J Diabetes Complicate.* 2017;31(1):213-217. doi: 10.1016/j.jdiacomp.2016.08.023.
- Guglin M, Maguire K, Missimer T, Faber C, Caldeira C. Improvement in blood glucose control in patients with diabetes after implantation of left ventricular assist devices. *Asaio J.* 2014;60(3):290-293. doi: 10.1097/MAT.0000000000000064.
- Moon K, Punjabi NM, Aurora RN. Obstructive sleep apnea and type 2 diabetes in older adults. *Clin Geriatr Med.* 2015;31(1):139-147, ix. doi: 10.1016/j.cer.2014.08.023.
- Chen L, Yao ZL, Liu WH. The effects of glargine combined metformin treatment on metabolism of free radicals in elderly patients with type 2 diabetes. *Chongqing Med J.* 2016;45(11):1502-1504, 1507. doi: 10.3969/j.issn.1671-8348.2016.11.018.
- Yuhong H, Wenxu F, Yanfen L, Yu L, Ziqiang L, Liu Y, et al. Comparison of the effects of acarbose and TZQ-F, a new kind of traditional Chinese medicine to treat diabetes, Chinese healthy volunteers. *Evid-Based Compl Alt Med.* 2014;308126. doi: 10.1155/2014/308126.
- Farahani P, Khan S, Oatway M, Dziarmaga A. Exploring the distribution of prescription for sulfonylureas in patients with type 2 diabetes according to cardiovascular risk factors within a Canadian primary care setting. *J Popul Ther Clin Pharmacol.* 2015;22(3): e228-236.
- Hu RJ, Li Y, Lv QG, Wu TX, Tong NW. Acarbose monotherapy and type 2 diabetes prevention in eastern and western prediabetes: an ethnicity-specific metaanalysis. *Clin Therap.* 2015;37(8):1798-1812. doi: 10.1016/j.clinthera.2015.05.504.
- Qin J, Wang XP, Zhang Na, Chen YF. Superior efficacy and safety of glargine insulin plus acarbose as compared to twice-daily injection of premixed insulin with poorly control of blood glucose in type 2 diabetic patients. *Chin J Diabet.* 2014;22(5):439-441. doi: 10.3969/j.issn.1006-6187.2014.05.016.

16. Goldman J, Trujillo JM. iGlarLixi: A Fixed-Ratio Combination of Insulin Glargine 100 U/mL and Lixisenatide for the Treatment of Type 2 Diabetes. *Ann Pharmacother.* 2017;51(11):990-999. doi: 10.1177/1060028017717281.
17. Orchard TJ, Cariou B, Connelly MA, Otvos JD, Zhang S, Antalis CJ, et al. The effects of basal insulin peglispro vs. insulin glargine on lipoprotein particles by NMR and liver fat content by MRI in patients with diabetes. *Cardiovasc Diabetol.* 2017;16(1):73. doi: 10.1186/s12933-017-0555-1.
18. Pohlmeier H, Berard L, Brulle-Wohlhueter C, Wu J, Dahmen R, Nowotny I, et al. Ease of use of the insulin glargine 300 U/mL pen injector in insulin-naïve people with type 2 diabetes. *J Diabet Sci Tech.* 2017;11(2):263-269. doi: 10.1177/1932296816668877.