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EVALUATION OF THE GLYCEMIC CONTROL AFTER TREATMENT WITH NPH AND GLARGINE INSULIN IN THE PATIENTS SUFFERING FROM TYPE-1 DIABETES

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Abstract:

Objective: *The aim of this research work is to assess the glycemic control with a combine treatment of glargine insulin & NPH.*

Methodology: *This study was a prospective research work conducted on 10 patients suffering from Type-1 diabetes. We assessed the control of the glucose level & hypoglycemic episodes with a combine treatment through insulin NPH & glargine. We recorded at baseline the HbA1C, fasting plasma glucose, PPG (post-prandial glucose) and glucose level of blood on the arrival of the children as well as after 2 months & six months.*

Results: *The average HbA1C decreased from 7.68% to 5.8%, the prevalence of the hypoglycemia decreased from 1.78% to 1.18%, average FBG (Fasting Blood Glucose) decrease 119.0 mg/dl to 106.0 mg/dl & average glucose of blood on their arrival from school decreases 285.58 to 165.28 mg/dl over a six-month period of observation.*

Conclusion: *This treatment is very helpful with better results with low level of blood glucose at the time of the arrival from the school as well as no enhancement in the hypoglycemic episodes.*

Keywords: *Glycosylated Hemoglobin, Type 1 Diabetes, Insulin Glargine, Prevalence, Glucose, Follow-Up.*

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INTRODUCTION:

Glargine is very long-acting type of insulin which is present with peak-less profile and it is successfully in use for the administration of the patients suffering from Type-1 diabetes in a mixture with short acting preparations of the insulin. It has the ability to decrease the prevalence of the nocturnal hypoglycemia and it is much effectual like the NPH in the management to control the glycosylated hemoglobin (HbA1C). In most of the clinical practice, glargine is in use as basal insulin in addition with the three or four doses of insulin which can be short-acting. The demerits of this treatment is that administration of at least four to five injections per day is necessary, very recurrent monitoring of the sugar of blood is compulsory and the monitoring expense & treatment is much high.

It is necessary to give the short-acting insulin with six to eight hours with the meals. The time of the school is almost of six hours and most of the students suffering from diabetes were taking their meal without the dose of insulin. Therefore, the glucose level of the blood must be high after their arrival from school. The insulin NPH has its peak action after complete 2 hours of injection on time of the meal of the student. We examined the impact of adding NPH in the glucose level of blood in the morning and after their arrival from the school activities.

METHODOLOGY:

Total 10 patients suffering from Type-1 diabetes from eleven to sixteen year of age were the part of this research work. In the start of the research work, all the patients were using insulin of glargine in addition with pre-meals short-acting insulin as its part. All the patients continued on same treatment except insulin which was short-acting before the breakfast altered to the insulin NPH. We gave the insulin Glargine in a separate injection as well as at a different site. We asked the patients to monitor the glucose of blood at home & maintain it in a diary and we requested all the patients to visit our institute within every thirty days. The monitoring was necessary to be carry out six time in a day with minimum three days in every week while in the remaining days, it was necessary to monitor two time in a day as well as at the time of arrival from school activities of the patients.

Different parameters which were under study were weight, height, reading of glucose level at home, HbA1C & total amount in numbers for the hypoglycemic episodes three & six month periods. HPLC (High Performance Liquid Chromatography) was in use for the performance of the HbA1C. We entered all the information in the data sheets which was well-organized for this purpose. We explained the main aim of the research and its some side effects as hypoglycemia to the patients as well as their parents. All the parents of the patients signed the willing form arranged for patients. We selected the patients if their glucose level of blood was higher just after their arrival from school. If there was extreme hypoglycemia and the level of the glucose of blood was less than fifty, we advised the patients to contact us directly & visit hospital immediately with no wastage of time. SPSS V.10 was in use for the statistical analysis of the collected information.

RESULTS:

Out of total 10 patients, 4 were male and 6 were female patients. The average age of the patients at the time of the research work was 12.60 years and the average duration of the Type-1 diabetes was 3.80 years (ranges from six months to eight years). The average insulin normal daily dose was 0.90 unit per kg at the baseline; dose was 1.0 u/kg at three months and remained similar for up to the six month of the treatment. Table-1 is describing the HbA1C, FBG, PPG, & level of the glucose of blood at the time of arrival of the children from school which reduced after six month of the treatment.

Declines in the fasting as well as post-prandial level of the glucose of blood were not much significant because all the patients were getting the intense treatment of insulin from the very start but level of glucose at the time of their arrival from their school activities & HbA1C were decreased significantly having P value of 0.0010 & 0.0020 correspondingly.

Table-I: Mean Values of The Study Parameter

Parameters	Baseline	3 months	6 months
Glycosylated Hemoglobin (%)	5.68	6.38	5.8
Hypoglycemic Episodes	1.78	0.78	1.18
Glargine (u/kg/d)	0.38	0.38	0.38
Short acting Insulin dose u/kg	0.48	0.38	0.38
NPH insulin dose u/kg/d.	—	0.8	0.14
Fasting blood glucose mg/dl.	119.00	109.00	106.00
Post prandial glucose mg/dl.	163.00	164.00	152.00
Blood glucose at arrival from the school. Mg/d/	285.58	186.00	165.25

DISCUSSION:

Various research works have confirmed that improved glycemic management control with the treatment through intensive insulin among patients suffering from Type-1 diabetes resulted into very high decrease in nephropathy, retinopathy & neuropathy. The term of intensive insulin treatment is in use to demonstrate very complex treatment that distinct the basal insulin treatment from the super-imposed doses of very rapid 3 or more than 3 times in a day. Previously, the very frequent utilized multiple dose treatment contained injections twice in a day of very fast acting and intermediary-acting insulin. This type of the treatment is not physiologic and now there is no recommendation of this research work. The insulin of glargine is present with no peak which has made it a better basal insulin groundwork for the intensive insulin treatment for Tpe-1 diabetes.

Glargine is present as better that the two times daily Ultralente and/or NPH for the control of the HbA1C, and in some research works, glargine is better than NPH for the control of the fasting glucose level of the blood. This is much closer to the CS11, which is an ideal method for the insulin treatment now a days and utilization of the Glargine is available to decrease the prevalence of the hypoglycemia. The main decision in the stat of the intensive treatment for insulin is whether doctors or patients are very uneasy with large amount of injections daily. There are not much disparities between treatments in effectiveness, rate of occurrence of hypoglycemic episodes or high influence on the QoL (Quality of Life) of majority of patients. In the city of Rawalpindi, majority of the patients with Type-1 diabetes are getting the treatment with multiple injections of insulin. Many patients show their resistance for this treatment because of multiple injections & requirement for very recurrent monitoring of the glucose level.

The other main issue experienced during treatments with multiple injections of insulin was long time duration of school and all the patients were not willing to have injections in their school time. The level of the glucose of blood was much high at the time of their arrival from school. Therefore, we decided to tackle this issue with the usage of the NPH insulin at the time of morning before taking breakfast. NPH insulin's peak action will be in the duration of the school time & with no fear of the hypoglycemia as they normally eat in the school timing. Majority of the children were present to take no good breakfast at their houses so there was no any worry about the hyperglycemia. The insulin NPH in the duration of day time with the Glargine enhanced the circulating insulin's level in the hours of waking but as majority of the children eat four to five times in a day, raised prevalence of hypoglycemia in day was not under notification. The glucose level of the blood on the arrival of the children from school improved considerably in the patients of this research work who were receiving NPH in the early morning hours in place of short-acting insulin.

CONCLUSIONS:

The findings of this research work concluded that the insulin NPH can work additionally to intensive treatment of insulin with insulin of glargine in place of the short-acting insulin at early in the morning. This treatment displayed good level of blood glucose on the arrival of the patients from their school activities as well as reduced level of HbA1C.

REFERENCES:

1. Yeung, C. K., Fhkam, F., Ngai, W. W. M., & Lau, I. T. (2017). Effect of Initiation of Basal Insulin Glargine on Glycemic Control in Patients with Diabetes: Real Life Experience from Hong Kong. Journal of Diabetes Mellitus, 7(03), 108.
2. Marra, L. P., Araújo, V. E., Oliveira, G. C., Diniz, L. M., Guerra Júnior, A. A., Acurcio, F. D. A., ... & Álvares, J. (2017). The clinical effectiveness of insulin glargine in patients with Type I diabetes in Brazil: findings and implications. Journal of comparative effectiveness research, 6(6), 519-527.
3. Czupryniak, L., Dzida, G., Gumprecht, J., Jarosz-Chobot, P., Klupa, T., Szelachowska, M., ... & Syta, A. (2016). Clinical value of glargine 300 U/mL based on randomized trials and routine medical practice. Clinical Diabetology, 5(6), 203-207.
4. Niemoeller, E., Silvestre, L., Gabor, B. O. K. A., & Miossec, P. (2017). U.S. Patent No. 9,821,032. Washington, DC: U.S. Patent and Trademark Office.
5. Nawaz, M. S., Shah, K. U., Khan, T. M., Rehman, A. U., Rashid, H. U., Mahmood, S., ... & Farrukh, M. J. (2017). Evaluation of current trends and recent development in insulin therapy for management of diabetes mellitus. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 11, S833-S839.
6. Araújo, L. P. M. V. E., & Diniz, T. B. S. L. M. (2016). Clinical Effectiveness and Safety of Analog Glargine in Type 1 Diabetes: A Systematic Review and Meta-Analysis.
7. Thabit, H., & Hovorka, R. (2016). Continuous subcutaneous insulin infusion therapy and

multiple daily insulin injections in type 1 diabetes mellitus: a comparative overview and future horizons. Expert opinion on drug delivery, 13(3), 389-400.
8. Owens DR, Griffiths S. Insulin glargine. Int J Clin Pract 2002, 56: 460-66.
9. The Diabetes Control and Complication Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long term complications in insulin dependent diabetes mellitus. N Engl J Med 1993; 329: 977.
10. Heinemann L, Linkeschova R, Rave K, Hompesch B, Sedlak M, Heise T. Time action profile of the long acting insulin analog insulin glargine in comparison with those of NPH insulin and placebo. Diabetes Care 2000; 23: 644.
11. Scholtz HE, Becker RA. Reproducibility of serum insulin and glucose infusion rate profiles of insulin glargine compared with NPH and insulin ultralente. Diabetes 2004; 53 (suppl 2): A 481.
12. Lepore M, Pampanelli S, Fanelli C, Porcelllati F, Bartocci L, Di Vincenzo A, et al. Pharmacokinetics and pharmacodynamics of subcutanous injection of long acting human insulin analog glargine, NPH, and Ultralente human insulin and continuous subcutaneous infusion of insulin lispro. Diabetes 2000, 49: 2142 – 48.
13. Ranter RE, Hirsch IB, Neifing Jl, Garg SK, Mecca TE, Wilson CA. Less hypoglycemia with insulin glargine in intensive insulin therapy for type 1 diabetes. U.S. Study Group of Insulin Glargine in Type 1 Diabetes. Diabetes Care 2000; 23: 639 – 43.
14. Tsui E, Barnie A, Ross S, Parkes R, Zinman B. Intensive insulin therapy with insulin Lispro: a randomized trial of continuous insulin infusion versus multiple daily insulin injection. Diabetic Care 2001; 24: 1722.
15. Sudhanshu, S., Nair, V. V., Godbole, T., Reddy, S. V. B., Bhatia, E., Dabadghao, P., ... & Bhatia, V. (2019). Glycemic control and long-term complications in pediatric onset type 1 diabetes mellitus: A single-center experience from Northern India. Indian pediatrics, 56(3), 191-195.
16. Home, P. D., Bergenstal, R. M., Bolli, G. B., Ziemen, M., Rojeski, M., Espinasse, M., & Riddle, M. C. (2015). New insulin glargine 300 units/mL versus glargine 100 units/mL in people with type 1 diabetes: a randomized, phase 3a, open-label clinical trial (EDITION 4). Diabetes Care, 38(12), 2217-2225.
17. Meiffren, G., Herbrand, T., Anastassiadis, E., Klein, O., DeVries, J. H., Heise, T., ... & Plum-Mörschel, L. (2019). Better glycaemic control with BioChaperone glargine lispro co-formulation than with insulin lispro Mix25 or separate glargine and lispro administrations after a test meal in people with type 2 diabetes. Diabetes, Obesity and Metabolism.
18. Kelsey, K. (2017). The Effects of Continuous Insulin Pump Therapy on Glycemic Control in Pregnant Type 1 Diabetics.
19. Kapellen, T. M. (2019). Pharmacotherapy of Children and Adolescents with Type 1 Diabetes Mellitus.
20. Greco, D. S. (2018). Diabetes mellitus in animals: diagnosis and treatment of diabetes mellitus in dogs and cats. In Nutritional and Therapeutic Interventions for Diabetes and Metabolic Syndrome (pp. 507-517). Academic Press.
21. Behrend, E., Holford, A., Lathan, P., Rucinsky, R., & Schulman, R. (2018). 2018 AAHA diabetes management guidelines for dogs and cats. Journal of the American Animal Hospital Association, 54(1), 1-21.
22. Agesen, R. M., Kristensen, P. L., Beck-Nielsen, H., Nørgaard, K., Perrild, H., Jensen, T., ... & Pedersen-Bjergaard, U. (2018). Effect of Insulin Analogs on Frequency of Non–Severe Hypoglycemia in Patients with Type 1 Diabetes Prone to Severe Hypoglycemia: Much Higher Rates Detected by Continuous Glucose Monitoring than by Self-Monitoring of Blood Glucose—The HypoAna Trial. Diabetes technology & therapeutics, 20(3), 247-256.
23. Ahmad, H., & Chowdhury, M. A. N. (2019). A Short Review on Anti-diabetics for Uncontrolled Type 2 Diabetes Mellitus. Medicine Today, 31(2), 120-127.