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## The Use Of Daily Continuous Glucose Monitoring (Chmg) In Clinical Practice

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### ABSTRACT

Type 1 diabetes mellitus is a disease in which the highest rates of premature mortality and early disability of patients are observed, which is caused by the onset of the disease at an early age, the instability of the course of type 1 diabetes and the threat of acute and chronic complications. The goals of type 1 diabetes mellitus treatment are its compensation, prevention of the risk of complications when normoglycemia is reached and stabilized.

### KEYWORDS

Diabetes mellitus, glucose, glycemia, self-monitors, insulin pump, glucated hemoglobin

### INTRODUCTION

Relevance of the problem: Diabetes mellitus in recent decades has been one of the first priorities of national health systems in all countries of the world, due to the high prevalence of this pathology and the growth

of socio-economic losses associated with the development of severe disabling complications. In 2014, the number of patients with diabetes mellitus in the world, according to WHO experts, amounted to more

than 360 million people, by 2030, it is expected to increase the number of patients to 480 million people. Self-monitoring of blood glucose is the primary way to control and manage diabetes. The current ADA (American Nutritional Association) recommendations imply that a patient with diabetes mellitus self-monitors blood glucose levels at least 4 times a day (3 times before meals and 1 time before bedtime).

**Target:** The aim of this work was to develop a continuous monitoring system (LMWH) of blood glucose in the management of type 1 diabetes mellitus using a pump. The CGM system was the first device approved by the FDA for three-day monitoring.

#### MATERIALS AND RESEARCH METHODS

The study was carried out on the basis of the Department of Endocrinology at the Samarkand Regional Endocrinological Dispensary. The study included 31 patients with type 1 diabetes mellitus, 36% (n=12) men and 64% (n=19) women. The duration of the disease ranged from 6 months to 25 years (on average,  $13.24 \pm 2.59$  years). The patients' age ranged from 15 to 45 years (average  $29 \pm 3.26$  years). Pear 1 - patients who received insulin therapy in the mode of continuous subcutaneous insulin administration using an insulin pump (9 person). Pear 2 (control) - patients who continued to receive a combination of insulin glargine (Lantus) plus ultrashort-acting human insulin analogues (22 people). The presence of complications of diabetes mellitus was determined according to the data of narrow specialists, as well as on the basis of biochemical blood tests. The inclusion criteria were: an established diagnosis of type 1 diabetes mellitus in the stage of decompensation, the presence of

motivation and the ability to follow the doctor's recommendations.

#### RESULTS AND DISCUSSION

Hyperglycemic and hypoglycemic fluctuations were assessed in detailed analysis. The variability of glycemia significantly decreased: the duration of normoglycemia one year after the start of pump therapy increased from  $21.6 \pm 0.3\%$  to  $87.3 \pm 0.35\%$  of the measurement time ( $p < 0.05$ ). the duration of hypoglycemia decreased from  $3.5 \pm 0.15\%$  to  $1.8 \pm 0.15\%$  ( $p > 0.05$ ), and the duration of the periods of hyperglycemia decreased by 2 times from  $74.9 \pm 0.43\%$  to  $10.9 \pm 0.22\%$  ( $p < 0.05$ ) measurement time. The absolute number of peaks-fluctuations of glycemia, both hyper- and hypoglycemic decreased from  $6.61 \pm 0.16$  to  $4.42 \pm 0.16$  (D2.2:  $p < 0.05$ ) and from  $3.81 \pm 0.1$  to  $1.22 \pm 0.11$  (D2.63  $p < 0.05$ ), respectively. Group 2, whose patients received conventional insulin therapy in a multiple-injection regimen, was considered as a comparison bulb, which made it possible to evaluate the advantages of different methods of insulin therapy. Therefore, a comparative analysis of the parameters of carbohydrate metabolism according to the data of self-control and continuous daily monitoring in group 2 and their comparison with the corresponding indicators of group 1 was of particular interest. The average total glycemic value decreased from  $10.81 \pm 0.04$  to  $9.04 \pm 0.04$  mmol / L ( $p < 0.05$ ), there was a significant decrease in the postprandial average glycemic value from  $12.3 \pm 0.18$  to  $9.92 \pm 0.18$  mmol / L ( $p < 0.05$ ). The glycated hemoglobin (HbA1c) value decreased after 6 months. therapy, however, without reaching the target level, and amounted to  $8.30 \pm 0.04\%$  ( $w < 0.21$ ), but 1 year after the start of observation, the average HbA1c level in this group of patients again increased to  $9.10 \pm 0.18\%$  ( $m < 0.03$ ), which

can partly be explained by a decrease in patient compliance and demonstrates the insufficient effectiveness of this method of insulin therapy. Daily fluctuations in glycemia according to the average values in group 2, as well as in group 1, did not fit within the established range of 3.9-10mmol / l, the target level of postprandial glycemia after 2 hours (glycemia less than 7.5 - 8.0 mmol / l) was not achieved. Hyperglycemic and hypoglycemic excursions have been studied in detail. The variability of glycemia decreased, but to a lesser extent than in group 1: the duration of normoglycemia one year after the start of pump therapy increased from 26.8 + 0.54% to 80.30.45% of the measurement time ( $p < 0.05$ ), the duration of hypoglycemia decreased from 3.6-0.13% to 2.8 + 0.12% ( $p > 0.05$ ), and the duration of periods of hyperglycemia decreased from 69.6 + 0.33% to 16.9 + 0.28% ( $p < 0.05$ ) measurement time. The number of peaks-fluctuations of glycemia, both hyper- and hypoglycemic, decreased from 6.84 + 0.2 to 5.61 + 0.13 ( $p < 0.05$ ) and from 4.91 + 0.11 to 3.81 + 0.11 ( $p < 0.05$ ), respectively. The study clearly demonstrated a more pronounced, statistically significant decrease in the hypoglycemic peaks of fluctuations against the background of insulin therapy in the НПВИ mode, including at night, reaching a plateau of normoglycemia, an increase in the duration of the period of normoglycemia during the day during LUTS. Thus, in spite of the fact that both of the considered variants of insulin therapy made it possible to control the average level of glycemia during the day within the limits close to the established range (3.9-10.0 mmol L), however, it was the continuous subcutaneous administration of insulin that ensured greater stability of glycemia during days and achievement of target values for most parameters of carbohydrate metabolism.

Results and discussion. 1. The use of NPVI in patients with type 1 diabetes mellitus provides less variability in the level of glycemia due to a decrease in the number of peaks-fluctuations in comparison with the regimen of multiple insulin injections, reduces the duration of episodes of hypo- and hyperglycemia, and significantly increases the duration of the period of normoglycemia to 87.3% when monitored with using a continuous glycemic monitoring system (CGM) for 72 hours.

2. On the background of therapy with an insulin pump, the target HbA1c values were achieved in 42.8% of patients, 57.2% of patients showed a decrease in HbA1c levels. In patients on a regimen of repeated insulin injections, the HbA1c value also decreases, however, not reaching the target value.

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