

THE IMPACT OF DIURNAL GLYCEMIC VARIABILITY ON THE CARDIOVASCULAR SYSTEM IN CHILDREN WITH TYPE 1 DIABETES MELLITUS

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Background: diurnal glycemic variability has a direct impact on the formation of chronic complications of Type 1 diabetes mellitus (T1DM) in children.

Aim: to clinically assess the function of the cardiovascular system depending on the diurnal glycemic variability in children with T1DM.

Material and Methods: the study involved 65 children (30 girls, 35 boys) aged 4-17 years (mean age -- 11+0.4 y.o.) with T1DM duration from 1 to 14 years (mean duration of the disease 4+0.3 y.) in the endocrinology center of CPH No. 2 (Tver, Russia). The subjects underwent clinical examination: they had glycated hemoglobin (HbA1c) testing, 24-hour blood glucose monitoring and electrocardiography (ECG). Depending on the glycemic variability parameters, the subjects were assigned to one of the two groups: Group 1 -- glycemic variability <5 mmol/L/day (3.7+0.26 mmol/L, N=15), Group 2 -- >5 mmol/L/day (7.8+0.30 mmol/L, N=50) (Figure 1).

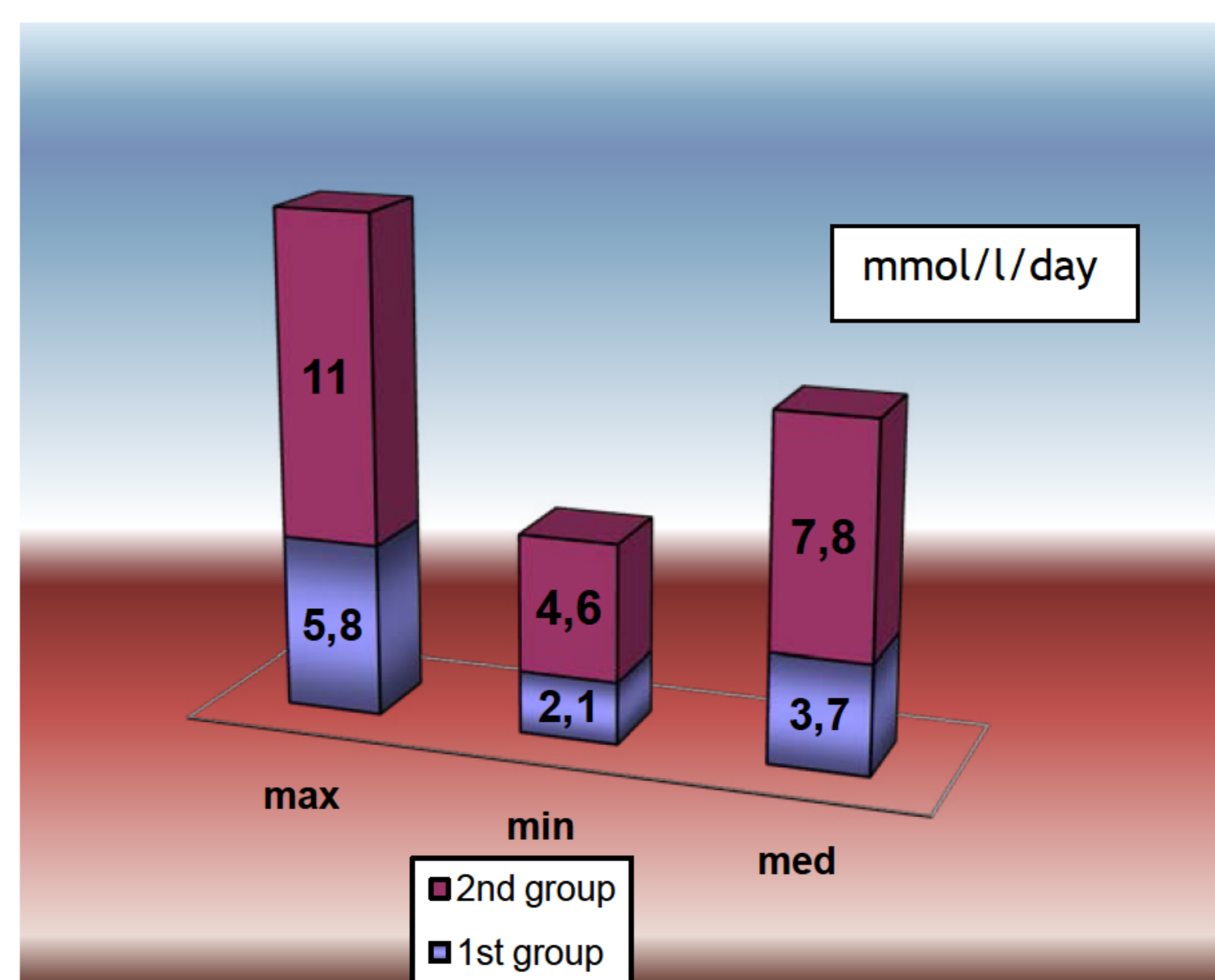
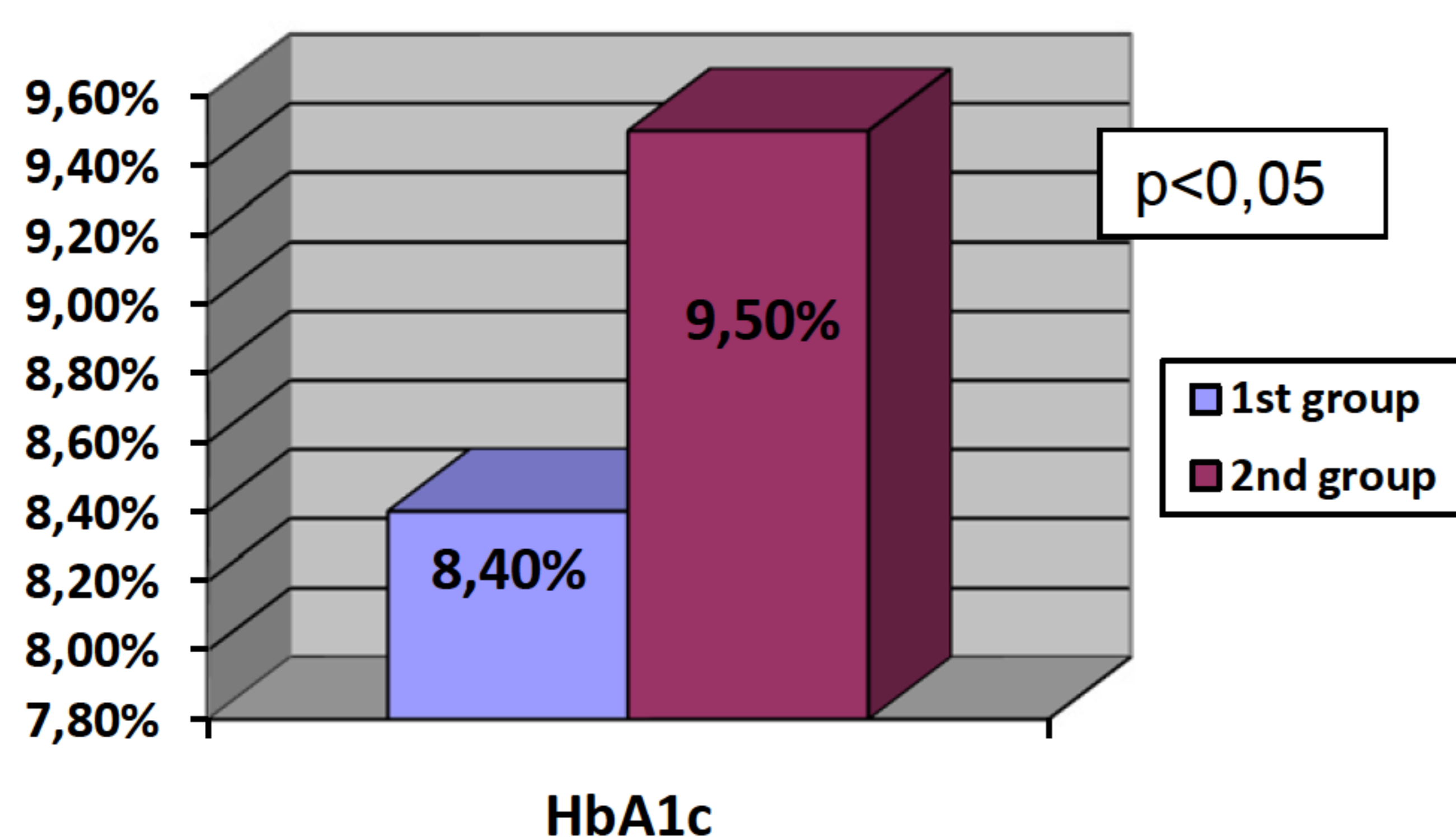


Figure 1. The diurnal glycemic variability in children with diabetes mellitus type 1.



Results: the study has revealed significant increase in HbA1c in Group 2 compared to Group 1 (Figure 2). The ECG analysis showed a significant increase in the frequency of sinus arrhythmia in Group 2 compared to Group 1. There was no significant difference in the incidence of tachycardia between the two groups. In Group 2 we found a significantly higher incidence of early repolarization syndrome compared to Group 1, wandering atrial pacemaker, 2nd degree sinoatrial block (Table 1).

Figure 2. Indicators of the level of glycated hemoglobin (HbA1c) in children with diabetes mellitus type 1, depending on the diurnal glycemic variability

Table 1. Rhythm disturbances in children with diabetes mellitus type 1, depending on the diurnal glycemic variability

group	sinus arrhythmia	tachycardia	early repolarization syndrome	wandering atrial pacemaker	2 nd degree sinoatrial block
1st	14%	35%	7%	0%	0%
2nd	35%	25%	25%	7%	7%
p	p<0,01	p>0,05	p<0,05	p<0,01	p<0,01

Conclusions: diurnal glycemic variability affects the function of the cardiovascular system in children with T1DM, which requires a differentiated approach to monitoring and rehabilitation.

