

# Hypoglycemia in Type 1 Diabetes Mellitus patients – a pilot study (the results of a continuous glucose monitoring)

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**Introduction:** Hypoglycemia is a frequent adverse effect of the treatment of diabetes mellitus with insulin. It is an undesirable episode which can not only interfere with everyday activities such as performing at work or driving but also influences the cardiovascular (arrhythmias and myocardial ischemia) and central nervous systems (faster cognitive decline and accelerated onset of dementia). Also, the fear of hypoglycemia affects the self-treatment of diabetes mellitus and prevents optimal glycemetic control.

**Aims:** We analyzed CGM records of patients with type 1 diabetes mellitus to determine the frequency of hypoglycemia, its duration, and depth. Also, the results of hypoglycemia treatment were analyzed.

## Materials and Methods:

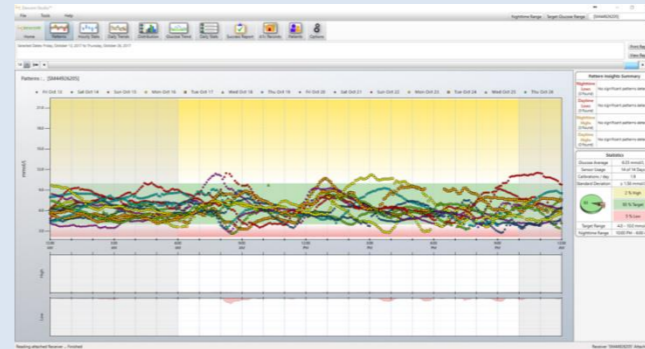
We analyzed CGM records of 13 patients with type 1 diabetes mellitus treated with an insulin pump. Each patient used CGMS for about 7 days and was instructed to record all the relevant activities such as insulin injection, meals, exercise, and hypoglycemic episodes. We inspected the glycemia levels to evaluate the number of hypoglycemic episodes per patient, the duration of each episode and the time of the day that the hypoglycemic episode occurred. We also analyzed the glycemia levels 1, 2 and 3 hours after hypoglycemia treatment as well as determined the lowest glycemia during an episode.

## Results:

We evaluated CGM records in 13 patients with type 1 diabetes mellitus (mean age was  $27 \pm 8.6$ , mean duration of the disease was  $8.4 \pm 6.1$  years, mean HbA1c was 65 mmol/mol, mean duration of monitoring was  $6.54 \pm 0.85$  days per patient). We detected 39 hypoglycemic episodes in 7 patients. There were 27 episodes during the day (from 0600 to 2400) and 13 episodes during the night (from 2400 to 0600). Average duration of hypoglycemia was 01:23:51 (total), 01:05:06 (day), 01:56:37 (night). The average lowest hypoglycemia was 3.24 (day) and 3.13 (night). Average glycemia 1, 2 and 3 hours after correction of the hypoglycemic episode was 7.70, 9.49, and 10.5 mmol/l respectively, the levels over 10 mmol/l occurred in 13 events.

**Conclusions:** Hypoglycemia episodes were present in more than half of the patients. Hypoglycemia was more common during the day than night but the hypoglycemic episodes during the night lasted almost twice as long on average. Higher than recommended values within 3 hours after the hypoglycemia treatment (10 mmol/l) occurred in 1/3 cases. Hypoglycemia should be a matter of regular education in type 1 diabetes patients.

Example of a CGM record



Daily records shown in one window

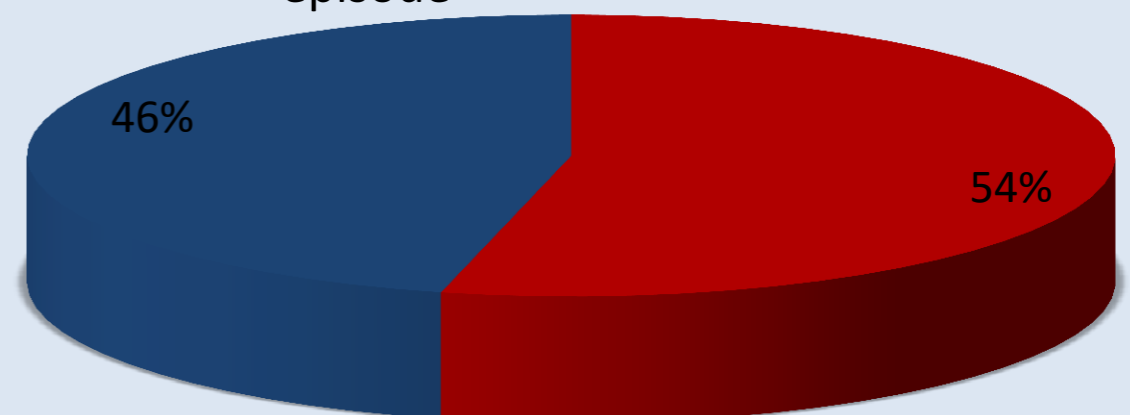
Continuous Glucose Monitoring (CGM) system



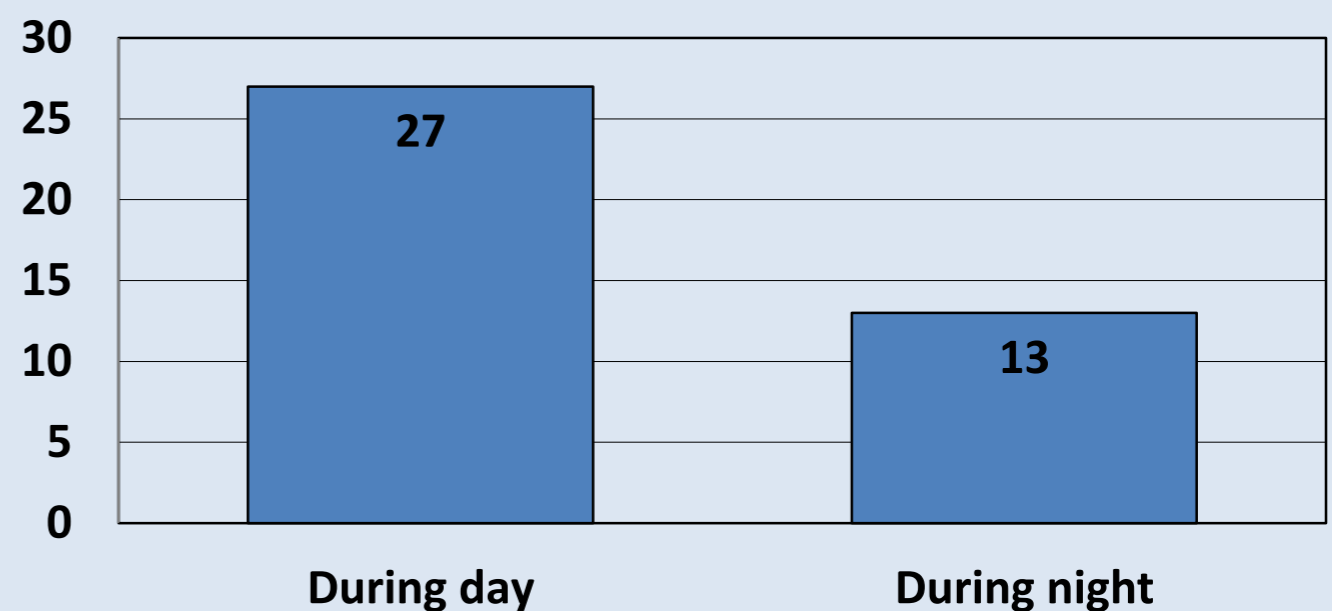
## Percentage of patients with a hypoglycemic episode

■ Patients with a hypoglycemic episode

■ Patients without a hypoglycemic episode



## Distribution of hypoglycemic episodes during day and night



## Distribution of glycemia in the period of 3 hours after treatment

