Frequent and prolonged daytime hypoglycaemia in diabetic children detected by continuous glucose monitoring: A problem of hypoglycaemia unawareness?

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The authors have nothing to disclose

Background

Hypoglycaemia represents a common issue in diabetic children, and the achievement of good metabolic control together with the avoidance of hypoglycaemia remains a tightrope walk.

As hypoglycaemia is not always recognized, data about hypoglycaemia frequency are limited.

Aims

This study focusses on **hypoglycaemia during the day** in diabetic children and aims at evaluating:

1. Frequency of hypoglycaemia.
2. Duration of hypoglycaemia.
3. Risk factors for hypoglycaemia.

Patients/Methods

In 60 children with type 1 diabetes mellitus for > 6 months a continuous glucose monitoring was performed for 6 days. 51 patients had a complete record.

Daytime hypoglycaemia was defined as any sensor glucose excursion < 3.7mmol/l during the day.

Hypoglycaemia was classified as symptomatic if the patient noted symptoms of hypoglycaemia at the time of occurrence.

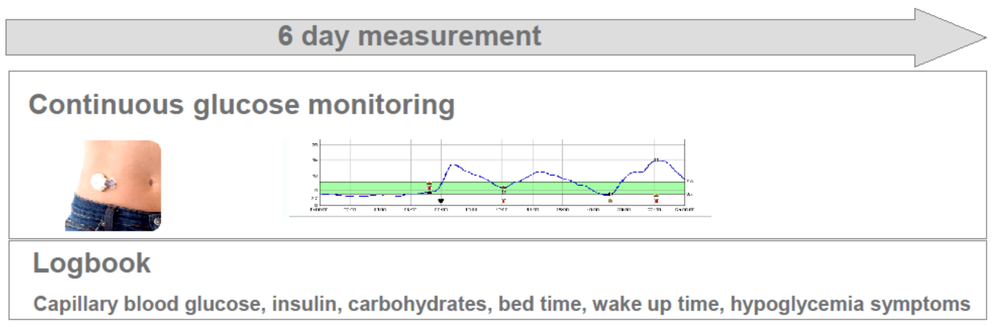

Fig. 1: study design

	mean (range)
N	51
sex (f/m)	29 / 22
insulin treatment (Multiple injection/pump)	36 / 15
age (y)	11.7 (2.4-17.6)
diabetes duration (y)	5.1 (0.5-14)
insulin dosage (U/kg/d)	0.9 (0.3-1.5)
% basal insulin (%)	49 (25-67)
HbA1c (%)	7.95 (6.0-12.3)

Table 1: patient collective

Results

1.Hypoglycaemia frequency

182 episodes of daytime hypoglycaemia (3.5/patient/6days)

33 (18%) symptomatic, **149 (82%) asymptomatic**

44% of all episodes: glucose **< 3mmol/l**

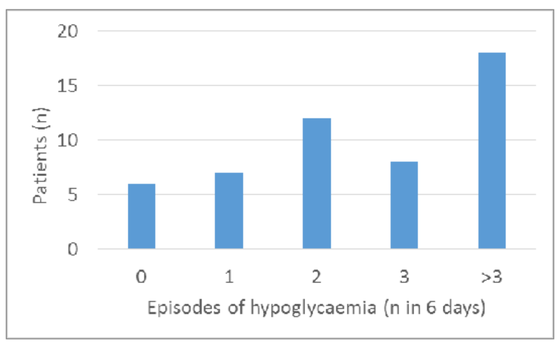

Fig. 2: Distribution of hypoglycaemia frequency to patients

2. Hypoglycaemia duration

60% of the episodes lasted for more than 30min and 25% more than 1 hour. The maximum duration was 6.5 hours.

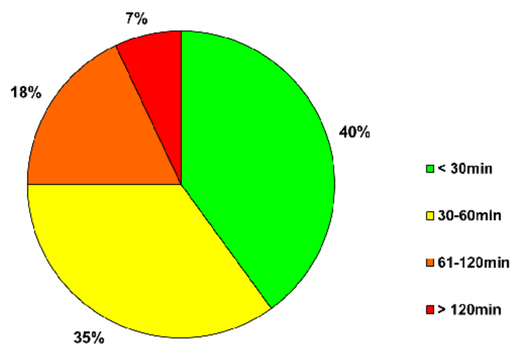

Fig. 3: duration distributed by percentage

3. Risk factors

The duration of the longest hypoglycaemic episode was **associated to diabetes duration** ($p < 0.05$, $r = 0.3$).

This means that hypoglycaemia was more prolonged in patients with a longer duration of diabetes.

Frequency or duration of daytime hypoglycaemia was

not associated to:
HbA1c (p 0.08/0.07)
Age (p 0.58/0.47)
Insulin dosage (p 0.88/0.59)
% basal insulin (p 0.14/ 0.68)

Type of treatment (MDI/CSII): no difference in frequency or duration of hypoglycaemia.

Treamtent	Multiple injection	Pump	p
No of episodes	3 (0-10)	4.9 (0.11)	0.1
Total duration (min)	153 (0-870)	218 (0-830)	0.36
Longest episode (min)	64 (0-390)	78 (0-235)	0.39

Table 2. Comparison of treatment groups (mean and range)

Conclusion

Hypoglycaemia is **frequent** in diabetic children, and even during daytime when patients are awake, most of the episodes are **asymptomatic** and can be **prolonged.**

In our study, tight metabolic control or high insulin dosage did not increase the risk for hypoglycaemia.

Longer diabetes duration is a **risk factor for prolonged hypoglycaemia**.

These data reveal the importance of hypoglycaemia unawareness and impaired counterregulation already in childhood.

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