

Hypoglycaemia in type 1 diabetes assessed by continuous glucose monitoring

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ABSTRACT

Hypoglycaemia is the most frequent side effect to insulin treatment. To detect hypoglycaemia, patients are dependent on symptoms and/or self-monitoring of blood glucose (SMBG). These methods of recording are sub-optimal. Continuous glucose monitoring (CGM) has now been introduced.

The dissertation consists of three papers using CGM technology: 1) a methodological validation, 2) a systematic evaluation of the occurrence of hypoglycaemia and risk markers for silent (asymptomatic) hypoglycaemia, and 3) a study of the Somogyi phenomenon.

1. The lower detection limit (2.2 mmol/l) of the applied CGM system (CGMS) is valid for retrospective recording of hypoglycaemia in relation to intra- and inter-sensor comparison. CGMS can potentially be used for adjustment of insulin treatment. The device is less accurate when evaluating duration of hypoglycaemic episodes.
2. A total of 119 patients with type 1 diabetes used CGMS for six days. Silent hypoglycaemia constitutes three fourth of all hypoglycaemic episodes (CGMS reading = 2.2 mmol/l) and is on average detected three times weekly. There is no relationship between conventional risk markers for severe hypoglycaemia and silent hypoglycaemia. Patients with conditions associated with renin-angiotensin blocking treatment seem to have a lower risk of silent hypoglycaemia.
3. The Somogyi phenomenon – nocturnal hypoglycaemia begetting morning hyperglycaemia – has previously been rejected in experimental studies on admitted patients but many health-care professionals still believe in its existence. Morning blood glucose is not high after nocturnal hypoglycaemia, but generally low. The existence of the Somogyi-phenomenon is now also rejected by CGMS in patients in daily life.