

Abstract

Background: For many patients with Type 1 diabetes mellitus (T1DM), hypoglycemia is a major obstacle to achieving satisfactory compensation. Hypoglycemia unawareness is present in approximately 25 % of patients with T1DM. We use the validated Gold Score and Clarke Score questionnaires in combination with data from continuous (CGM) or instantaneous (FGM) glucose monitoring sensors to assess the perception disorder.

Aims: The aim of this diploma thesis was a comprehensive assessment of the occurrence of hypoglycemia unawareness based on the validated Gold Score and Clarke Score questionnaires and the demonstration of the connection between impaired perception of hypoglycemia according to questionnaires and the percentage of time spent in hypoglycemia based on sensor data.

Research methodology: In this observational and questionnaire non-interventional study, 73 patients treated with T1DM for more than 12 months and using CGM or FGM (age 41 years \pm 16, duration of T1DM 16.7 years \pm 11, HbA1c 52 mmol/mol \pm 9,7) who completed the Gold Score, Clarke Score and HABS questionnaires to supplement the psychological level of the issue. In these patients, data from their sensors was obtained and the parameters such as average glycemia, percentage of time in the range in hypoglycemia (3.9-10 mmol/l), glycemic variability and estimated HbA1c were evaluated.

Results: Hypoglycemia unawareness was verified (ie, Gold Score and/or Clarke Score \geq 4) in 25 % (18/73) of respondents. A 3 % higher incidence of impaired perception of hypoglycemia was demonstrated in patients who spend more than the recommended 5 % of time in the Time-Below-Range (TBR, blood glucose below 3.9 mmol/l). In a sub-analysis including patients with only CGM, the incidence of impaired perception of hypoglycemia was found to be 8 % higher. We observed the occurrence of impaired recognition of hypoglycemia more often in patients with a longer duration of the disease.

Conclusion: The hypoglycemia unawareness syndrome is a condition that can lead not only to the withdrawal of a driver's license, but also to the patient's life. In this work, we demonstrated a higher incidence of hypoglycemia recognition disorder according to questionnaires in patients who spend a higher percentage of time in hypoglycemia from sensor data. Thus, reducing the time spent in hypoglycemia could lead to a lower incidence of hypoglycemia recognition failure. Further research in this area would be of great benefit.

Keywords: type 1 diabetes mellitus, hypoglycemia unawareness, time-below-range, gold score, clarke score