

## Self-Adjustment of Insulin Dose Using Graphically Depicted Self-Monitoring of Blood Glucose Measurements in Patients with Type 1 Diabetes Mellitus

Andreas Reichel, M.D.,<sup>1</sup> Hannes Rietzsch, M.D.,<sup>1</sup> Barbara Ludwig, M.D.,<sup>1</sup> Katrin Röthig,<sup>1</sup> Annette Moritz, Ph.D.,<sup>2</sup> and Stefan R. Bornstein, M.D.<sup>1</sup>

### Abstract

#### **Background:**

There is a need for patients to be able to adjust their insulin doses accurately and independently during continuous subcutaneous insulin infusion (CSII) therapy in order to avoid glycemic excursions and improve glycemic control. Use of new technology has the potential to aid patients in visualizing their circadian patterns and improving their understanding of data provided by self-monitored blood glucose (SMBG) measurements.

#### **Methods:**

A 24-week crossover study was performed in 25 patients with type 1 diabetes mellitus using CSII and SMBG. Patients were randomized either to entering blood glucose data into handwritten logbooks or to using the Accu-Chek SmartPix information management system (IMS) coupled with instructions from a training manual to aid interpretation of the IMS readings. Patients analyzed these chart readings every 2 weeks, and outpatient visits were scheduled for both arms every 6 weeks.

#### **Results:**

There was a significantly lower mean overall blood glucose level with the IMS compared with use of a logbook ( $139 \pm 16.2$  versus  $150 \pm 19.8$  mg/dl;  $\Delta = 10.8$  mg/dl;  $p < .01$ ), and a significantly higher proportion of blood glucose values was in the target range compared with use of a logbook (43.6% versus 38.5%;  $p < .001$ ). Hypoglycemic events were also significantly lower with the IMS compared with logbooks (3.7 fewer events/6 weeks;  $p < .05$ ). There was no significant difference between groups in the daily frequency of SMBG measurements.

#### **Conclusions:**

The use of an IMS, coupled with an easily understood training manual, enables patients to improve glycemic control by performing accurate and timely self-adjustments to their insulin regimens.

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**Author Affiliations:** <sup>1</sup>Medical Clinic and Outpatient Clinic 3, University Hospital of Carl-Gustav-Carus, Dresden, Germany; and <sup>2</sup>Roche Diagnostics Deutschland GmbH, Mannheim, Germany

**Abbreviations:** (CSII) continuous subcutaneous insulin infusion, (HbA1c) glycosylated hemoglobin, (IMS) information management system, (SD) standard deviation, (SMBG) self-monitored blood glucose, (T1DM) type 1 diabetes mellitus

**Keywords:** glycemic control, hypoglycemia, information management system, self-monitoring of blood glucose, type 1 diabetes mellitus

**Corresponding Author:** Andreas Reichel, M.D., Medical Clinic and Outpatient Clinic 3, University Hospital of Carl-Gustav-Carus, Fetscherstr. 74, D-01307 Dresden, Germany; email address [andreas.reichel@uniklinikum-dresden.de](mailto:andreas.reichel@uniklinikum-dresden.de)