

## Pilot Study of the SPRINT Glycemic Control Protocol in a Hungarian Medical Intensive Care Unit

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### Abstract

#### Introduction:

Stress-induced hyperglycemia increases morbidity and mortality. Tight control can reduce mortality but has proven difficult to achieve. The SPRINT (Specialized Relative Insulin and Nutrition Tables) protocol is the only protocol that reduced both mortality and hypoglycemia by modulating both insulin and nutrition, but it has not been tested in independent hospitals.

#### Methods:

SPRINT was used for 12 adult intensive care unit patients (949 h) at Kálmán Pándy Hospital (Gyula, Hungary) as a clinical practice assessment. Insulin recommendations (0–6 U/h) were administered via constant infusion rather than bolus delivery. Nutrition was administered per local standard protocol, weaning parenteral to enteral nutrition, but was modulated per SPRINT recommendations. Measurement was every 1 to 2 h, per protocol. Glycemic performance is assessed by percentage of blood glucose (BG) measurements in glycemic bands for the cohort and per patient. Safety from hypoglycemia is assessed by numbers of patients with BG < 2.2 (severe) and %BG < 3.0 and < 4.0 mmol/liter (moderate and light). Clinical effort is assessed by measurements per day. Results are median (interquartile range).

#### Results:

There were 742 measurements over 1088 h of control (16.4 measurements/day), which is similar to clinical SPRINT results (16.2/day). Per-patient hours of control were 65 (50–95) h. Initial per-patient BG was 10.5 (7.9–11.2) mmol/liter. All patients (100%) reached 6.1 mmol/liter. Cohort BG was 6.3 (5.5–7.5) mmol/liter, with 42.2%, 65.1% and 77.6% of BG in the 4.0–6.1, 4.0–7.0, and 4.0–8.0 mmol/liter bands. Per-patient, median percentage time in these bands was 40.2 (26.7–51.5)%, 62.5 (46.0–75.7)%, and 74.7 (61.6–87.8)%, respectively. No patients had BG < 2.2 mmol/liter, and the %BG < 4.0 mmol/liter was 1.9%. These results were achieved using 3.0 (3.0–5.0) U/h of insulin with 7.4 (4.4–10.2) g/h of dextrose administration (all sources) for the cohort. Per-patient median insulin administration was 3.0 (3.0–3.0) U/h and 7.1 (3.4–9.6) g/h dextrose. Higher carbohydrate nutrition formulas than were used in SPRINT are offset by slightly higher insulin administration in this study.

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**Abbreviations:** (ACCP) American College of Chest Physicians, (BG) blood glucose, (EN) enteral nutrition, (ICU) intensive care unit, (IQR) interquartile range, (PN) parenteral nutrition, (SPRINT) Specialized Relative Insulin Nutrition Tables

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**Abstract cont.****Conclusions:**

The glycemic performance shows that using the SPRINT protocol to guide insulin infusions and nutrition administration provided very good glycemic control in initial pilot testing, with no severe hypoglycemia. The overall design of the protocol was able to be generalized with good compliance and outcomes across geographically distinct clinical units, patients, and clinical practice.

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