Initial ICU Clinical Results Using SPRINT to Guide Insulin Infusions in a Hungarian Medical ICU

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Objective:
To report the initial clinical results and glycemic control using the SPRINT protocol at an independent intensive care unit (ICU), with modifications to modulate only insulin infusions.

Method:
The SPRINT (Specialised Relative Insulin-Nutrition Titration) protocol was used for 10 adult ICU patients (615 hours) at Kálmán Pándy Hospital (Gyula, Hungary) as part of a clinical practice assessment. SPRINT insulin recommendations were administered via constant infusion rather than bolus delivery. Nutrition was administered per local standard protocol weaning parenteral to enteral nutrition, and reduced per SPRINT when required and clinically approved. Measurement was 1-2 hourly per protocol. Glycemic performance is assessed by percentage of (hourly resampled) blood glucose measurements in glycemic bands for the cohort and per-patient. Safety is assessed by numbers of patients with BG < 2.2 (severe) and 3.5 (moderate) mmol/L. Clinical effort is assessed by measurements per day. Results are median [IQR] as appropriate.

Results:
There were 428 measurements over 615 hours of control (16.7 measurements/day), which is similar to clinical SPRINT results (16/day). Per-patient hours of control were 56 [46-75] hours. Initial per-patient BG was 10.5 [8.6-11.5] mmol/L. All 10 patients (100%) reached 6.1 mmol/L in 7.5 [1.5-9.0] hours. Cohort BG was 6.6 [5.6-7.7] mmol/L with 48.8%, 61.8% and 81.0% of BG in the 4.0-6.5, 4.0-7.0 and 4.0-8.0 mol/L bands, respectively. Per-patient, the percentage time in these bands were 54.2 [32.5-68.5]%, 63.8 [42.6-83.7]% and 85.5 [70.0-92.6]%, respectively. No patients had BG < 2.2 mmol/L and 2 had one BG < 3.5 mmol/L. %BG < 4.0 mmol/L was 1.6%.

These results were achieved using 3.0 [3.0-5.0] U/hour of insulin with 7.4 [4.0-10.8] g/hour of dextrose administration (all sources), for the cohort. Per-patient median insulin administration was 3.0 [3.0-3.0] U/hour, and 6.3 [1.3-9.7] g/hour dextrose. Higher carbohydrate nutrition than in SPRINT is offset by

slightly higher insulin administration.

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