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

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OBJECTIVE

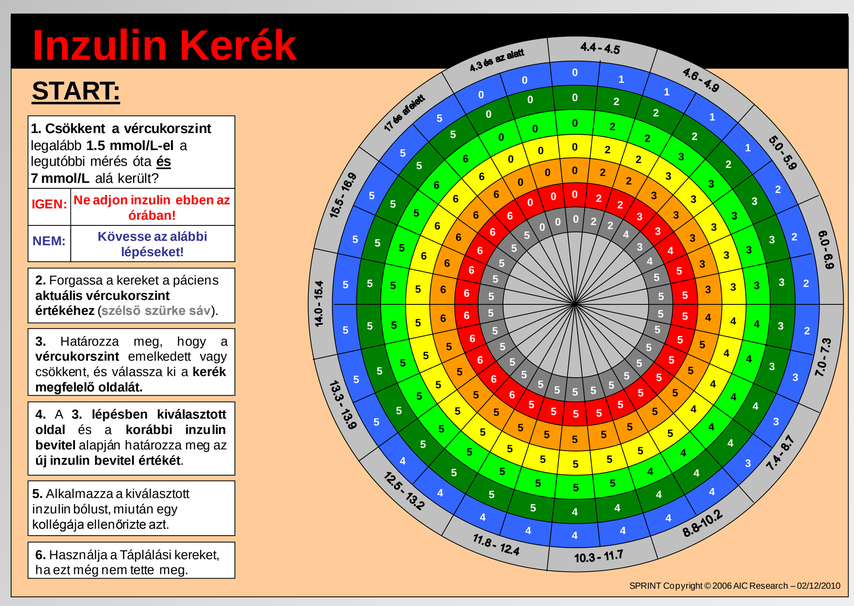
To report the initial clinical results and glycemic control using the SPRINT protocol at an independent intensive care unit (ICU), with modifications to modulate insulin infusions and comply with local clinical nutrition regimes.

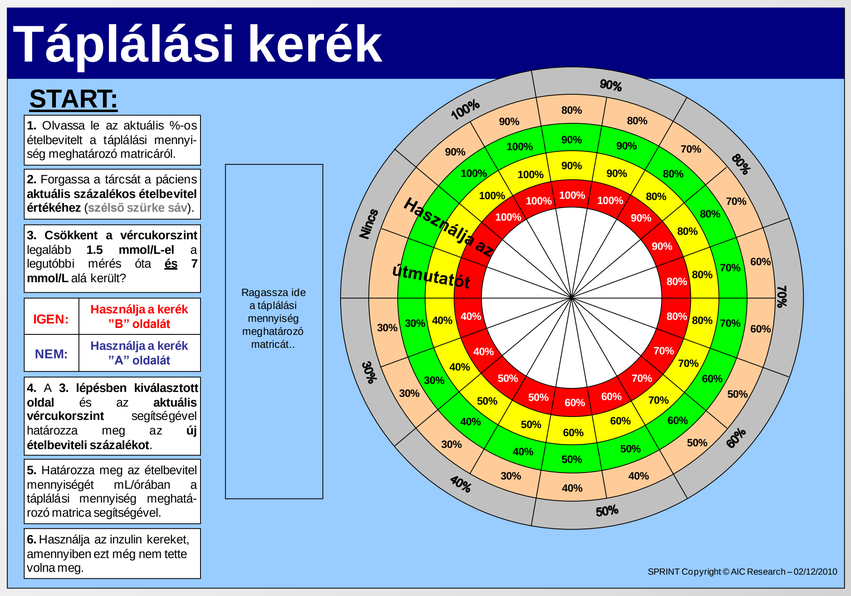
METHODS

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 implementation was modified from its initial Christchurch, NZ design. Insulin recommendations were administered via constant infusion rather than bolus delivery. Nutrition was administered via both parenteral and enteral routes per local protocol (PN weaned to EN) and modulated together as per SPRINT when required and clinically approved.

BG 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 < 40 (severe) and 70 (moderate) mg/dL. 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 194 [155-207] mg/dL. All 10 patients (100%) reached 110 mg/dL in 7.5 [1.5-9.0] hours.

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 [3.1-9.7] g/hour dextrose. Higher carbohydrate nutrition than used by SPRINT in Christchurch, NZ is offset by slightly higher insulin administration.

	Whole cohort	Per-patient
Workload		
# BG measurements:	428	43 [32 – 52]
Measures/day:	16.7	15.9 [14.5 – 19.8]
Control performance		
BG median [IQR] (mg/dL):	117 [101 – 137]	119 [104 – 128]
% BG within 80 - 145 mg/dL	79	84.3 [68 - 89]
% BG > 180 mg/dL	2.6	2.8 [0.0 – 5.6]
Safety		
% BG < 72 mg/dL	1.6	1.9 [0 – 2.7]
# patients < 40 mg/dL	0	0
Clinical interventions		
Median insulin rate (U/hr):	3.0 [3.0 – 5.0]	3.0 [3.0 – 3.0]
Median glucose rate (g/hour):	7.4 [4.0 – 10.8]	6.3 [3.1 – 9.7]

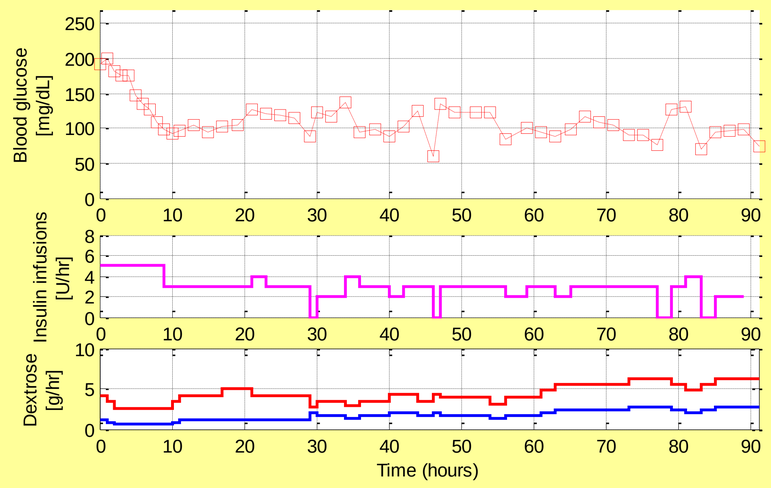


Fig. 1: Blood glucose control under SPRINT with modifications for Kálmán Pándy Hospital . Insulin administration is by infusion only (second panel) and the combination of enteral (blue) and parenteral (red) nutrition is modulated according to the specified SPRINT nutrition rates.

CONCLUCISONS

The glycemic performance shows that the SPRINT protocol to guide insulin/nutrition 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.

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