Advanced feeding regime combined with STAR protocol on ICU patients

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Objectives

Controlling stress-induced hyper blood glucose (BG) levels and variation is a critical task in the intensive care unit (ICU). The STAR protocol combined with an advanced feeding regime was used at an independent ICU to assess the impact of systematically increased energy input versus the basic STAR insulin and nutrition control approach.

Methods

Data

26 Patients BG data, feeding and Insulin administration data (total 2703 hours) were recorded at the ICU of Kálmán Pándy Hospital, Gyula. All the patients were treated by the combination of STAR protocol and an advanced feeding regime used especially at the Kálmán Pándy Hospital. These Data were compared to Christchurch Hospital 38 patients-cohort (total 3763 hours) on STAR.

STAR Protocol

S(tochastic)TAR(get) control is a clinically validated model-based stochastic control method that manages both insulin and nutrition rates for 1-3 hour intervals. The protocol uses model-based insulin sensitivity and its potential stochastic variation to predict the range of possible BG levels over the measurement interval with a guaranteed maximum risk of BG < 4.4 mmol/L.

Advanced Feeding Regime

Clinically selected levels of parenteral nutrition are used to systematically augment and increase total energy content in Gyula, while total enteral and parenteral input is still modulated by STAR.

Results

The cohort median BG [IQR] of the combined treatment at *Gyula* was 6.43 [5.70-7.43] mmol/L. Patients spent 63.53% and 77.64% of ICU time in the 4.4-7.0 and 4.4-8.0 mmol/L bands, and 1.73% was under 4.0 mmol/L. The per-patient median dextrose rate was 7.3 [5.8-9.1] g/hour. *Christchurch* had median BG [IQR] of 6.1[5.6-6.8] mmol/L with 77.8% and 89.43% of time in the 4.4-7.0 and 4.4-8 mmol/L bands, and 0.87% BG<4.0 mmol/L. Median insulin rates are slightly higher in Gyula but similar, with median 2.6[2.0-4.3] U/hour for *Gyula* and 2.5 [1.0-4.5]U/hour for *Christchurch*. Enteral nutrition was also similar with 4.36 [2.44-5.46] for *Gyula* and 4.87 [0.00-6.09] for *Christchurch*. However, the advanced feeding regime achieved these values by giving an additional 3.35 [1.55 : 4.22] parenteral nutrition in *Gyula* where *Christchurch* gives none.

Conclusion

The combination of STAR and the advanced feeding regime from Gyula was able to provide more energy and nutrition while achieving similar BG levels and quality of control using only slightly more insulin to achieve the outcome.