CRITICAL CARE

LETTER

Hourly measurements not required for safe and effective glycemic control in the critically ill patient

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In the recently published work of Juneja and colleagues the authors describe the excellent results of a computerized insulin dosing algorithm (Clarian GlucoStabilizer™) [1]. To prevent hypoglycemia, however, the authors note that frequent (that is, hourly) measurements are required. We believe that, with an adequate algorithm, the required level of glucose control can be reached without hourly glucose measurements.

We implemented the glucose regulation for intensive care patients (GRIP) computer-assisted glucose regulation program, which uses time-variant sampling intervals [2]. In a recent analysis, hypoglycemia rates were comparable with or lower than those described by Juneja and colleagues [3]. Most importantly, these rates were achieved with only 5.6 measurements per patient per day. In all fairness it must be said that GRIP aimed at (and achieved) levels of 4.0 to 7.5 mmol/l, which is not as tight and challenging as the GlucoStabilizer™ target of 4.4 to 6.1 mmol/l. Nevertheless, it is our conviction that an up to fivefold higher glucose sampling rate cannot be justified by current evidence on glucose control.

Finally, we would like to note that two main approaches for designing computer control of glucose levels exist: model predictive control, and proportional-integral derivative [4]. The underlying algorithm of GRIP is not model predictive control, as mistakenly stated in the article by Juneja and colleagues [1], but proportional-integral derivative. In fact, the algorithm of Juneja and colleagues also appears to be proportional-integral derivative.

To achieve effective and safe computerized glucose control, therefore, it is not necessary to perform hourly measurements, provided a realistic target and an adequate algorithm with a time-variant sampling rate are used.

Abbreviations

GRIP = glucose regulation for intensive care patients.

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