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COMMENTS AND RESPONSES

Multicentric, Randomized, Controlled Trial to Evaluate Blood Glucose Control by the Model Predictive Control Algorithm Versus Routine Glucose Management Protocols in Intensive Care Unit Patients

Response to Plank et al.

I n the February issue of *Diabetes Care*, Plank et al. (1) reported the results of their computer-assisted model predictive control (MPC) algorithm versus routine glucose management in 60 postoperative thoracosurgical patients in three different hospitals. We agree that better glycemic control is worth aiming for, but we have some doubts concerning the design of the study and, consequently, the conclusion.

When comparing two protocols, both have to be "state-of-the-art." In the control group, however, the glucose algorithm protocol in the different ICUs was not standardized, the target blood glucose values were not identical, the insulin was given continuously or as bolus injection, and the frequency of glucose measurements was lower than in the MPC algorithm (once every 3 h versus hourly). It is known from the literature that glycemic control can best be achieved with a protocol using continuous insulin infusion combined with frequent blood glucose measurements and that the last two blood glucose values are used to determine the rate of insulin infusion (2).

In our opinion, before one may conclude that "computer can beat man," this promising MPC algorithm should *1*) be compared with the best available nurse-driven protocol, *2*) be tested in a more critically ill patient population, i.e., medical ICU patients, and *3*) be studied after an adequate power analysis has been performed.

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Multicentric, Randomized, Controlled Trial to Evaluate Blood Glucose Control by the Model Predictive Control Algorithm Versus Routine Glucose Management Protocols in Intensive Care Unit Patients

Response to Ligtenberg et al.

W e thank Ligtenberg et al. (1) for drawing attention to our study, which demonstrated the efficacy and safety of the model predictive control (MPC) algorithm in controlling glycemia in critically ill postsurgery patients (2). We agree that properly designed studies evaluating different treatment approaches are needed. Our contribution was to execute the first prospective multicenter comparison of insulin titration protocols aiming to achieve tight glucose control. We agree that the best feasible approach for a nurse-led algorithm is to include the last two glucose measurements, the so-called dynamic scale protocol (3), and infuse insulin continuously, but this alone does not constitute "state-of-the-art glucose management protocol." Extensive variations on the theme exist. Additionally, intensity of educational support for nurses and (dis-) continuous nutritional feeding impact the outcome. While the "gold standard" is formed, our study evaluated existing protocols that have been designed for tight glucose control, that have been operational, and that have received institutional support in their respective intensive care units (ICUs). In agreement with the conclusion of a comprehensive review of the literature by Meijering et al. (3), a dynamic scale protocol (Prague) demonstrated comparable glycemic control, and a sliding-scale protocol (Graz) demonstrated inferior glycemic control compared with the MPC