Improvement in Glycemic Control Using Algorithm-Guided Basal-Bolus Insulin Therapy in Hospitalized Patients with Type 2 Diabetes

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Objective:
Type 2 diabetes (T2D) treatment in hospitalized patients is often insufficient, resulting in sustained hyperglycemic or hypoglycemic events due to insulin dosing errors. Therefore, an algorithm-based decision support system (GlucoTab®, decide Clinical Software GmbH, Graz, Austria) was developed, to guide basal-bolus insulin therapy (BBI) in inpatient treatment of T2D. We aimed to analyze the effect of GlucoTab® BBI compared to standard care on glycemic control throughout inpatient stays on a general ward.

Method:
In a retrospective analysis, we obtained data of 153 patients with T2D admitted to a general medicine ward over 12 months for various admission indications. We compared patients treated using the algorithm-based BBI therapy to patients receiving standard diabetes care provided by treating physicians.

Result:
Among the 153 cases, there were 43 episodes with continuous algorithm-based therapy lasting a minimum of 3 days. 26 patients were treated using the algorithm continuously for at least seven days (maximum duration: 20 days). Overall there were 379 days of algorithm-based BBI treatment and 779 days of standard diabetes care including any given insulin therapy, resulting in a mean daily glucose of 159.9 ± 40.6 vs. 177.1 ± 50.8 mg/dL. For algorithm-treated patients we compared the first day of algorithm therapy with day 3 (n=43; 190.4 ± 58.3 vs. 161 ± 35.3 mg/dL) and day 7 (n=26; 195.1 ± 66.8 vs. 150.2 ± 31.2 mg/dL).

Conclusion:
Algorithm-guided BBI treatment safely titrates insulin dosage leading to a rapid improvement of mean daily glucose within three days. There was less glycemic variability, resulting in a decrease in hyper- and hypoglycemic events. Our analysis supports the use of algorithm-based decision support systems in hospitalized insulin-treated T2D patients.