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ORIGINAL ARTICLE

Reduction of Postprandial Glycemic Excursions in Patients with Type 1 Diabetes: A Novel Human Insulin Formulation versus a Rapid-Acting Insulin Analog and Regular Human Insulin

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Abstract

Background:

Evaluation of postprandial glycemic excursions in patients with type 1 diabetes with three prandial insulins: VIAject™ (Linjeta™), an ultra-fast insulin (UFI); insulin lispro (LIS); and regular human insulin (RHI).

Methods:

After stabilization of preprandial glycemia, 18 patients received a subcutaneous injection with an individualized insulin dose prior to a meal.

Results:

Injection of UFI resulted in a more rapid insulin absorption than with either LIS or RHI (time to half-maximal insulin levels: 13.1 ± 5.2 vs 25.4 ± 7.6 and 38.4 ± 19.5 min; $p = .001$ vs LIS and $p < .001$ vs RHI, LIS vs. RHI $p < .001$). Maximal postprandial glycemia was lower with UFI (0–180 min; 157 ± 30 mg/dl; $p = .002$ vs RHI) and LIS (170 ± 42 mg/dl; $p = .668$ vs RHI) than after RHI (191 ± 46 mg/dl; RHI vs LIS $p = .008$). The difference between maximum and minimum glycemia was smaller with UFI (70 ± 17 mg/dl) than with either RHI (91 ± 33 mg/dl; $p = .007$ vs UFI) or LIS (89 ± 18 mg/dl; $p = .011$ vs UFI). Also, the area under the blood glucose profile was lower with UFI than with RHI (0–180 min; 21.8 ± 5.8 vs 28.4 ± 7.6 g·min/dl; $p < .001$).

Conclusions:

The rapid absorption of UFI results in a reduction of postprandial glycemic excursions.

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Abbreviations: (AUC) area under the curve, (BG) blood glucose, (Cmax) maximum insulin concentration, (GIR) glucose infusion rate, (IV) intravenous, (LIS) insulin lispro, (NPH) neutral protamine Hagedorn, (RHI) regular human insulin, (SC) subcutaneous, (SD) standard deviation, (*t*) time, (UFI) ultra-fast insulin

Keywords: insulin therapy, meal-time insulin, prandial insulin, rapid-acting insulin analogs, ultra-fast insulin, ultra-rapid insulin

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