

Overnight versus 24 Hours of Continuous Subcutaneous Insulin Infusion as Supplement to Oral Antidiabetic Drugs in Type 2 Diabetes

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Abstract

Background:

Basal continuous subcutaneous insulin infusion (CSII) therapy at a fixed rate may effectively improve glycemic control in patients with type 2 diabetes when oral antidiabetic treatment fails. Regimens of *simple* constant subcutaneous delivery of insulin may provide theoretical advantages in type 2 diabetes.

Methods:

Ten subjects with type 2 diabetes who obtained insufficient glycemic control on oral antidiabetic drugs were included. Following an initial control day, two periods of 3 days with CSII of a rapid-acting insulin analogue, 1.5 IU/h (dose obtained from a preceding study), for 8 hours overnight and for 24 hours, respectively, were carried out in random order. Profiles of serum insulin aspart, serum endogenous insulin, and plasma glucose were recorded.

Results:

Compared to the control day, an 8-hour overnight insulin infusion during a 3-day period improved fasting plasma glucose (FPG) (mean differences \pm SEM; $\Delta 59.0 \pm 10.1$ mg/dl; $p < 0.01$) and 2-hour postprandial plasma glucose (PPPG) ($\Delta 57.8 \pm 10.6$ mg/dl; $p < 0.01$) after breakfast. Compared to an 8-hour overnight infusion, a 24-hour infusion further improved all three PPPG values after breakfast, lunch, and dinner ($\Delta 28.8 \pm 8.1$ mg/dl, $\Delta 30.6 \pm 8.1$ mg/dl, and $\Delta 35.1 \pm 7.9$ mg/dl; $p < 0.01$). During insulin infusion, only one hypoglycemic episode with PG < 55.8 mg/dl and mild symptoms was recorded.

Conclusion:

Continuous subcutaneous insulin infusion with a rapid-acting insulin analogue at a *fixed rate* of 1.5 IU/h, either overnight or for 24 hours, improved glycemic control without safety concerns in patients with type 2 diabetes who had secondary failure to oral antidiabetic drugs. The effect on FPG was similar for both treatments, whereas the effect on PPPG was superior when insulin was infused during the entire 24 hours.

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Abbreviations: (ANOVA) analysis of variance, (AUC) area under the curve, (CSII) continuous subcutaneous insulin infusion, (FPG) fasting plasma glucose, (NPH) neutral protamine Hagedorn, (PG) plasma glucose, (PPPG) postprandial plasma glucose

Keywords: CSII, insulin analogue, insulin aspart, insulin pump, intermittent insulin pump, type 2 diabetes

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