Pancreatic Polypeptide Administration Enhances Insulin Sensitivity and Reduces the Insulin Requirement of Patients on Insulin Pump Therapy

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Abstract

Introduction:
The effects of pancreatic polypeptide (PP) infusion were examined in patients on insulin pump therapy to determine whether PP administration can reduce insulin requirements in patients with type 1 diabetes mellitus (T1DM) or type 3c diabetes mellitus (T3cDM; pancreatogenic).

Methods:
Ten subjects with long-standing T1DM (n = 7) or T3cDM (n = 3) on insulin pump treatment received a 72 h subcutaneous infusion of 2 pmol/kg/min bovine PP or saline by portable infusion pump in a single-blinded, randomized, crossover design.

Results:
Pancreatic polypeptide infusion raised plasma PP levels to 450–700 pmol/liter. Daily insulin infusion requirements (I) fell from 48 ± 6.9 to 40 ± 7.5 U on day 2 (p < .05) and from 46 ± 7.7 to 37 ± 6.6 U on day 3 (p < .05) of PP infusion compared with saline. Corrected for average blood glucose concentration (G), I/G fell in 10/10 subjects during the second 24 h period and in 7/10 subjects during the third 24 h period; sensitivity to insulin, calculated as 1/(I/G), increased 45% ± 12% on day 2 (p < .01) and 34% ± 14% on day 3 (p < .05) of PP infusion. Pancreatic polypeptide responses to a test meal were compared with the change in insulin infusion requirements in 5 subjects; the reduction in insulin requirements seen during PP infusion correlated with the degree of baseline PP deficiency (p < .002).

Conclusions:
A concurrent subcutaneous infusion of PP enhances insulin sensitivity and reduces insulin requirements in patients with long-standing T1DM and T3cDM on insulin pump therapy. The benefit of PP infusion correlated with the degree of PP deficiency.


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Abbreviations: (bPP) bovine pancreatic polypeptide, (CP) chronic pancreatitis, (IR) insulin receptor, (OGTT) oral glucose tolerance test, (PP) pancreatic polypeptide, (SE) standard error of the mean, (STM) standardized test meal, (T1DM) type 1 diabetes mellitus, (T3cDM) type 3c diabetes mellitus

Keywords: hepatic insulin sensitivity, insulin, insulin pump treatment, pancreatic polypeptide, type 1 diabetes, type 3c diabetes

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