Journal of Diabetes Science and Technology
Volume 3, Issue 5, September 2009

ORIGINAL ARTICLES

Serum Insulin Aspart Concentrations Following High-Dose Insulin Aspart Administered Directly into the Duodenum of Healthy Subjects: An Open-Labeled, Single-Blinded, and Uncontrolled Exploratory Trial

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Abstract

Objective:

The goal of this study was to determine the bioavailability of high-dose insulin aspart administered directly into the duodenum of healthy subjects.

Methods:

In a pilot study, four subjects each received four escalating doses of a 1-ml solution of insulin aspart (100, 300, 600, and 1000 IU, respectively) directly into the duodenum. In the following main study, eight subjects each received two identical doses of insulin aspart of 1000 IU, in 4- and 8-ml solutions, respectively, directly into the duodenum. Subjects in the main study also received an intravenous and a subcutaneous injection of 4 to 6 IU of insulin aspart.

Results:

A considerable number of samples and, in some cases, consecutive samples revealed significantly increased concentrations of serum insulin aspart. Despite the significant serum insulin aspart concentrations, no significant changes of plasma glucose were measured. Moreover, no significant suppression of endogenous insulin secretion was detected, as assessed by the levels of serum human insulin.

Conclusions:

Administration of high-dose insulin aspart directly into the duodenum of healthy subjects resulted in significantly increased serum insulin aspart concentrations in a high number of consecutive samples using a specific enzyme-linked immunosorbent assay. However, no significant changes in the levels of plasma glucose or serum human insulin were observed. Thus, the study did not provide any evidence of biological activity of the original insulin aspart molecule after high-dose administration directly into the duodenum.

J Diabetes Sci Technol 2009;3(5):1183-1191

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Abbreviations: (ELISA) enzyme-linked immunosorbent assay, (MCA) monoclonal antibodies, (TMB) 3,3′, 5,5′-tetramethylbenzidine

Keywords: absorption, administration, degradation, duodenum, insulin aspart, oral

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