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Insulin Aspart

A Viewpoint by Lutz Heinemann

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Rapid-acting insulin analogues such as insulin aspart were developed to allow a more physiological prandial insulin substitution than occurs with regular human insulin. Our knowledge of the physicochemical properties of insulin aspart is limited, for example, up to now it has not been clear if the analogue remains in a monomeric or dimeric state in the pharmaceutical formulation or if it associates to a more loosely formed hexamer as is the case with the rapid-acting insulin analogue insulin lispro (Humalog™). In addition, relatively little is known about the reasons for the considerable intra-individual variability of the metabolic effect induced by subcutaneously injected regular insulin, a highly clinically relevant problem.

The variability of the metabolic effect induced by insulin aspart does not differ from regular insulin in many parameters. However, the observed smaller variability in the decline of the metabolic effect allows diabetic patients to more precisely estimate the duration of action of the injected insulin. In a condensed manner Simpson and Spencer reviewed the published data on the pharmacodynamic and pharmacokinetic properties of insulin aspart. That the differences in the pharmacokinetic parameters studied were more pronounced than those seen with the pharmacodynamic parameters can in part be explained by the problems in the precise estimation of the insulin analogues' concentration. It would be interesting to compare the data for insulin aspart with that for the commercially available insulin lispro.

From the data available one can assume that implementation of insulin aspart in the insulin treatment of patients with type 1 diabetes mellitus will result in an improvement of the prandial metabolic control of such patients. It remains to be demonstrated in appropriately designed clinical trials if this leads to better overall metabolic control, i.e. lower glycated haemoglobin levels, lower number of hypoglycaemic events and improved quality of life. Unfortunately, the duration of the otherwise excellent study of Home and co-workers[1] was too short to show a benefit in metabolic control, although blood glucose fluctuations during the day were considerably smaller with insulin aspart.

Our knowledge of the frequency of hypoglycaemic events and the quality of life in clinical trials has been limited up to now, however, the results of the ongoing clinical trials with a longer study duration will hopefully add the required information. Use of insulin aspart should facilitate optimisation of metabolic control in diabetic patients. However, conversion to insulin aspart can not be done on a simple one-to-one basis as the pharmacodynamic properties of insulin aspart require an adequate adoption of the total insulin therapy, especially of the basal insulin supply. ▲

References

1. Home P, Lindholm A, Hylleberg B. Improved glycemic control with insulin aspart: a multicenter randomized double-blind crossover trial in type 1 diabetic patients. Diabetes Care 1998; 21 (11): 1904-9