

Invited Speaker Abstract

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Title of Presentation

Protein and fat in diet for diabetes: how do we measure and cover them with insulin?

1. Abstract

Postprandial glycemic control is essential for acute and chronic complication prevention in type 1 diabetes patients. Intensive insulin therapy either by multiple daily insulin injection regimens (basal-bolus therapy) or by continuous subcutaneous insulin infusion (insulin pump therapy) is considered the gold standard for achieving optimal glycemic control. A necessary component of intensive insulin therapy is carbohydrate counting and adjustment of insulin doses to consumed carbohydrates since carbohydrate is considered the main macronutrient affecting postprandial glycaemia. However, research data from the last decade with the use of continuous glucose monitoring, suggest that not only carbohydrate but also fat and protein as well as the glycemic load of the food consumed significantly affect postprandial glucose values and prandial insulin needs. Different research groups propose different ways of calculating the insulin needs for fat and protein, like the use of dual or extendent bolus and the use of fat-protein unit (FPU) in insulin pump users, or the use of the food insulin index (FII) for people on multiple daily insulin injection therapy. Even though the results regarding the optimal way of calculating insulin needs for fat and protein are not consistent, research shows that meals with high fat/protein content require more insulin than meals with identical carbohydrate content but low in fat/protein. For covering the early postprandial spike after meals with high glycemic load altering insulin injection timing seems an effective strategy. The exact algorithm that allows calculation of insulin needs for all dietary macronutrients is not clear, yet research data so far show that these parameters should be taken into account in clinical practice and in patient education.

2. key references

- Bell KJ, Smart CE, Steil GM, Brand-Miller JC, King B, Wolpert HA. Impact of fat, protein, and glycemic index on postprandial glucose control in type 1 diabetes: implications for intensive diabetes management in the continuous glucose monitoring era. *Diabetes Care*. 2015;38(6):1008-1015.
- Kordonouri O, Hartmann R, Remus K, Bläsing S, Sadeghian E, Danne T. Benefit of supplementary fat plus protein counting as compared with conventional carbohydrate counting for insulin bolus calculation in children with pump therapy. *Pediatr Diabetes*. 2012;13(7):540-544.
- Smart CE, Evans M, O'Connell SM et al. Both dietary protein and fat increase postprandial glucose excursions in children with type 1 diabetes, and the effect is additive. *Diabetes Care*. 2013;36(12):3897-3902.

3. key messages

1. Meals with high fat/protein content may require more insulin than meals with identical carbohydrate content but low in fat/protein.
2. Meals with high fat/protein content may require splitting prandial insulin for patients in multiple daily injection therapy or using dual or/and extended bolus features for pump users.
3. Meals with a high glycemic load may require earlier pre-prandial insulin injection to cover the early postprandial glucose excursion.