Advanced insulin management

Using insulin-to-carbohydrate ratios and correction factors

A nutrition resource for living well with diabetes

If you are using background and meal-time insulin therapy (long-acting insulin plus rapid-acting insulin), you may benefit from using an insulin-to-carbohydrate ratio and a blood glucose correction factor to determine your meal-time insulin dose.

Learning to adjust your insulin dose to the amount of food you eat provides flexibility with eating. It also requires a good understanding of your insulin and carbohydrate counting.

What is an insulin-to-carbohydrate ratio?

An insulin-to-carbohydrate ratio helps you to know how much rapid-acting insulin you need to inject to 'cover' the carbohydrate you will eat at a meal or snack. For example, some people might take one unit for every carbohydrate exchange (15grams), while others may take one unit for every 10 grams of carbohydrate.

Records of what foods you ate, the estimated amount of carbohydrate in your meal, how much insulin you took, and what your blood glucose was before and two hours after you ate, will help you decide if the ratio is correct, or if it should be adjusted.

Different people have different insulin-to-carbohydrate ratios. Additionally, insulin-to-carbohydrate ratios may change over the course of your lifetime or even throughout the day. Some people have one ratio for breakfast and a different ratio for lunch and dinner.

What is an insulin correction factor?

The insulin correction factor (sometimes called an insulin sensitivity factor) is used to calculate the amount of insulin you need to bring your blood glucose into target range. This adjusts or corrects a blood glucose level that may be higher than desired before a meal. The correction dose is added to the pre-meal insulin dose. Your health care provider will help you determine your insulin correction factor as you begin working with this.

Target blood glucose range

Your health care provider should give you individualised guidelines for what your blood glucose range should be for safety and good health.

Example pre-meal target range: 4mmol/l to 6mmol/l.

Example post-meal target range: less than 8mmol/l (two hours after the first bite).

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Your new insulin plan

1. Insulin-to-carbohydrate ratio:
   You will need one unit of rapid-acting insulin for each _____ grams of carbohydrate.
2. Blood glucose correction factor (insulin to correct high blood glucose):
   One unit of rapid-acting insulin will lower your blood glucose level by _____ mmol/l.
3. Your pre-meal target blood glucose level: _____ mmol/l.

Step 1 Calculate an insulin dose for food

> Add up the grams of carbohydrate in the foods you will eat
> divide this by your insulin-to-carbohydrate ratio

$$\frac{\text{Total grams of carbohydrate to be eaten}}{\text{Insulin-to-carbohydrate ratio}}$$

Practice

Let's say you plan to eat 60 grams of carbohydrate and your insulin-to-carbohydrate ratio is one unit of insulin for every (_____) grams of carbohydrate eaten. To figure out how much insulin to give, divide 60 by (_____) .

$$\frac{\text{60 grams of carbohydrate to be eaten}}{\text{(\_\_\_\_\_)}}$$

= (_____) units of insulin for food

Step 2 How to use your correction factor to reach your target blood glucose

> Subtract your target blood glucose level (BGL) from your current BGL
> divide the difference by your correction factor

$$\frac{\text{Current BGL – target BGL}}{\text{Correction factor}}$$

= Correction dose

Practice

You check your blood glucose and it is 14mmol/l, and you know your target blood glucose is _____ mmol/l.

Your insulin correction factor is (_____) .

$$\frac{\text{14 mmol/l – (\_\_\_\_\_) mmol/l}}{\text{(\_\_\_\_\_)}}$$

= (_____) units of insulin will bring blood glucose of 14mmol/l down to your target blood glucose of (_____) .

Step 3 Add the insulin needed for food (from step 1), to the insulin to correct high blood glucose for your total dose (from step 2)

Practice

Example from steps 1 and 2:

(_____) units for food (carbohydrate)

plus

(_____) units to correct BGL

Total dose = _____ unit

For more information

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