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Leicester Children's Hospital

NHS University Hospitals of Leicester NHS Trust

Testing the background (basal) insulin for children with type 1 diabetes

Paediatric Diabetes

Information for Patients, Parents & Carers

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What is basal insulin?

Basal insulin is sometimes called "background insulin." People usually take basal insulin 1 or 2 times a day to keep blood sugar levels stable. Basal insulin keeps blood glucose levels stable by converting sugar into energy when you are not eating.

When the basal insulin dose is right, diabetes can be much easier to manage.

Why do I need to test the basal rate?

The basal rate is the rate at which the insulin pump gives background doses of insulin. Basal rates should be checked regularly, including during school holidays to make sure this is enough to meet the body's insulin needs. The basal insulin dose will need to be increased as your child grows, particularly during puberty where insulin requirements change rapidly.

Doing a basal test involves fasting and checking what effect this has on blood glucose levels over a section of the day, when only the basal insulin is working.

Testing can be split into time blocks (overnight, morning, afternoon and evening) which will hopefully make this process easier to manage. Although a 24 hour day needs to be covered, it is not advised to complete all time blocks on the same day.

If fasting is not possible (e.g. young children), you will need to delay them eating for as long as possible, and only allow small amounts of carbohydrate-free foods during the testing period. In young children, ideally no more than 1 meal should be missed or delayed.

If the basal rate is correct, testing should show the blood glucose level staying within the target range.

Instructions for performing a basal rate test

- Do not begin basal rate testing if your child is unwell, has been doing a lot of exercise or is due a change in the pump's infusion set (set change).
- The last meal and insulin bolus/ correction should be at least **4 hours** before starting a basal rate test. Avoid high fat / low glycaemic index (GI) foods in the meal before testing as these will continue to affect blood glucose several hours after eating. Speak to your dietitian about suitable foods if you are not sure.
- Give a normal insulin bolus with the last meal and do not split or extend the bolus if on a pump.
- Do not let your child eat until the end of the time block. If needed, suitable carbohydrate-free foods are given below.
- In young children, ideally no more than 1 meal should be missed or delayed.
- Aim to check the blood glucose every 1 to 2 hours during the testing period.
  You must always stop basal rate testing at any time in the event of a hypoglycaemia (blood glucose under 3.9 mmol/L) or hyperglycaemia (blood glucose over 14.0 mmol/L).

Suitable foods while testing the basal rate

These foods may be eaten in small amounts while testing. Be aware that large amounts of these foods may produce a rise in blood glucose levels.

- Plain meat or fish (without batter, breadcrumbs) e.g. plain chicken, ham, salami, seafood sticks.
- Poached/ boiled/ scrambled egg (no milk).
- Cheese (e.g. individual Babybel or cheese string).
- Vegetable or salad items: broccoli florets; lettuce; rocket; olives; celery; mushrooms.
- Sugar free jelly.
- Zero carbohydrate liquids: sugar free cordial; black tea/ coffee; Bovril.

Recording blood glucose levels

The tables on the next page show examples of how you can record blood glucose.

A continuous glucose monitor (CGM) measures the fluid surrounding your cells. This is closely related to the amount of sugar in the blood, but is not exactly the same thing. If your child wears a sensor and this suggests their blood glucose level is not changing quickly (e.g. the arrow is not pointing up or down) you may wish to use this reading as a way of checking blood glucose during basal rate testing. However, to make sure this reading is accurate it is still a good idea to also include some finger prick results in the testing period.

Overnight (e.g. 10pm to 6am) - 2 hourly testing record:

Avoid high fat/ low GI foods with the evening meal before starting overnight testing.

Time:						
BG day 1 Date:						
BG day 2 Date:						

Morning (e.g. 6am to 12 noon) - 2 hourly testing record:

Miss breakfast meal and eat lunch after 12 noon.

Time:						
BG day 1 Date:						
BG day 2 Date:						

Afternoon (e.g. 12 noon to 6pm) - 2 hourly testing record:

Eat breakfast by 8am or earlier, and miss lunch. Eat evening meal after 6pm.

Time:						
BG day 1 Date:						
BG day 2 Date:						

Evening (e.g. 6pm to 10pm) - 2 hourly testing record:

Eat lunch 2pm or earlier, and miss evening meal. Eat late supper after 10pm.

Time:						
BG day 1 Date:						
BG day 2 Date:						

When to change the basal rate

It's best to test one time block per day and consider doing 2 tests before you decide to change the basal insulin dose.

For each part of the day, once you have carried out basal rate testing on a couple of different days, take a look at how blood glucose has responded to fasting.

If the background insulin is working well, blood glucose levels should remain stable when your child misses a meal. The aim is to keep all blood glucose levels between your child's target blood glucose range of 4 to 7 mmol/L.

If you see the same changes, this suggests that the basal insulin needs adjusting. Your diabetes team will advise if this is the case and by how much.

After you have made any change to the basal insulin dose, it's a good idea to re-test each section of the day to make sure this has improved glucose levels.

Contact details

Department of Nutrition and Dietetics

Dietitian: 0116 258 5400 / 0116 258 3930 - 8.30am to 4.30pm

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