



## Hyperglycaemia

Hyperglycaemia is the medical term for high blood glucose – this is a blood glucose value or range above that needed for optimal health and body function. The term is derived as follows:

Hyper = high    glyc = glucose (sugar)    aemia = blood.

**Hyper**-glycaemia must not be confused with **hypo**-glycaemia, which means low blood glucose.

The healthy range for blood glucose in *people without diabetes* is between 3.6 and 7.8 mmol/l. In these people, a blood glucose level greater than 5.5 mmol/l fasting or greater than 7.8 mmol/l two hours after eating is in the hyperglycaemic range.

One of the main characteristics of diabetes is a *chronic tendency towards hyperglycaemia*. A laboratory fasting blood glucose of 7 mmol/l or above, or a value of 11 mmol/l or above after a two hour glucose tolerance test, is within the diagnostic range for diabetes (If symptoms of uncontrolled diabetes are *absent*, this reading will need to be confirmed with a repeat laboratory test on another day within two weeks).

Once diagnosed, an important goal of good diabetes care and control is to keep your blood glucose values as much within *your individual target range* (your diabetes team will help here) as possible *without incurring significant hypoglycaemia or hyperglycaemia*. Once your diabetes is correctly treated and under control, you may however still experience occasional episodes of hyperglycaemia. If these episodes are short-lived and infrequent, you don't need to worry about them, *besides trying to understand and correct the cause*. If your blood glucose spends much time in the hyperglycaemic range in the long term, it increases your risk for *preventable* complications of *uncontrolled* diabetes.

### How will I know if I have hyperglycaemia?

Ideally, you should be testing your blood glucose regularly as advised by your diabetes team. This will help you to check if your blood glucose levels are within your healthy target range or not.

When blood glucose rises much above 10-12 mmol/l *in young people* (15-20 mmol/l or more in older people), *symptoms* of hyperglycaemia may occur (*of course, this also means that hyperglycaemia may be present without symptoms*). Regular home blood glucose monitoring may alert you to the high blood glucose *before* this point is reached.

The specific, 'classic' symptoms *of this very high level* of hyperglycaemia include:

- the frequent passing of excessive amounts of urine (polyuria) and frequent night time urination (nocturia), which may present as bed-wetting in children,
- extreme thirst (polydipsia),
- weight loss
- profound fatigue



Keeping a diabetes diary is the best way to monitor your own blood glucose control. If there a pattern of hyperglycaemia emerges at a particular time of day, this would generally indicate that your treatment (insulin / diabetes tablets) is not optimal. Speak to your Diabetes Team about this.

Some blood glucose monitors and / or associated 'apps' automatically store blood sugar readings. If you do not have such a meter, consider using a paper based diabetes diary to store and track your readings.

### What can cause hyperglycaemia?

Quite simply *any imbalance between life* (exercise, stress, infections, medications and drugs that raise blood glucose and what you eat and drink) and your *diabetes therapies* will result in hyperglycaemia. The most common *specific* causes of hyperglycaemia are:

- Too little medication in relation to food
- Missing or reducing a dose of diabetes medication
- Bigger than normal intake of carbohydrates
- Incorrect timing of meals / snacks relative to medication
- Very strenuous anaerobic/resistance exercise or exercising above your current level of fitness
- Lack of exercise
- Infection / illness
- Emotional stress
- Cortisone treatment (tablets or injection) or drugs like dagga, cocaine and ecstasy
- Damaged insulin (exposed to sunlight, heat or temperatures below 2°C)
- Not rotating insulin injection sites and thus injecting into 'lumps'

If you experience hyperglycaemia relatively often, it is important to pinpoint exactly what the cause or causes may be. Your diabetes team can help you with this.

### What should I do if I have hyperglycaemia?

If your blood glucose is high, it is important to

- *drink sufficient water* to replace any urine losses and prevent dehydration
- Look for the *cause* of the hyperglycaemia and correct this in future
- *contact your diabetes team* sooner rather than later for guidance and to prevent any possible complications. CDE Patients have the luxury of having access to a *24-hour Emergency Hotline* – please use it! Ensure that you always have your CDE Hotline number with you and that your family and friends have it too.

### If you have Type 1 diabetes:

- If your blood glucose reading is *above 14 mmol/l* or if you have *any one of illness/infection, nausea, tummy pain or are feeling breathless*, you need to test for ketones. If ketones are positive, contact your diabetes team *immediately*. *DO NOT exercise to try bring the level down* - you will need extra insulin and oral fluids to bring the level down. This requires knowledge and understanding, and you



should have received some education on how to do this, from your diabetes educator or doctor. Your Hotline staff will be glad to ‘walk’ you through this to correct it safely and prevent any unnecessary hospital admission

- If your reading is above your target range and you *don’t have ketones*, some extra water, some gentle exercise (walking) and an *appropriate correction dose of insulin* (you will need to know your *insulin sensitivity factor taught by your diabetes team*) at your next meal will help to correct the level.

#### **If you have Type 2 diabetes:**

- If your blood glucose is above 10 mmol/L, *firstly try to determine the cause*. (See above for possible causes). If you are feeling well otherwise, with sufficient water intake, sensible eating and a gentle walk, a once-off high reading will probably settle down, and levels will normalise in your target range.
- If high blood glucose readings *persist or if you are feeling unwell*, contact your Diabetes Team. You may need help to correct the cause or you may need to intensify your therapy, to stabilise your levels.

#### **Myths and Misconceptions – what NOT to believe**

“If I feel fine, my blood glucose level must be fine”. **Not true!**

Unless your blood glucose level is *very high*, you often do not experience symptoms of hyperglycaemia – the risk of complications due to hyperglycaemia starts *long before your blood glucose reaches a reading high enough to produce any symptoms*. Checking your blood glucose as requested by your Diabetes Team will help you to keep good control within *your personal target range* and avoid complications.

#### **Goals and Recommendations - Be SMART**

- Test your blood glucose levels *regularly*, to alert yourself about possible hyperglycaemia *before* symptoms arise.
- If your blood glucose meter does not automatically store blood glucose results, keep a manual diary of your readings. This can help in identifying when and why problems occur.
- When you are stressed or ill, lookout for higher than normal blood glucose levels.

#### **REMEMBER!**

- Look for *patterns* of high blood glucose at different testing times.
- A brief episode of hyperglycaemia is not usually dangerous, but chronically elevated (long-term) blood glucose increases the risks of *preventable* diabetes complications.
- Common causes of hyperglycaemia include too little medication or too much carbohydrate, illness, stress, defective insulin and cortisone.
- Common symptoms of hyperglycaemia (*which only appear depending on your age and blood glucose level*) may include increased urination, severe thirst, weight loss and fatigue.
- Drink lots of water to prevent dehydration if your glucose level is high.
- Contact your Diabetes Team if you have high levels that don’t settle down within a day