



HYPERGLYCEMIA TREATMENT AND DKA PREVENTION

The importance of recognizing and managing **high** blood sugar levels to prevent diabetic ketoacidosis (DKA)

THE BASICS

Hyperglycemia is a condition that is caused by high levels of blood sugar (glucose) – a reading of 10 mmol/L or higher. Common causes of hyperglycemia include illness, stress, infection, kinked cannulas or occlusions which can result in missed insulin doses.¹

KNOW THE SIGNS

Signs and symptoms of hyperglycemia include¹:



Fatigue



Frequent urination
(especially at night)



Unusual thirst
or hunger



Blurred vision

Hyperglycemia is a serious condition and if left unmanaged, can result in serious complications, such as DKA and diabetic coma.¹

Blood glucose levels of 13.9 mmol/L or higher may be a sign of diabetic ketoacidosis, which occurs when the body produces high levels of acids called ketones, causing the blood to become acidic.¹

Signs and symptoms of DKA include²:



Weakness or
fatigue



Frequent
urination



Excessive thirst



Severe abdominal
pain



Nausea and
vomiting



Shortness of
breath



Fruity-scented
breath



Confusion

A healthcare provider should be contacted immediately if the following is experienced/observed:

- Persistent nausea and/or vomiting
- Diarrhea lasting for over 2 hours

Long-term complications of hyperglycemia include cardiovascular disease, nerve damage, and kidney disease/failure.

This is why it is important to recognize the signs/symptoms and treat promptly. Continue reading for hyperglycemia treatment recommendations.

TAKE ACTION²

If you are on an insulin pump, use the chart below to find out how much extra fast-acting insulin you need to take, based on your ketones and blood-glucose measurements.

Verify and check blood glucose level

If blood glucose is more than 13.9 mmol/L, check urine or blood for ketones and proceed as follows:

A	B	C	D
<p>Trace or negative urine ketones or blood ketones <0.6mmol/L:</p> <p>Blood glucose 6-20 mmol/L</p> <ul style="list-style-type: none">• Take correction dose suggested by the pump, no additional insulin needed <p>Blood glucose > 20 mmol/L</p> <ul style="list-style-type: none">• Add 10% of TDD to the suggested bolus dose calculated by the pump <p>Consider changing your infusion set or Pod and giving correction bolus via insulin pen or syringe</p>	<p>Positive urine ketone or blood ketone levels that are between 0.6–1.4 mmol/L:</p> <ul style="list-style-type: none">• Add 5-10% of TDD to suggested bolus dose from the pump <p>Consider drinking sugar-containing fluids to prevent hypoglycemia if unable to eat as usual</p> <p>If ketones do not improve, change infusion set or Pod and take a correction dose adding 10% of TDD plus the calculated correction dose from the pump, but consider delivering this via insulin pen or syringe</p>	<p>Small (+) urine ketone or blood ketone levels that are between 0.6–1.4 mmol/L:</p> <ul style="list-style-type: none">• Add 10% of TDD to suggested bolus dose from the pump <p>If ketones do not drop, change infusion set or Pod and give a correction bolus of 15% TDD plus calculated correction from the pump. Consider taking this bolus via insulin pen or syringe</p> <p>If ketones still do not drop, consider contacting your HCP or proceed to the ED</p>	<p>Moderate (++) urine ketone or blood ketone levels that are 1.4 mmol/L or more:</p> <ul style="list-style-type: none">• Add 15% of TDD to the suggested bolus dose calculated by the pump• If ketones do not drop, change infusion set or Pod and give a correction bolus of 20% TDD plus calculated correction from the pump. Consider taking this bolus via insulin pen or syringe• Consider contacting your HCP and go to the ED

If blood ketones are higher than 1.5 mmol/L, or when in doubt, consider proceeding to your nearest ED

BE PREPARED

Be sure to discuss a sick-day management plan with your healthcare provider and follow the directions given. The following information provides some general guidelines.

If you have a cold, stomach virus, toothache, or other minor illness:

- Check blood glucose levels more often (every 2–4 hours or at least 4 times a day)
- Check ketones at any time blood glucose levels are 13.9 mmol/L or higher
- Use temp basal as directed by your healthcare provider
- Stay hydrated
- Monitor urine output
- Keep a record of information including: blood glucose and ketone levels, fluids, time/amount of urine, vomiting, diarrhea, and body temperature
- Continue taking insulin, even if not eating as usual



Call your healthcare provider immediately if the following is experienced/observed:

- Persistent nausea and/or vomiting
- Diarrhea for over 2 hours
- Difficulty breathing or severe stomach pain
- Unusual behaviour (such as confusion, slurred speech, double vision, inability to move, jerking movements)
- Persistent high blood glucose levels and/or positive for ketones after treating with extra insulin and fluid intake
- Persistent low blood glucose that is not responsive to decreasing insulin and the intake of carbohydrate-containing fluids
- A fever above 38°C
- Moderate to large urine ketone or blood ketone levels ≥ 1 mmol/L

The symptoms of diabetic ketoacidosis are much like those of the flu. Before assuming you have the flu, check your blood glucose to rule out DKA. Consult your healthcare provider for further information.

CHECK YOUR SETTINGS

If you are using an insulin pump, review the following settings to determine what might have contributed to the high blood sugar

Check status screen

- Last bolus: Was it too small?
 - Was the bolus timing correct?
 - Were high-protein or high-fat meals accounted for?
- Basal program: Is the proper basal program running?
- Temp basal: Is there a temp basal running that should have been turned off?
- Suspend: Has insulin delivery been suspended?

Check site and records

- Alarm history: Was there an alarm that was not heard, or ignored, that should have been addressed?
- Check your site for blood or possible kinked cannula

Consult your healthcare provider for guidance about adjusting your pump settings appropriately

References: 1. Mayo Clinic. Hyperglycemia in diabetes. Accessed May 2023. 2. Nova Scotia Health. Patient & Family Guide (2022). Preventing and Managing Diabetic Ketoacidosis (DKA) in Adults.