



Education

Diabetic Ketoacidosis

What is diabetic ketoacidosis?

Diabetic ketoacidosis is a serious, life-threatening complication of high blood sugar. It may happen if you have type 1 diabetes. (It rarely happens if you have type 2 diabetes.) It is an emergency that must be treated right away. If ketoacidosis is not treated right away, it can cause diabetic coma or death.

How does it occur?

Ketoacidosis can happen when the blood sugar level is very high, generally 250 to 300 milligrams per deciliter (mg/dL) or higher.

If you have type 1 diabetes and do not have proper treatment for it, you may develop a high blood sugar level. High blood sugar is called hyperglycemia. Hyperglycemia happens when you do not have enough insulin to get sugar out of your blood and into your cells. When the cells of the body can't use sugar for energy, they break down fat for energy. The fat byproducts (ketones) and high sugar level can cause ketoacidosis, a life-threatening chemical imbalance.

Reasons why your blood sugar may increase, even if you are taking insulin, include:

- not getting enough insulin
- not getting enough exercise
- eating the wrong amounts or types of food, especially carbohydrates
- not testing your blood sugar levels properly or regularly
- having an insulin pump that stops working right
- changing medicines.

However, ketoacidosis may occur even with proper treatment for diabetes when there is a change in your life such as:

- illness
- infection
- trauma
- heart attack
- surgery
- pregnancy
- other types of physical or emotional stress.

Sometimes the diagnosis of diabetes is not made until ketoacidosis occurs. When you have type 1 diabetes, the pancreas stops making insulin. As a result, blood sugar may become very high, very fast. Sometimes it happens so fast that ketoacidosis symptoms are the first symptoms of diabetes.

What are the symptoms?

Symptoms of high blood sugar include:

- increased thirst
- increased hunger
- dry mouth
- increased urination
- blurred vision.

If you have ketoacidosis, you may also have these symptoms:

- excessive urination (several quarts a day)
- excessive thirstiness (several quarts a day)
- fruity-smelling breath
- rapid breathing
- nausea or vomiting
- confusion
- tiredness.

The ketoacidosis symptoms leading to a diabetic coma usually happen gradually. In most cases it takes hours to a couple of days for ketoacidosis to cause a diabetic coma.

How is it diagnosed?

To diagnose ketoacidosis, your health care provider will ask about your medical history, review your symptoms, and examine you. Your provider will pay special attention to:

- possible infection
- the amount of fluids in your body
- how clearly you are thinking
- your breathing
- your heart and kidney function.

Your provider will do some tests to check the levels of sugar and other chemicals in your blood. If needed, your provider will also order other lab tests, a chest x-ray, or ECG.

How is it treated?

- Ketoacidosis needs immediate treatment. You may need to be treated at a hospital.
- You will be given insulin as soon as ketoacidosis is diagnosed.
- Your blood will be checked often for sugar levels and chemical balances.
- You will be given intravenous (IV) fluids.
- Your treatment will include antibiotic medicine if you have an infection.

How long will the effects last?

Ketoacidosis will continue until enough insulin is available to the body to achieve a normal blood sugar level and the insulin and fluids have restored chemical balance. If this condition is not treated, it can be fatal. With treatment, you will usually recover in hours to days.

What can be done to help prevent diabetic ketoacidosis?

To help take care of yourself and prevent ketoacidosis, follow these guidelines:

- Keep your blood sugar level under control.
 - Eat a healthy diet.
 - Follow the physical activity or exercise plan your health care provider has recommended.
 - Check your blood sugar level as often as you and your provider have discussed.
 - Never take more insulin until you have double-checked your blood sugar reading and made sure your sugar level is too high. The symptoms of low blood sugar can be similar to those of high blood sugar.
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- Know the early signs and symptoms of ketoacidosis.
- Test for ketones in your urine if:
 - Your blood sugar level is staying higher than 250 mg/dL.
 - You are ill or under more stress than usual.
- Check your blood sugar more often if you think you are getting sick.
- Keep extra insulin with you.
- Carry an ID (such as a card or bracelet) that says you have diabetes, in case of an emergency.
- If you are pregnant and diabetic, be sure to follow your provider's recommendations for monitoring your blood sugar and ketones.

Call your provider right away if:

- You have ketones in your urine.
- You have symptoms of an infection, such as flu or a bladder infection.
- Your fasting blood sugar has been 250 mg/dL or more for 2 days, especially if you also have vomiting or other symptoms of ketoacidosis.

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