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# Diabetic Ketoacidosis

Diabetic ketoacidosis (DKA) is a serious problem that can happen in people with diabetes. DKA should be treated as a medical emergency. This is because it can lead to coma or death. If you have the symptoms of DKA, get medical help right away.

DKA happens more often in people with type 1 diabetes. It can also happen to people with type 2 diabetes who are taking the SGLT-2 inhibitors for diabetes control. It also can happen in women with diabetes during pregnancy (gestational diabetes).

DKA happens when insulin levels are too low. Without enough insulin, sugar (glucose) can't get to the cells of your body. The glucose stays in the blood. The liver then puts out even more glucose into the blood. This causes high blood glucose (hyperglycemia). Your body breaks down stored fat, when your cells don't get the glucose they need for energy. When this happens, acids called ketones are released into the blood. This is called ketosis. High levels of ketones (ketoacidosis) can be harmful to you. Hyperglycemia and ketoacidosis can also cause serious problems in the blood and your body, such as:

- Low levels of potassium and phosphate
- Damage to kidneys or other organs
- Coma
- Dehydration

## What causes diabetic ketoacidosis?

In people with diabetes, DKA is most often caused by too little insulin in the body. It's also caused by:

- Diabetes that's not under good control
- Infections such as a urinary tract infection or pneumonia
- Serious health problems such as a heart attack
- Reactions to certain prescribed medicines used to treat type 2 diabetes
- Reactions to illegal drugs including cocaine
- Problems with insulin delivery from an insulin pump

## Symptoms of diabetic ketoacidosis

DKA most often happens slowly over time. But it can worsen in a few hours if you are vomiting and dehydrated. The first symptoms are:

- Thirst and dry mouth
- Urinating a lot
- Belly pain
- Nausea or vomiting

- Breath that smells fruity (from the ketones)

Over time, these symptoms may happen or get worse:

- Dry or flushed skin
- Nausea and vomiting
- Loss of appetite
- Weight loss
- Belly pain
- Trouble breathing or breathing that is deep and rapid
- Trouble thinking or confusion
- Feeling very tired or weak. This can lead to coma.

## How is diabetic ketoacidosis diagnosed?

Your healthcare provider will ask about your health history. They will give you a physical exam. You may also have these tests:

- Blood tests to check your glucose levels and ketones
- Blood tests to check your electrolytes, such as potassium, sodium, and bicarbonate
- Urine test to check for ketones
- Electrocardiogram (ECG)

These tests are done to check for DKA, and watch it over time.

## How is diabetic ketoacidosis treated?

DKA needs treatment right away in the hospital. Treatment includes:

- **Insulin.** This is the main type of treatment. Insulin allows the cells to use the glucose in the blood. This lowers the levels of both blood glucose and ketones.
- **Fluids and electrolytes.** These are given by IV (intravenous) line into a vein. Fluids are replaced and abnormal electrolyte levels are corrected.
- **Other medicines.** These may be given to treat an illness that caused DKA. For example, antibiotics may be given to treat a urinary tract infection that caused DKA.

## Preventing diabetic ketoacidosis

To help prevent DKA, make sure you:

- Take all of your medicines for diabetes exactly as prescribed. This includes insulin.
- Check your blood glucose levels exactly as instructed.

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- Be very careful when you are sick with an illness or an infection. Take extra care to follow diabetes care instructions for sick days. Check your blood glucose more often. Contact your healthcare provider if you have questions about how to manage your diabetes while you are ill.
  - Don't exercise when your blood sugar is high and you have ketones in your urine.
  - Check your urine ketone levels if told to do so. This is done with a urine test strip. Ask your provider how often to check your urine.

## **When to call your healthcare provider**

Call your provider right away if you:

- Have symptoms of DKA
- Have very high blood glucose levels or high levels of ketones in your urine
- Are getting sick with another illness
- Are confused about how to manage your diabetes