Patient information from BMJ

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Diabetic ketoacidosis

Diabetic ketoacidosis is a complication that can happen to people who have diabetes. It is a medical emergency that needs immediate treatment. Most people recover completely after treatment. But it is serious and can be fatal.

What is diabetic ketoacidosis?

Diabetic ketoacidosis (DKA) usually affects people with type 1 diabetes who are taking insulin to treat the condition. Insulin is a hormone that your body needs to help process the sugar in your blood so that you can use it for fuel.

People who have type 1 diabetes don't produce insulin in their bodies, so they take it as shots.

DKA can also happen to people who have type 2 diabetes, usually because of an infection or serious heart problems.

When insulin levels are so low that your body can't process your blood sugar, you start to break down your body fat to use as fuel. By-products of this fat-burning process, called ketones, then start to build up in your body. If this build-up of ketones gets too high and is not treated it can be damaging and even fatal. This is called diabetic ketoacidosis.

If you have diabetes you will know that there are several complications that can happen if your blood sugar gets too high or too low, or if you are not taking the right dose or type of medication. DKA is probably the most serious of these complications.

The most common cause of DKA is when someone with type 1 diabetes doesn't take enough insulin. For example, this could happen if:

- your dose is too low
- you become sick and stop taking your insulin as usual
- your body needs more insulin than usual because you have had an infection.

If you are unsure about how much insulin to take if you are sick, talk to your doctor or your diabetic nurse or practitioner. If you are very sick or you have an infection, seek emergency medical help. It's a good idea to have a plan in place about what to do about insulin if you get an infection or another illness.

Some other health conditions, such as heart attacks and strokes, can also make DKA more likely, as can some medications. These include:

- anti-inflammatory drugs called corticosteroids
- some drugs used to treat anxiety and other mental-health problems.

DKA can also happen as the first sign of diabetes in people who didn't know they had the disease.

What are the symptoms?

If you take insulin to treat diabetes, or if you have a child who takes insulin for diabetes, you should be aware of the symptoms of DKA. If you think that you or your child might be developing DKA seek medical attention right away.

The symptoms of DKA usually develop quickly over a matter of hours. The most common symptoms are:

- needing to pass urine a lot more than usual
- being extremely thirsty and needing to drink a lot of fluids (because you are passing so much urine and becoming dehydrated)
- being very hungry.

But you might have other symptoms, such as:

- feeling weak
- nausea or vomiting
- abdominal pain
- a fruity breath odor
- feeling confused.

If your symptoms come on over several days you might notice some sudden weight loss.

If you use a kit to test your own blood sugar or ketone levels, you might find that these are higher than usual. But this is not always the case.

The doctor will test your blood and urine to check levels of sugar, ketones, and other substances. He or she will also ask you about any medications you might be taking, including diabetes medications.

Your doctor might also suggest some other tests, such as tests to check your heartbeat, or a chest x-ray.

What treatments work?

DKA is a medical emergency. Most people need to be treated in the hospital. If your symptoms are severe you might need to be treated in an intensive care unit (ICU) to begin with. Treatment in an ICU allows for more detailed monitoring and testing.

But wherever you are treated, your treatment will come in two basic steps.

Step one: fluids

The first treatment you will need is fluids to treat the dehydration that goes with DKA. You will be given fluids by an intravenous (IV) drip.

If your blood tests show that you are low in some important minerals, such as potassium, you might also be given minerals in your IV.

Step two: insulin

You will need treatment with insulin. This will reduce your blood sugar level to where it needs to be.

Insulin treatment for DKA is given gradually in small doses so that your blood sugar comes down slowly. This is to prevent any sudden changes that might cause an unwanted reaction, and to help your body adjust comfortably to the fall in blood sugar.

If your symptoms are mild or moderate you will probably be given insulin in small doses as shots, every hour or two. If your symptoms are more severe you will probably be given low-dose insulin by IV.

What will happen?

Most people recover completely from DKA. But complications can happen. These are usually short term, such as blood sugar becoming too low, and they can be corrected with the right treatment.

More serious complications, such as swelling in the brain, can sometimes happen. And some people die from DKA.

After treatment you will need to stay in the hospital for monitoring for a while. But you should be able to leave the hospital when you feel well enough to eat and drink normally. A doctor or diabetes nurse should talk with you before you go home, to advise you about what causes DKA and how to prevent it happening again.

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