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Diabetic ketoacidosis

Diabetic ketoacidosis is a problem that occurs in people with diabetes. It occurs when the body cannot use sugar (glucose) as a fuel source because there is no insulin or not enough insulin. Fat is used for fuel instead.

Byproducts of fat breakdown, called ketones, build up in the body.

Causes

People with type 1 diabetes do not have enough insulin, a hormone the body uses to break down sugar (glucose) in the blood for energy. When glucose is not available, fat is broken down instead.

As fats are broken down, acids called ketones build up in the blood and urine. In high levels, ketones are poisonous. This condition is known as ketoacidosis.

Blood glucose levels rise (usually higher than 300 mg/dL) because the liver makes glucose to try to combat the problem. However the cells cannot pull in that glucose without insulin.

Diabetic ketoacidosis is often the first sign of type 1 diabetes in people who do not yet have other symptoms. It can also occur in someone who has already been diagnosed with type 1 diabetes. Infection, injury, a serious illness, or surgery can lead to diabetic ketoacidosis in people with type 1 diabetes. Missing doses of insulin can also lead to ketoacidosis in people with diabetes.

People with type 2 diabetes can develop ketoacidosis, but it is rare. It is usually triggered by a severe illness. Hispanic and African-American people are more likely to have ketoacidosis as a complication of type 2 diabetes.

Symptoms

Symptoms can include:

- Deep, rapid breathing
- Dry skin and mouth
- Flushed face
- Fruity smelling breath
- Nausea and vomiting
- Stomach pain

Other symptoms that can occur include:

- Abdominal pain
- Breathing difficulty while lying down
- Decreased appetite
- Decreased consciousness
- Dulled senses that may worsen to a coma
- Fatigue
- Frequent urination or thirst that lasts for a day or more
- Headache
- Muscle stiffness or aches

- Shortness of breath

Exams and Tests

Ketone testing may be used in type 1 diabetes to screen for early ketoacidosis. The ketones test is done using a urine sample. Ketone testing is usually done:

- When the blood sugar is higher than 240 mg/dL
- During an illness such as pneumonia, heart attack, or stroke
- When nausea or vomiting occur
- During pregnancy

Other tests for ketoacidosis include:

- Amylase blood test
- Arterial blood gas
- Blood glucose test
- Blood pressure measurement
- Potassium blood test

This disease may also affect the results of the following tests:

- CO₂
- CSF collection
- Magnesium blood test
- Phosphorus blood test
- Potassium urine test
- Sodium blood test
- Sodium urine test
- Urine pH

Treatment

The goal of treatment is to correct the high blood sugar level with insulin. Another goal is to replace fluids lost through urination and vomiting.

Most of the time, you will need to go to the hospital, where the following will be done:

- Insulin replacement
- Fluid and electrolyte replacement
- The cause of the condition (such as infection) will be found and treated

You may be able to spot the early warning signs and make changes at home before the condition gets worse. It is important to stay in close touch with your doctor.

Outlook (Prognosis)

Acidosis can lead to severe illness or death. Improved therapy for young people with diabetes has decreased the death rate from this condition. However, it remains a big risk in the elderly, and in people who fall into a coma when treatment has been delayed.

Possible Complications

- Fluid buildup in the brain (cerebral edema)

- Heart attack and death of bowel tissue due to low blood pressure
- Kidney failure

When to Contact a Medical Professional

This condition can become a medical emergency. Call your health care provider if you notice early symptoms of diabetic ketoacidosis.

Go to the emergency room or call the local emergency number (such as 911) if you have:

- Decreased consciousness
- Fruity breath
- Nausea
- Trouble breathing
- Vomiting

Prevention

People with diabetes should learn to recognize the early warning signs and symptoms of ketoacidosis. In people with infections or who are on insulin pump therapy, measuring urine ketones can give more information than glucose measurements alone.

Insulin pump users need to check often to see that insulin is still flowing through the tubing, and that there are no blockages, kinks, or disconnections.

Alternative Names

DKA; Ketoacidosis

References

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Update Date: 6/28/2011

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