What Is Diabetic Ketoacidosis?

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Fruity breath, abdominal pain, vomiting are all tell-tale signs of diabetic ketoacidosis (DKA).

If you're experiencing DKA, it is an emergency situation and must be dealt with immediately; for this reason, you must know what diabetic ketoacidosis is, the symptoms of DKA, how to treat DKA, and what to do if you suspect you have DKA.

Diabetic Ketoacidosis

When you have diabetes, you probably understand that your body has issues with utilization of insulin. The glucose that circulates in the blood is essentially moved out of the circulation and moved to where it needs to go, such as to the muscles, by the insulin.

If there is not enough insulin or a lack of insulin, the glucose will stay in the bloodstream. Blood glucose levels can get dangerously high. The kidneys can filter some of the glucose out, but the majority of the glucose will remain in the blood.

Because the cells are not utilizing glucose for energy, they begin to break down fat instead. Instead, ketones are broken down. When this happens, diabetic ketoacidosis develops.

When DKA begins to develop and you will go on to develop symptoms – so it is a good idea to know the symptoms of DKA.

What Are the Symptoms of Diabetic Ketoacidosis?

The hallmark symptom of DKA is a fruity odor to the breath, which is caused by the breakdown of ketones. Other symptoms of DKA include:

- Loss of appetite accompanied by abdominal pain and vomiting
- Blurred vision
- Flushed, dry, hot skin
- Rapid, deep breathing

You may read these symptoms and right now and think, "I have one or two of these symptoms! Do I have DKA?"

For example, a loss of appetite coupled with abdominal pain and vomiting can signify a stomach virus. Rapid, deep breathing with flushed, dry, hot skin can be an upper respiratory infection (although rapid, deep breathing in someone with DKA is typically a later stage symptom and signifies an emergency).

It is the combination of all of these symptoms that comprise DKA – so if you have all of these symptoms or a majority of these symptoms, it is important to know how to act.

What Causes Diabetic Ketoacidosis?

DKA is typically caused by one of two things (or sometimes a combination of these two things!) – Illness or an issue with insulin therapy.

Illness can cause DKA because it causes an excess production of cortisol and adrenaline. When these hormones are produced in higher amounts, they can counteract the effect of insulin – which can then cause DKA.

Issues with insulin therapy are also known to cause DKA. What do we mean by “issues” with insulin therapy? This typically means omitted doses of insulin – whether it is because you forgot the dose or skipped the dose on purpose.

However, it can also mean inadequate dosing of insulin. For example, if you require 75 units of Lantus and you only take ten units, you are setting yourself up for a dangerous situation.

Although these are the two most common causes of DKA, there are several other times and situations that you may find yourself at an increased risk for DKA:

- Heart attack
- Physical trauma
- Emotional trauma
- Alcohol and drug abuse, notably cocaine abuse
- The use of certain medications, notably corticosteroids such as prednisone, and diuretics

What Are the Dangers of Diabetic Ketoacidosis?

Depending on the person, DKA may develop slowly or quickly. However, it doesn’t matter how quickly DKA has developed – DKA can be life-threatening if it is untreated.

High levels of ketones can be poisonous to the body. According to Mayo Clinic, untreated DKA can lead to “loss of consciousness and, eventually, it can be fatal.”

Treatment of DKA typically is performed in the hospital setting (which we will cover in a later section) but remember that DKA is an emergency situation – in an emergency setting, there are still risks and complications that can happen as the body attempts to regulate itself:

- **Hypoglycemia** (low blood sugar): in the hospital setting, you will likely receive insulin because your body has a distinct lack of insulin. If your blood sugar drops too quickly, you can suffer from hypoglycemia.
- **Hypokalemia** (low blood potassium levels): in addition to receiving insulin, you will likely receive intravenous fluids. The combination of intravenous fluids and insulin can increase the likelihood of decreasing your potassium levels. If this happens, it can inhibit the functioning of your heart, muscles and nervous system.
- **Cerebral edema** (swelling of the brain): if your medical team attempts to adjust your blood sugar levels too quickly, swelling of the brain can develop.

While these are things that can happen, please keep in mind that your healthcare team will monitor your blood glucose levels through fingersticks and lab draws. They will also check your electrolytes through lab draws and will make every effort to minimize these complications from developing.

How can you minimize these complications from happening? By taking the proper steps and preventing DKA from happening in the first place – and acting quickly if you suspect that you may be in DKA!

How Do You Prevent Diabetic Ketoacidosis?

Sometimes people suffer from DKA because it is the first “sign” that they notice before receiving a diabetes diagnosis. It seems that their body has suddenly gone haywire – then all of a sudden, they are in the emergency department with a type 1 or type 2 diabetes diagnosis!

However, if you already have a type 1 or type 2 diabetes diagnosis, there are several things that you can do to ensure that you don’t get DKA.

The most important thing you can do? Take care of yourself! For example, your treatment regimen may differ, depending on the type of diabetes you have.

If you have type 1 diabetes, you need insulin for absolute survival – your pancreas no longer produces insulin, so you must make up for it by giving yourself injections with the insulin that you no longer produce.

If you have type 2 diabetes, your pancreas still makes insulin – but it may not produce enough insulin, or your body may be insulin resistant. You may be prescribed insulin, but you may also be managing your diabetes with diet and exercise, oral medications, or other injectable medications – or any combination of diabetic medications listed above.

Next page: Learn more about what is diabetic ketoacidosis, steps to take to avoid DKA, what to do if you suspect DKA, and more.

How Do You Prevent Diabetic Ketoacidosis?

Steps to Take to Avoid Diabetic Ketoacidosis

1. **Taking your insulin and/or medications as prescribed.** If your physician tells you to take Lantus 10 units at bedtime, you should take it. If they ask you to take a certain amount of Novolog with meals, take it. It doesn’t mean you can’t question them if you feel that the dosing is inaccurate – It just means that if you don’t take your medication, you may end up with dangerously high blood sugar levels.
2. **Check your blood sugar!** Often, insulin is dosed according to your blood sugar levels so knowing these numbers is important. If you don’t take insulin for the treatment of your diabetes, knowing your blood sugar levels is also important – it helps you and your physician know how well your treatment regimen is working, plus it lets you know if your lifestyle habits need “tweaking.”
3. **Ask your physician for a referral to a certified diabetes educator (CDE).** CDEs can help with many things – such as insulin management, education on those “lifestyle habits,” and can help if you think things may be going haywire.
4. **Know exactly what to do if you think you may have DKA.** There is a process you should follow that may keep you out of danger – or at least get you to the hospital as quickly as possible.

Please continue reading so that you know what to do if you suspect you have DKA.

What to Do If You Suspect You May Have Diabetic Ketoacidosis?

As hard as it may be, do not panic.

Objectively, look at your symptoms. Do they match up with the symptoms above? Then, check your blood sugar. Is it dangerously high? Think back. Have you been ill or stressed? Stress to the body – mental, physical, emotional – can cause an increase in blood sugar levels. Or did you omit insulin – intentionally or accidentally?

If your symptoms match up with symptoms listed above and your blood sugar is high, you need to check your ketone levels.

How to Check Your Ketone Levels

Here's how to check your ketone levels. Although there are meters that can test your blood ketones, most insurance plans do not cover this type of testing, and it is costly, so it is more practical to purchase urine ketone testing strips.

For this reason, we will outline the steps for urine ketone testing:

1. While urinating, pass the ketone strip into the urine stream. You may also urinate into a clean container and dip the ketone strip into the clean sample of urine if it is difficult to pass the strip into the urine stream.
2. Shake any excess urine off of the ketone strip.
3. Each bottle of ketone strips will tell you how long to wait before checking for results; refer to your bottle of ketone testing strips.
4. Once you have waited the allotted amount of time, check the strip. It should have changed color. Compare the color to color chart on the bottle. The color chart will tell you an estimate of the amount of ketones in your urine.
5. Use the ketone chart to decide what you should do next.

The charts will typically state that your ketones are "trace" or "small," "moderate," "large" or "very large." When your ketones are "trace" or "small," ketones are starting to build and may be able to be managed at home.

Contact your physician or CDE – they may ask you to give additional insulin, change your insulin pump infusion site (if you utilize an insulin pump), and other self-care measures, such as proper hydration.

However, if your ketones are "moderate" or larger, it is typically recommended to seek emergency medical attention. Ketones can build up very quickly, and it can turn dire very quickly.

Can I Get Diabetic Ketoacidosis If I Have Type 2 Diabetes?

Generally speaking, DKA is much more common in people who are diagnosed with type 1 diabetes than with type 2 diabetes. In fact, in the past, it was almost unheard of for someone to present with type 2 diabetes and DKA.

However, it is becoming increasingly more common for someone with type 2 diabetes to present to an emergency department with DKA. Why?

According to *The BMJ,* "some people with type 2 diabetes may develop acute reductions in insulin production, which, coupled with insulin resistance, can cause DKA, usually without a precipitant." People with type 2 diabetes who are prone to developing DKA are considered "ketosis-prone type 2 diabetic".

This does not mean that every person with type 2 diabetes is prone to developing DKA. In fact, studies suggest that most people with type 2 diabetes will not go on to develop DKA.

Studies indicate that African-Caribbean and other non-white ethnic groups are more likely to have ketosis-prone type 2 diabetes; "observational studies in African-Caribbean people presenting with ketoacidosis indicate that 20-50% have type 2 diabetes."

The Bottom Line…

DKA is almost always unavoidable if you take the proper steps in treating and managing your diabetes. However, knowing how to detect DKA and then what to do if you suspect you have DKA is of the utmost importance as it can save your life.