

# Diabetic ketoacidosis (DKA)

Information and advice for people with diabetes

## *Diabetes, endocrinology and lipid metabolism*

### **What is the diabetic ketoacidosis (DKA)?**

Diabetic ketoacidosis (DKA) is a serious complication of diabetes where large amounts of ketones (an acidic substance) are produced and accumulate in the blood making the blood more acidic; this can cause damage to your organs.

### **What causes diabetic ketoacidosis?**

DKA happens when your body does not have enough insulin to help the glucose in your blood get into the body cells to be used to produce energy. Your body then starts to use fat to produce energy instead, but this also produces an acidic substance called ketones. Small amounts of ketones in the blood aren't harmful but large amounts increase the level of acid in the blood and this is harmful to your organs.

You can develop diabetic ketoacidosis if:

- You stop taking your insulin or miss doses of insulin frequently
- You have a serious infection or injury or have had major surgery
- You are pregnant

People are also at risk of developing DKA if they have type 1 diabetes but are not aware of it. DKA is also more common in people with type 1 diabetes and those who have previously had an episode of DKA.

### **What are the symptoms of diabetic ketoacidosis?**

The most common symptoms of DKA include:

- High blood glucose levels
- Ketones in the blood or urine
- Increasing thirst
- Passing large volumes of urine
- Feeling sick and vomiting
- Stomach pain
- Extreme tiredness

Symptoms of severe DKA include:

- Confusion
- Drowsiness
- Unconsciousness

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### How is diabetic ketoacidosis diagnosed?

Ketones in your blood and urine are a warning sign of DKA. If you feel unwell or have any of the symptoms above you should test your blood glucose. If it is above 12mmol/L you should test your blood or urine for ketones every 2 hours using the ketone testing strips. Your doctor or diabetes nurse will explain how to test for ketones in more detail.

If you need treatment in hospital you may have blood tests and other investigations to find a possible cause for the DKA.

### How to interpret the blood ketones results

Ketone Level in blood (mmol/L)	Action
<0.6	Normal – repeat in 2 hours if blood glucose remains high
0.6-1.5	Indicates a need for extra insulin – follow the 'sick day rules' (points 1-7 below)
>1.5	Risk of DKA – contact your diabetes team immediately

High levels of ketones in the **urine** make the test strip turn **dark purple**.

### How is diabetic ketoacidosis treated?

If you feel unwell or have any of the early symptoms of DKA do the following:

1. Contact your diabetes team.
2. Don't stop taking your insulin.
3. Drink plenty of sugar-free alcohol-free fluids to prevent dehydration
4. Check your blood glucose using your glucometer every 2 hours. If it is higher than 12mmol/L, inject a correction dose of quick-acting insulin, e.g. Novorapid, Humalog or Apidra (1 unit of quick-acting insulin lowers the blood glucose by 2-3mmol/L).
5. If your blood glucose is above 12mmol/l check your blood or urine for ketones every 2 hours.
6. Continue with your normal diet. If your appetite is poor have small (20g) carbohydrate snacks e.g. a scoop of ice cream, lucozade, soup and a slice of bread or a milky drink.
7. Avoid strenuous activity

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If you are vomiting and unable to keep fluids down, or continue to feel unwell you should go to your nearest A&E and take your diabetes medicines and equipment with you. In hospital you may be given fluids and insulin through a drip into your vein.

### **What are the benefits of the treatment?**

The benefit of the treatment is that, if it is given soon enough, it will resolve your symptoms within a few hours and you will be back to normal.

### **What are the risks of the treatment?**

There are no risks to these treatments, but if they are not given soon enough you can become seriously ill.

### **What are the risks of not getting treatment?**

If you do not have treatment for DKA your condition can become life-threatening. Children are particularly at risk of this.

### **Are there any alternatives to this treatment?**

There are no alternatives to this treatment.

## **How can diabetic ketoacidosis be prevented?**

There are several steps you can take to reduce the risk DKA:

1. Learn to recognise the early symptoms of DKA.
2. Test your blood glucose and ketone levels when you feel unwell and follow the sick day rules.
3. Always check your insulin pen or pump is working correctly.
4. Learn how to correct high blood glucose levels with your quick-acting insulin; your diabetes nurse can teach you how to do this.
5. Never miss doses of insulin. Your body needs insulin even when you are not eating and needs more insulin when you are ill; if you have type 1 diabetes all of your insulin comes from injections because your body cannot produce it naturally.

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### Contact details

If you have any questions or concerns please speak to your GP or contact your local diabetes centre (Monday – Friday, 9am – 5pm):

#### City Hospital Diabetes Centre

0121 507 6006

#### Sandwell Hospital Diabetes Centre

0121 507 3063

Outside of normal working hours please go to your local Urgent Care Centre for advice, or in an emergency go your local A&E.

### Further information

There are more information leaflets about diabetes available in the diabetes centres and you can also find more information from Diabetes UK.

#### Diabetes UK

[www.diabetes.org.uk](http://www.diabetes.org.uk)

Helpline: 0845 120 2960 (Monday – Friday, 9am – 5pm)

#### DVLA (Medical information)

[www.dft.gov.uk/dvla.medical](http://www.dft.gov.uk/dvla.medical)

Contact centre: 0300 790 6806

Monday – Friday, 8am – 5.30pm and Saturday 8am – 1pm

For more information about our hospitals and services please see our website:

#### Sandwell and West Birmingham Hospitals NHS Trust

[www.swbh.nhs.uk](http://www.swbh.nhs.uk)

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### Sources used for the information in this leaflet

- National Institute for Health and Clinical Excellence, CG15 'Type 1 diabetes: Diagnosis and management of type 1 diabetes in children, young people and adults', issued July 2004, most recently updated October 2011
- Joint British Diabetes Societies Inpatient Care Group, 'The Management of Diabetic Ketoacidosis in Adults', March 2010
- Textbook of Diabetes second edition, chapter 39 'Acute Metabolic Complications of Diabetes Mellitus: Diabetic Ketoacidosis, Hypersomolar non-ketotic syndrome and Lactic Acidosis', 1997
- The Lancet, 'Diabetic Ketoacidosis', March 1995

If you would like to suggest any amendments or improvements to this leaflet please contact the communications department on 0121 507 5420 or email: [swb-tr.swbh-gm-patient-information@nhs.net](mailto:swb-tr.swbh-gm-patient-information@nhs.net)



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ML3754  
Issue Date: July 2012  
Review Date: July 2014