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## Diabetic coma

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### Summary

- The three types of diabetic coma include diabetic ketoacidosis coma, hyperosmolar coma and hypoglycaemic coma.
  - Diabetic coma is a medical emergency and needs prompt medical treatment.
  - Uncontrolled blood glucose levels may lead to hyperglycaemia or hypoglycaemia.
  - Low or persistently high blood glucose levels mean your diabetes treatment needs to be adjusted. Speak to your doctor or registered diabetes healthcare professional.
  - Prevention is always the best strategy. If it is a while since you have had diabetes education, make an appointment with your diabetes educator for a review.
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Diabetes mellitus is a condition characterised by high blood glucose (sugar) levels. Uncontrolled diabetes may lead to a diabetic coma or unconsciousness. The three types of coma associated with diabetes are diabetic ketoacidosis coma, hyperosmolar coma and hypoglycaemic coma.

### Diabetic ketoacidosis coma

Diabetic ketoacidosis typically occurs in people with type 1 diabetes, which was previously known as juvenile diabetes or insulin dependent diabetes mellitus (IDDM), though it can occasionally occur in type 2 diabetes. This type of coma is triggered by the build-up of chemicals called ketones. Ketones are strongly acidic and cause the blood to become too acidic.

When there is not enough insulin circulating, the body cannot use glucose for energy. Instead, fat is broken down and then converted to ketones in the liver. The ketones can build up excessively when insulin levels remain too low. Common causes of ketoacidosis include a missed dose of insulin or an acute infection in a person with type 1 diabetes. Ketoacidosis may be the first sign that a person has developed type 1 diabetes.

### Symptoms of ketoacidosis

Symptoms of ketoacidosis are:

- extreme thirst
- lethargy
- frequent urination (due to high blood glucose levels)
- nausea
- vomiting
- abdominal pain
- progressive drowsiness
- deep, rapid breathing
- a fruity or acetone smell on the breath.

In order to pick up the earliest signs of ketoacidosis, people with type 1 diabetes whose blood glucose levels are particularly high require more frequent monitoring of blood glucose. Checking of ketone levels is also recommended. If available, blood ketone testing is preferred. If blood ketone testing is not available, urine testing may be used.

### Diabetic hyperosmolar coma

A diabetic hyperosmolar coma is caused by severe dehydration and very high blood glucose levels

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(hyperglycaemia).

Events that can lead to high blood glucose levels include:

- forgotten diabetes medications or insulin
- an infection or illness, such as the flu or pneumonia
- increased intake of sugary foods or fluids.

Those at most risk of this type of coma are people with type 2 diabetes, who have an infection or acute illness and have reduced their intake of fluids.

The kidneys respond to high levels of blood glucose by doing their best to remove it, along with a great deal of water. The person experiencing diabetic hyperosmolarity will be very thirsty, but they can't drink enough water to replace the lost fluids. They will become dehydrated and urgently need intravenous fluids. Without this kind of treatment, they may lapse into hyperosmolar coma.

Hyperosmolar coma develops slowly over several days or weeks, so if the high blood glucose levels or dehydration are detected and treated early, coma can be prevented.

### **Diabetic hypoglycaemic coma**

Hypoglycaemia, or low blood glucose levels (below 3.5 mmol/l), may occur if a person on insulin or certain other diabetes medications (such as sulphonylureas tablets):

- takes an extra dose or an increased dose
- exercises strenuously without eating extra food or reducing their medication
- misses a meal or snack
- drinks too much alcohol or drinks alcohol without eating food.

If the blood glucose falls to very low levels, the person may become unconscious (hypoglycaemic coma) and seizures may occur.

### **Symptoms of hypoglycaemia**

Symptoms of hypoglycaemia include:

- tremor
- racing pulse or heart palpitations
- sweating
- weakness
- intense hunger
- confusion, altered behaviour, drowsiness or coma – these may occur if the blood glucose level becomes very low.

Prolonged or frequent coma should be avoided and hypoglycaemia needs to be treated quickly.

### **First aid for diabetic coma**

First aid for someone who has lapsed into a diabetic coma includes:

- Call triple zero (000) for an ambulance immediately.
- Don't try to give them anything to eat or drink, as they may choke.
- Turn them onto their side to prevent obstruction to breathing.
- Follow any instructions given to you by the operator until the ambulance officers arrive.
- Don't try to give them an insulin injection.
- If available, administer 1 mg of glucagon for rapid reversal of hypoglycaemia.

### **Diagnosis of diabetic coma**

A coma is a medical emergency. A quick diagnosis can save the person's life. The cause of a diabetic coma is

diagnosed using a number of tests including:

- medical history
- physical examination – the person may be wearing an emergency bracelet identifying their medical condition
- blood tests – including tests for glucose and ketone levels.

### **Treatment for diabetic coma**

Treatment options for diabetic coma include:

- ketoacidotic coma – intravenous fluids, insulin and administration of potassium
- hyperosmolar coma – intravenous fluids, insulin, potassium and sodium given as soon as possible
- hypoglycaemic coma – an injection of glucagon (if available) to reverse the effects of insulin or administration of intravenous glucose.

### **Where to get help**

- In an emergency, always call triple zero (000)
- The emergency department of the nearest hospital
- Your doctor
- Diabetes specialist
- Baker Heart and Diabetes Institute Tel. (03) 8532 1111
- Diabetes Victoria Tel. 1300 437 386
- Australian Diabetes Educators Association Tel. (02) 6287 4822

### **Things to remember**

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**This page has been produced in consultation with and approved by:**

Baker Heart and Diabetes Institute

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