

## Diabetes and coma

Diabetes mellitus is a condition characterised by high blood glucose (sugar) levels. Uncontrolled diabetes may lead to coma or unconsciousness. The three types of coma associated with diabetes include ketoacidotic coma, hyperosmolar coma and hypoglycaemic coma.

### **Ketoacidotic coma**

Ketoacidotic coma is more common in people with type 1 diabetes, which used to be called juvenile diabetes or insulin dependent diabetes mellitus (IDDM). 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.

Ketones are by-products of fat breakdown; they can build up excessively when there is insufficient insulin in the body. When there is not enough insulin circulating, the body cannot use glucose for energy. Instead fat is broken down, which is then converted to ketones in the liver. Common causes of ketoacidosis include a missed dose of insulin or an acute infection.

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 may also be present.

Tests will reveal whether large amounts of ketones are present in the blood and urine.

### **Hyperosmolar coma**

A hyperosmolar coma is caused by severe dehydration and very high blood glucose levels (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 or are taking diuretic medication or steroids.

The kidneys respond to high levels of blood glucose by doing their best to excrete 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, so if the high blood glucose levels are detected and treated early, coma can be prevented.

### **Hypoglycaemic coma**

Hypoglycaemia, or low blood glucose levels (below 3.5mmol/L), may occur if a person on diabetes medication or insulin:

- Takes an extra or an increased dose
- Exercises strenuously without eating extra food or reducing their insulin intake
- Misses a meal or snack
- Drinks too much alcohol or drinks alcohol without eating food.

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

Symptoms of hypoglycaemia include:

- Trembling
- Palpitations
- Weakness
- Sweating
- 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 treated quickly.

### First aid

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

- Dial 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.

### Diagnosis methods

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
- Blood tests, including glucose and ketones
- Urine tests.

### Treatment options

Treatment options for diabetes-related coma include:

- **Ketoacidotic coma** – intravenous fluids, insulin and administration of potassium and sodium.
- **Hyperosmolar coma** – plenty of intravenous fluids, insulin, potassium and sodium given as soon as possible.
- **Hypoglycaemic coma** – administration of the hormone glucagon to reverse the effects of insulin, or glucose given intravenously.

### Where to get help

- Always call an ambulance in an emergency Tel. 000
- Emergency department of the nearest hospital
- Your doctor
- Diabetes specialist
- Baker IDI Heart and Diabetes Institute Tel. (03) 9258 5000
- Diabetes Australia – Victoria Tel. 1300 136 588

### Things to remember

- The three types of coma associated with diabetes include ketoacidotic coma, hyperosmolar coma and hypoglycaemic coma.
- Diabetic coma is a medical emergency and needs prompt medical treatment.
- Uncontrolled blood glucose levels may lead to hyper or hypoglycaemia.
- Low or persistently high blood glucose levels means your diabetes treatment needs to be adjusted. Speak to your doctor or health 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.

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

Baker IDI Heart and Diabetes Institute

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