
Coma

Summary

- Coma is a state of consciousness that is similar to deep sleep, except no amount of external stimuli (such as sounds or sensations) can prompt the brain to become awake and alert.
 - A coma is a medical emergency.
 - The wide range of causes includes head injury, stroke, cardiac arrest, hypoglycaemia, hyperglycaemia, hypothermia, drug overdose, and kidney or liver failure.
 - A person in a persistent vegetative state has damage to the areas of the brain responsible for consciousness, self-awareness and personality.
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Coma is a state of consciousness that is similar to deep sleep, except no amount of external stimuli (such as sounds or sensations) can prompt the brain to become awake and alert. A person in a coma can't even respond to pain. A wide range of illnesses, conditions and events can cause coma.

Coma occurs when there is a serious problem with the brain's arousal system (the reticular activating system), or with its communications between other brain areas (such as the cerebral hemispheres) and the brain's activity becomes impaired.

In some cases a person can descend into a persistent vegetative state, where the brain has lost its higher functions (including consciousness, self-awareness and personality) but retains involuntary functions such as breathing and swallowing, heart rate and blood pressure.

Symptoms of coma

The symptoms of coma include:

- The person looks like they're asleep.
- No amount of sensory stimulation can wake them up.
- They may be breathing unusually.
- They may be holding their body in an unusual posture.
- Their pupils may be affected in a number of different ways. For example, one pupil is larger than the other or both pupils are constricted.

Causes of coma

The various causes of coma can be broadly divided into three main categories, which are:

- Intracranial – events occurring within the skull. This can include infection (such as meningitis), haemorrhage following a severe head injury, stroke, brain abscess, brain tumour, cerebral oedema (swelling of the brain) or the after-effects of an epileptic seizure
- Extracranial – any external event that reduces oxygen or blood flow to the brain (cerebral hypoxia). This can include acute cardiac arrest (heart attack), alcohol poisoning, drug overdose (prescribed or illegal), carbon monoxide poisoning, liver or kidney failure, hypoglycaemia (low blood sugars), hyperglycaemia (high blood sugars), fever, electrocution and hypothermia (drop in body temperature)
- Psychiatric – mental disorders, including depression and catatonia, can cause a state of consciousness that appears very similar to coma.

Diagnosis of coma

A coma is a medical emergency. A quick diagnosis can be life-saving. For example, a person with diabetes may have dangerously lowered their blood sugar levels by accidentally injecting too much insulin. Immediate treatment is crucial in this type of life-threatening situation.

Generally, the order in which medical personnel diagnose and treat for coma is:

- The airway, breathing, blood pressure and pulse of the person are checked.
- Their temperature is taken. A high temperature may indicate fever and infection, while a low temperature suggests hypothermia.
- The body is examined for injuries in case the person may have sustained a serious head injury.
- The doctor checks for signs of brain damage such as complete limpness of the whole body or unusual breathing patterns.
- The pupils of the eyes can offer information about the cause of the coma. For example, unequal pupil sizes can indicate pressure in the brain, while pinpoint pupils could suggest narcotic overdose.
- A variety of blood tests can check a range of important factors including red and white blood cell counts, sugar levels, salt levels, alcohol levels, and blood levels of oxygen and carbon dioxide.
- Urine tests can show the presence of toxins and sugars.
- Scans of the brain, including CT and MRI, may be needed to help diagnose injuries to the brain.
- Suspected infections can be checked via lumbar puncture (a small amount of cerebrospinal fluid is drawn from the spine and tested in a laboratory).

Immediate intensive care for coma

Proper diagnosis can sometimes take hours or even days. In the meantime, the person is given immediate intensive care, including:

- An intravenous line (IV or drip) to provide fluids and drugs
- An oxygen mask
- Urinary bladder catheterisation
- Constant monitoring of their vital signs including pulse, breathing and blood pressure
- Intravenous glucose
- Pumping of the stomach, if it is thought the person ate or drank something poisonous
- Administration of a narcotic antidote, if a drug overdose is suspected
- A respirator, if the person is unable to breathe by themselves.

Treatment for coma

Treatment of coma depends on the cause and severity, but may include:

- Intravenous administration of glucose in the case of hypoglycaemia
- Intravenous administration of naloxone in the case of a heroin overdose
- Surgery in the case of haemorrhage, for example, subdural haematoma (a blood clot between the brain and its covering)
- Antibiotics in the case of infection.

Recovery from coma

The person's recovery depends on the cause and severity of the coma, but anyone who falls into a comatose state is at risk of dying. In some cases, there may be a complete recovery with no loss of brain functioning, while in other cases, lifelong brain damage is the result.

Vegetative state coma

If the person's brain is severely damaged or deprived of oxygen for a long time, they may be in a vegetative state. If this lasts longer than a month or so, it is known as a persistent vegetative state. This means they can breathe, swallow and startle to stimuli such as loud noises, but have lost the higher brain functions that allow consciousness and personality.

While comas usually only last a few weeks, a vegetative state can continue for months or even years. The longer the person remains in this state, the bleaker their chances of making a recovery.

Signs of vegetative state coma

Some of the characteristics of a vegetative state coma include:

- The person looks like they're asleep
- They can't wake up, talk or respond to commands
- The eyes may open in response to stimuli
- The person is able to move their body
- Heart rate, blood pressure and respiration continue
- The person can randomly laugh, cry or pull faces.

Complications of vegetative state coma

Common complications of a persistent vegetative state can include:

- Infections
- Pneumonia
- Bed (pressure) sores
- Contracture (muscles shorten and contort the body).

Ongoing treatment for vegetative state coma

The person's chances of recovery decrease as time goes by. There is often no way of knowing how long the vegetative state will last, so it is important to keep the person as healthy as possible in the hope they will eventually recover.

Medical care includes:

- Prevention and treatment of infection
- Keeping the skin clean and regularly turning the person to prevent bedsores and ulcers
- Physical therapy to help keep the muscles supple
- Good nutrition, delivered via an intravenous drip or nasogastric tube (which is passed in through the nose and down into the stomach).

Recovery from vegetative state coma

Recovery is usually a slow process, with the person first gaining some awareness of what's going on around them and eventually being able to respond. However, only a small percentage of people who wake from a persistent vegetative state after six months or more are able to live independently. In most cases, they are permanently brain damaged and disabled.

Brain death

Brain death means the person has such severe brain damage that they are no longer able to breathe by themselves and need to be kept on a respirator. An electroencephalogram (EEG) typically shows no brain activity

at all, indicating that the person has died, even though their heart continues to beat.

Where to get help

- In an emergency, always call triple zero (000)
- Your doctor
- Emergency department of your nearest hospital
- Neurologist

Things to remember

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Royal Melbourne Hospital - Neurology Department

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