

This pamphlet gives you some information about "traumatic brain injury" and explains some of the medical terms used. We would like you to understand what we are doing in the DCCM and why.

What is a traumatic brain injury?

The main feature of a severe traumatic brain injury is a lowered level of consciousness. Unconsciousness is a state where the patient is unable to wake and unable to obey simple commands. Coma is a general term meaning 'unconsciousness'.

It may be caused by brain injury, or due to sedative drugs administration, or a variety of other causes.

The brain is encased in the skull (cranium), a protective, bony box. Where there is a traumatic brain injury the brain may be injured in different ways.

Acceleration or deceleration injuries are caused by sudden stopping, turning, or speeding up, as in a violent high-speed impact. There may also be a **local injury** such as a direct blow.

The brain, its covering layers, and blood vessels may be torn, stretched or sheared apart. This damage is often widespread affecting all of the brain (diffuse injury). Or the brain may be injured in just one or two specific areas causing a localised brain injury.

Despite having a severe traumatic brain injury, there may be no visible external damage. Injuries to other parts of the body e.g. broken bones, internal bleeding and damage to organs complicate the care of a patient with a traumatic brain injury. These injuries may lead to a low blood pressure or poor breathing which can seriously reduce the flow of blood rich in oxygen to the brain.

There is no treatment for damage done at the time of impact (primary damage). If this is very severe, then there is very little that surgery and intensive care can do to improve the situation.

However, the damage to the brain does not stop at the initial injury. Swelling and bleeding in the brain often continue and this damage may worsen the initial injury. This is called secondary damage. The major role of intensive care is to try and prevent and treat the secondary brain injury.

Haemorrhage or bleeding is often seen with severe traumatic brain injury. In the brain this may happen at the time of injury, or develop over the next few hours.

Secondary Complications of Brain Injury

Brain swelling (cerebral oedema) This may be present immediately or develops over the first few hours. Severe brain swelling can lead to further damage to the already injured brain.

A blood clot (haematoma) may occur over the surface of the brain or develop deep within the brain tissue. Some of these clots may be able to be surgically removed but some may be inoperable for technical reasons.

Raised intracranial pressure is the name given to the build up of high pressure inside the skull. Such pressure within the skull may lead to further damage to the injured brain and this often requires specific treatments. Both brain swelling and bleeding often cause the pressure to rise.

Hospital care Treatment of a patient with severe traumatic brain injury starts in the Emergency Department. This includes intravenous fluids, oxygen, and anaesthetic medications to make the patient sleep, and to relieve pain. Breathing is helped with the use of a ventilator (breathing machine). CT scans (computer generated photos) of the brain are done early after admission. Depending on the nature of injuries the patient may go directly to the operating room before coming to the DCCM.

In the DCCM the aim is to minimise further damage to the injured brain and prevent secondary complications.

It is important to maintain good blood pressure, breathing and oxygenation. This is to promote the best possible flow of oxygen rich blood to the brain. Early treatment may include keeping the patient heavily sedated to try and "rest" the brain. Continuous monitoring of the patient's condition allows any complications to be detected and treated early.

Monitoring Monitoring of the patient with severe traumatic brain injury involves constantly measuring blood pressure, oxygenation and breathing. The pressure within the skull is sometimes measured by a device to measure the intracranial pressure (a wire that is inserted into the brain to measure pressure).

CT scans are repeated on a regular basis. In some cases electrical tests of nerve and brain function may be performed.

At some stage when the patient is stable, the sedating medications are reduced so that clinical examination can be carried out. This is done to assess the level of consciousness of the patient. The patient's ability to obey commands, move their limbs in response to stimulation and open their eyes is assessed.

Outcomes

It can be difficult to predict the recovery of a person who has suffered a severe traumatic brain injury.

Occasionally the recovery is good but many patients who have had severe traumatic brain injury have some loss of mental abilities. These losses may involve memory, concentration, personality, intellect and emotional ability. Some patients may have physical difficulties also (weakness, visual changes, loss of smell, impaired hearing), many complain of tiredness, headaches & exhaustion. Depression is also common.

It can take a lot of time (weeks – months) for rehabilitation to teach the patient to do ordinary things again. There can be permanent brain damage. Sometimes injuries are so severe that the patient does not survive.

When intensive care is no longer needed, a brain-injured patient will be transferred to the neuroservices wards opposite on the 8th floor. Rehabilitation plans will be made. Traumatic brain injuries are not only a problem for the person injured, but also for the family/whānau and friends of that person. It is a life-changing event. If you have any questions please do not hesitate to ask the staff.

Filename: Severe traumatic brain Injury
Issued by: DCCM Quality Committee
Authorised by: DCCM Senior Nurses
Reviewed: September 2017



Department of
**Critical Care
Medicine**

Severe traumatic brain injury

Information
pamphlet for
families and whānau