



Understanding Neurological Death

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It is difficult to imagine a more devastating experience than discovering a loved one has been severely injured and is being examined for signs of life. Mere words cannot convey the feelings of shock and helplessness, and the fear of impending loss we suffer when such a sudden and unexpected reality is presented to us.

It is a time when we may hear and be forced to come to terms with phrases like ‘neurological death’ or ‘brain death’. How do these medical terms describe the condition of our loved one – and what are we to do with this information?

This booklet seeks to help answer those questions and explain what a neurological determination of death means.

We understand that the confusion and uncertainty you might be experiencing in these circumstances can at times seem unbearable. We hope that in these moments of shock and sorrow we can provide the information you need to know about neurological death, and answer the questions you might not think to ask under the circumstances.

Neurological Determination of Death

Neurological Determination of Death – a definition: A diagnosis of death by neurological criteria (also referred to as “brain death”) means the brain has permanently lost all function.

As a result of the severe brain injury or trauma your loved one suffered, the accumulation of fluid, blood, or a swelling of the brain cells has caused pressure to build inside the skull, making it increasingly difficult for life-giving blood and oxygen to flow into the brain.

Since the bones of the skull create a space only slightly larger than the brain, as the pressure increases, the brain soon has no place to expand. The pressure then builds rapidly to the point that all blood flow to the brain is completely blocked and all brain function ceases. Without the oxygen the blood delivers, the brain begins to die immediately. Once brain cells die there is no way to bring them back to life; the brain itself dies and no longer functions in any capacity – and never will again. When the brain dies, the person can no longer breathe, move, think or feel. Neurological death is a process that, when completed, is irreversible and there can be no hope of recovery whatsoever.

What causes neurological death?

There are many causes of neurological death. A brain hemorrhage or bleed as a result of an aneurysm or stroke is a common cause; others include severe head trauma that may occur in a motor vehicle accident, an injury from a gunshot wound, a severe blow to the head, or brain tumours. Drowning, poisoning, and medication overdoses may also result in neurological death.

How is the diagnosis reached?

A doctor experienced in caring for patients suspected of neurological death will perform a standard series of tests designed to assess the function of the brain. The tests are conducted in such a manner so as to leave no room for error.

What tests are performed to determine neurological death?

Physical examinations are conducted that detect brainstem reflexes such as gag, cough, physical movement, and the changes in the patient's eyes (pupils) when exposed to light. Apnea testing is carried out, which involves removing the patient from the ventilator (breathing machine) to determine if they will breathe.

Sometimes additional testing, like a CAT scan of the brain and/or a brain flow study that checks for the presence or absence of blood flow to the brain is also used to help determine the diagnosis of neurological death.

But my loved one is still breathing and their heart is beating – doesn't the heart have to be stopped for death to be pronounced?

No. As a result of the emergency treatment your loved one required, they have been placed on a ventilator that takes over the function of breathing for them. As long as oxygen and other intensive care interventions are being supplied, the heart will continue to beat for a short period of time only. It is the ventilator and medications, not the heart and lungs, that are sustaining the body's vital functions.

It can be confusing or upsetting to be told that your loved one is dead when you can see the chest rising and falling and see the evidence of the heart beating. But your loved one is not alive or even dying – your loved one is already dead.

Is neurological death different than other kinds of death?

No. Death occurs when the brain dies. This is why people who have had a cardiac arrest – whose hearts have stopped even for a few minutes – can sometimes be resuscitated and recover; recovery is possible because the brain has not yet died. When neurological death has occurred there is no possibility of recovering. Neurological death *is* death.

Couldn't our loved one just be deeply unconscious or in a coma?

Unfortunately not. Coma and neurological death are not the same thing. With neurological death, medical technology can create the appearance of a living person – though they are dead. A person in a coma or in a persistent vegetative state continues to have some brain activity and would not be treated as neurologically dead. Neurological death literally means death.

Can anything else be done?

Be assured that everything that could be done to save the life of your loved one has been done. If neurological death has been pronounced, nothing further can be done to help the patient. There is no chance of recovery; neurological death is not reversible. The time of neurological death is the legal time of death and is the time that appears on the death certificate.

People talk about miracles - do such things happen?

Sadly, no. Using the strict Canadian guidelines developed by experts to determine neurological death, there has never been a recorded case of a person recovering from a determination of neurological death in Canada.

I've heard that people sometimes move or twitch after they've been diagnosed as brain dead. This doesn't make sense if brain death means that there is no brain function. What is going on?

Your loved one may exhibit spinal activity or reflexes such as twitching or muscle contractions – movements that are understandably confusing and upsetting to observe. Spinal reflexes are caused by electrical impulses that remain in the spinal column. These reflexes can occur even though the brain, and therefore the patient, is dead.

What happens when neurological death is determined?

If organ donation is a possibility for your loved one, he or she may continue to receive oxygen and medications while on the ventilator until a decision is made. It is at this time that the opportunity to donate your loved one's organs and/or tissues will be discussed with you.

Can a brain dead patient be kept on a ventilator indefinitely?

No. After neurological death has been determined, if the family has chosen not to proceed with organ donation, the ventilator will be discontinued. If organ donation is to proceed, the ventilator will be discontinued in the operating room following the recovery of your loved one's organs. It's important to remember that discontinuing the ventilator does not cause death - your loved one is already dead.

Will we be allowed to spend time with our loved one to say our goodbyes?

Your loved one's healthcare team will ensure that you are provided with the time and privacy needed to say goodbye and to facilitate any special religious or cultural rituals you may have at this time. From the time you enter the hospital, the doctors, nurses, and other members of the health care team will explain what is happening as you journey through this difficult time. You are not alone.

What if we have more questions?

There are Organ Donor Coordinators available to answer your questions. If you have a specific question they cannot answer, they will find the information for you. Call the Critical Care Organ Donation Program at 902.473.5523 or toll free at 1.877.841.3929.

Organ and tissue donation is the most precious, unique and altruistic gift a person can give; it is the ultimate act of humanity, making the individuals and families who choose the opportunity, genuine heroes of our time.

Healthcare Team:

ICU Nurses

ICU Doctors

Organ Donation Coordinator

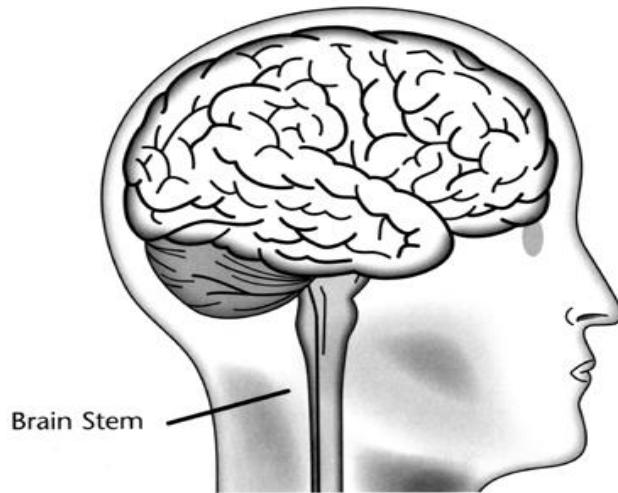
Chaplain

Social Worker

Other

Notes

The Brain



Glossary

Aneurysm – An aneurysm is a dilation of a blood vessel (similar to a balloon) which as it expands has the potential for rupture. Rupture of an aneurysm in the brain can cause a stroke.

Apnea Test – A test to determine if the patient can breathe.

Brain Flow Study – A test to confirm the absence of blood flow to the brain.

Brain Death – The brain has permanently lost all function.

Brainstem Reflexes – Reflex actions such as cough, gag, motor and pupillary response to light. The absence of brainstem reflexes indicate the brain is no longer able to send messages to the body to make it work - to breathe and to perform other vital functions.

CT or CAT Scan – A special X-ray technique that uses a computer to incorporate multiple X-ray images into a 2 dimensional cross-sectional image.

Coma – A deep, prolonged and sometimes irreversible unconsciousness.

Brain Hemorrhage – A large release of blood from the blood vessels into the brain itself.

Magnetic Resonance Imaging (MRI) – A special imaging technique used to show internal structures of the body, particularly soft tissues such as the brain.

Neurological – Having to do with the brain and/or other parts of the central nervous system.

Spinal Reflexes – Movements that are caused by electrical impulses conducted by, or originating from nerves or spinal cord rather than the brain.

Ventilator – A machine that is used to assist a patient's breathing, or takes over this function when they cannot breathe. The ventilator can be used to deliver oxygen to organs when a person is not breathing.

Source Material:

Severe Brain Injury to Neurological Determination of Death: A Canadian Forum
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Report and Recommendations: Canadian Council for Donation
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The Sharing Network – Organ and Tissue Donation Services, Springfield, N.J.