

Brain Death Determination

The Statement provides assurance to the community that determination of death and the conduct of organ and tissue donation are undertaken in accordance with defined medical standards and within legal requirements.

The Australian and New Zealand Intensive Care Society (ANZICS) *Statement on Death and Organ Donation*; Edition 3.1 2010 (the Statement) provides the framework for best practice in the determination of death, aspects of end of life care in the intensive care unit, and providing the best possible care for the patient and their family. It draws on the best available scientific evidence, the extensive experience of the ANZICS Death and Organ Donation Committee, and feedback from health care professionals involved in the care of patients with severe brain damage and other fatal diseases that may cause admission to intensive care.

The purpose of this document is to summarise the evidence-based approach used in Australia for determination of brain death by intensive care specialists. It is intended to assure the Australian community that the tests described are both necessary and sufficient for diagnosis and confirmation of brain death. It describes the circumstances in which further testing, such as brain blood flow imaging, is required. ANZICS is committed to ensuring that the protocol for diagnosis of brain death is comprehensive and verified. This statement is intended to ensure the utmost public confidence in the Australian process of organ and tissue donation and the clinical process for determination of brain death. This confidence is essential for families when making decisions about donation at the time of death.

Legislation

Donation of organs and tissues after death is governed by laws. In 1977, the Australian Law Reform Commission addressed the absence of a definition of death in Australian law, recommending that a statutory definition of death should be introduced. They recommended that death be defined as:

- a) irreversible cessation of all function of the brain of the person; or
- b) irreversible cessation of circulation of blood in the body of the person.

The Commission further agreed that 'the creation and prescription of techniques of diagnosis should be the responsibility of the medical profession'. They specified that, although it appeared in the context of transplantation, the determination of death should have general application whether or not organ and tissue donation and subsequent transplantation were to follow.

Current Australian state and territory laws are based on the recommendations of the Australian Law Reform Commission.

Brain Death Determination in the Adult

Whole brain death is required for the legal determination of death in Australia. If the condition causing coma and loss of all brain-stem function has affected only the brain-stem and there is still blood flow to the supratentorial part of the brain (the cerebral cortex), this does not meet the legislative requirements in Australia. This contrasts with some other countries where brain-stem death (even in the presence of cerebral blood flow) is the accepted standard.

In Australia brain death cannot be determined unless there is evidence of severe brain injury sufficient to cause death. Such injury is associated with an increase in the pressure inside the skull which cuts off the blood supply to the brain. Blood flow to the brain ceases and the entire brain, including the brainstem, dies. There is no recovery from brain death.

Before clinical testing for brain death can even begin other causes of deep coma such as drugs, high or low blood sugar levels and abnormal electrolyte levels must be ruled out. There must also be a minimum of four hours observation and mechanical ventilation, during which the patient is completely unresponsive to all stimuli (Glasgow Coma Score of 3), with pupils that don't respond to bright light, no cough even when a suction catheter is put down the endotracheal tube into the lung

and no breathing efforts of any kind, before clinical testing for brain death determination can be performed.

Brain death testing is carried out by two medical practitioners with specific experience and qualifications according to State and Territory laws. Two separate sets of tests are performed with each doctor being responsible for performing one set of tests. The tests may be done consecutively but not simultaneously.

Clinical testing to determine that brain death has occurred requires that the following conditions apply at the time of the testing:

- ❖ brain scans or other tests show sufficient brain pathology to cause death; **and**
- ❖ body temperature is normal; **and**
- ❖ blood pressure is normal and sufficient to not faint; **and**
- ❖ sedative drugs and other drugs are not causing coma; **and**
- ❖ significant electrolyte, metabolic or endocrine (hormone) disorders are absent; **and**
- ❖ neuromuscular function – the transmission of signals from nerve to muscle – is intact; **and**
- ❖ examination of brain stem reflexes is not prevented by, for example, severe injuries to the eyes or ears; **and**
- ❖ it is possible to confirm the absence of any ability to breathe without blood oxygen levels falling too low.

And then:

- ❖ absence of brain reflex responses to all stimuli including pain; **and**
- ❖ absence of brain-stem reflexes – the basic reflexes that protect the body and maintain life; **and**
- ❖ complete absence of any breathing efforts even when the patient is not connected to the mechanical ventilator for much longer than anyone would be able to hold their breath – breathing is a basic instinct that is essential for people to stay alive.

If for any reason clinical tests cannot be used to determine that brain death has occurred, for example because of severe injuries to the face and head affecting the eyes and ears, or the presence of sedative drugs commonly used in patients in intensive care, then brain death is determined by special X-rays of the head that demonstrate that there is no blood flow to the brain.

The Statement can be accessed at www.anzics.com.au/death-and-organ-donation.

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