Canadian National TRANSPLANT Research Program

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Fast Facts:

Death Determination and Deceased Organ Donation

INTRODUCTION

A fundamental principle of organ donation is that donation cannot cause the death of the donor. Some organs and tissues may be donated without causing the death of a living donor (e.g. blood, bone marrow, one kidney, a section of liver). Apart from this, due to the rule that donation must occur only after the death of a donor, it is important to know specifically when death occurs.

THE DEAD DONOR RULE

The “dead donor rule” is the indispensable ethical and legal requirement that the removal of vital organs cannot be the cause of the donor’s death. The legal framework for the determination of death in the context of organ donation is contained in provincial statutes. In most provinces, death is determined ”in accordance with accepted medical practice” by at least two physicians not involved in the transplantation and not associated with the proposed transplant recipient.

The Criminal Code of Canada states that no person can consent to be killed, and so the dead donor rule cannot be waived by the donor. It is, however, permissible to withdraw life-sustaining therapies from a person where the legally required decision-making procedures are followed, as this is regarded as the removal of treatment that allows the underlying disease condition to bring about death naturally.[1]

The **Canadian National Transplant Research Program** (CNTRP) is a national research initiative designed to increase organ and tissue donation in Canada and enhance the survival and quality of life of Canadians who receive transplants.

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HOW DO WE DETERMINE WHEN DEATH HAS OCCURRED?

Historically, a person was determined to be dead on the basis of a lack of respiration and heartbeat. People who had lost all brain function would stop breathing and their hearts would stop beating once they stopped breathing. However, when the mechanical ventilator was introduced in medicine, it became possible to maintain the respiration and heartbeat of a person whose brain had irreversibly stopped functioning. As a result, the concept of "brain death" or, the determination of death using neurological criteria, was developed in the late 1960s to describe situations of this type.[2]

Today two main techniques of determining death are widely accepted. They are:

1. circulatory or cardio-respiratory criteria ("cardiac death" or "circulatory death")
2. neurological criteria ("brain death").

In both cases, specified clinical criteria and tests are applied to verify death.[3] In Canada, accepted medical practice for both neurological and circulatory death are based on national consensus recommendations.[4] Both are clinical determinations. In the case of death determined according to neurological criteria, doctors perform a rigorous clinical examination to demonstrate the loss of consciousness, brainstem reflexes and the capacity to breathe. This test is considered reliable and irreversible if performed accurately in cases where there is a known cause and there are no reversible or confounding conditions such as hypothermia or certain drug intoxications.

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ORGAN DONATION STATUTES

Many, but not all of the provinces and territories have enacted statutes that address death determination for the purposes of organ donation. Most of these statutes do not specifically define death or set criteria for how to determine when it has occurred. Instead, they indicate that death is to be determined according to "accepted medical practices." One exception is Manitoba, which states that death occurs when a person suffers the irreversible cessation of all brain function.

Other countries have included more specific definitions in their legislation. For example, in the United States, many states have adopted laws along the lines of the 1981 Uniform Declaration of Death Act. This model law states that death refers to the "irreversible cessation of circulatory and respiratory functions," or the "irreversible cessation of all functions of the entire brain, including the brain stem." Whether either of these things has happened is to be determined according to "accepted medical standards."[5] In 1981, the Law Reform Commission of Canada recommended that Canada should also legislate a more specific definition of death, although this recommendation was not generally followed.[6]

CONTROVERSIES OVER "BRAIN DEATH"

The public is generally comfortable with the traditional way of determining death according to the absence of a heartbeat and respiration. The use of neurological criteria for determining death ("brain death") can be a bit more challenging for some people to understand or accept because the bodies of brain dead persons are attached to mechanical ventilators and so they will appear to breathe, their hearts will beat, and they will remain warm. In such cases, it may be challenging to understand the difference between the death of the person, the death of the body or the death of particular organs.

While the major religions of the world now largely accept the neurological determination of death ("brain death") as valid, some sub-groups within these religions may not.[7] The recent highly publicized cases of Jahi McMath and Marlise Muñoz in the United States illustrate the sometimes contentious nature of brain death for some today.[8]

In addition to misgivings among some members of the public about the concept of "brain death," some experts have raised concerns about the accuracy of brain death testing, and one has suggested that a safety measure would be to perform an additional test (beyond what is the usual set of tests) to show the absence of blood flow to the brain.[9]

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TYPES OF DECEASED ORGAN DONATION

Organ donation may occur after death in three possible scenarios, although not all forms of donation occur in Canada at present:

Donation after neurologically-determined death

Donation occurs after a person has been declared dead on the basis of neurological criteria – neurological determination of death (NDD). This is also known as donation after brain death or DBD. When a brain dead person's body is maintained on a mechanical ventilator, blood circulation continues to bring oxygen to the organs and this enhances the chances of a successful transplant following removal of the organs from the donor. This form of deceased donation has been practiced in Canada for many years, and is currently the most common form of deceased donation in Canada.[10]

Controlled Donation after circulatory death (DCD)

Donation occurs after a person dies following the removal of life-sustaining treatment. In this case, a decision is made to withdraw mechanical ventilation for a seriously ill patient who is not brain dead, but who has no prognosis for recovery. Once the ventilator is removed, the patient's heart may stop beating. Donation will not take place until a pre-determined time period has elapsed after the heart stops beating. This form of deceased donation started in Canada in 2006.[11]

Uncontrolled donation after circulatory death

This form of deceased donation does not take place in Canada, although it is used in other jurisdictions such as Spain and France and is being explored in some parts of the United States. In these cases, resuscitation efforts are made to save a patient who suffers an unanticipated cardiac arrest. If the efforts to resuscitate the patient are unsuccessful, circulatory death is declared and deceased donation may occur. This is different from DCD (described above), where a prior decision has been taken to remove mechanical ventilation and so cardiac arrest is predicted.

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