Maimonides's cooling period and organ retrieval

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As surgeons keep their scalpels at hand for emergencies, so should you have your principles ready.

Marcus Aurelius. *Meditations* 167; III: 13

Over 800 years ago, when Maimonides codified the diagnosis of death as absence of the heart beat and respiration with cooling of the body,[1] he was likely documenting a standard used from the dawn of civilization. It remains in use today. Myrtle Darvall was declared dead on this basis at the scene of a pedestrian car accident in 1967. Her daughter Denise, knocked down by the same car, made it to a hospital but there was declared to be brain dead.

Denise's death changed the way we think of ourselves: hers was the heart used in the first human heart transplantation.[2] The ethical debate about withdrawal of mechanical life support and organ retrieval, which had been progressing slowly, was suddenly heightened. In 1968 the *Canadian Medical Association Journal* (*CMAJ*) editorialized on the "unedifying spectacle of the medical profession washing a piece of its dirty linen in public."[3] Even today, detractors unjustly link early heart transplantation to apartheid. Ironically, overwhelming public support for transplantation became the sword of Damocles that brought the debate to a successful conclusion.[4] Currently in Canada all cadaveric donors are declared brain dead before organ retrieval. However, for every cadaveric organ donor, 100 other deaths are declared using traditional standards (irreversible cardio-respiratory arrest). In the USA over the last decade, 6.6% of donors have been declared dead on this basis.[5]

A *CMAJ* commentary by Knoll and Mahoney[6] suggesting that non-heart-beating donors (NHBDs) also be used in Canada sparked a radio debate in 2003. Medical ethicist Margaret Somerville objected, voicing a belief that a person is not dead until the brain is determined to be dead, regardless of heart and lung function. Although it might seem astonishing to a physician, this belief is common. It appears to have replaced that held before the debates of the 1960s when, for the first time, the mass media imposed on the public a discussion of complex medical issues. Confusion arose around the diagnosis of death, between that of the person as a whole and judgement based on the examination of a body part.[4] The American College of Critical Care Medicine supports the use of NHBDs, whereas the Canadian Critical Care Society does not.[6,7] This must provoke a sense of déjà vu in those who witnessed the earlier debates. For those who did not, it is wise to consider the Canadian discussions of that time.

An article in the *Canadian Journal of Surgery* (*CJS*) by Joe Murray,[8] subsequent winner of the Nobel Prize, reviewed the development of kidney transplantation as of 1965. Most organs were removed from living donors, but the trend to use NHBDs was welcomed as a way of "circumventing the ethical and moral factors involved in the use of living volunteer donors."[8] The success at 18 months of NHBD transplantation (54%) was similar to that of transplants from living donors (60%). By 1973, Farrow, Wilson, Fenton and Heyman of Toronto were reporting[9] an initial success rate of over 80% using a majority of living-donor grafts that had long-term results superior to those of cadaveric grafts.

In 1968, *CMAJ* commissioned a 2-part review of the legal aspects of transplantation from Jean-Gabriel Castel, a distinguished Professor of Law.[10] It provides today a fascinating glimpse of those times when laws designed for other purposes were applied to new situations. For instance, a married woman had only recently gained the right to undergo operations without the consent of her husband, but if the kidney was consid-

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Accepted for publication Jan. 6, 2004

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ered a gift the laws of property might apply. Castel noted that Article 77 of Code Napoleon required a period of 24 hours between the declaration of death by a civil officer and interment or autopsy. A 1924 law required that death be established by the absence of heartbeat and respiration. These laws were modified over time to allow first for modern autopsy and then for transplantation. The concept of declaration of death by 2 independent physicians was introduced in 1955.

Barnard's earliest detailed report[2] of the first 3 heart transplantations was published in the *CMAJ* in 1969. The hesitancy associated with Denise Darvall's declaration is intimated by his description that "extensive investigation by neurosurgeons and neurologists indicated that her brain had been severely damaged that in fact she had come to a stage of brain death." Raymond Hoffenberg, an enemy of apartheid who had to leave South Africa soon after the second heart transplantation, described in a recent memoir the agonizing that went into declaring the donor dead.[11] Canadian physicians were spared these dilemmas by a world consensus on the determination of brain death and by Provincial Tissue Gift Acts, the evolution of which is described by Castel.[10] In general, these laws currently require 2 determinations of death "in accordance with accepted medical practice" by physicians who are not on the transplant team.

No legal impediments to NHBDs exist in Canada; their use atrophied because of the presumed superior quality of perfused organs. It has not been restored here because the increase in donation from NHBDs is not considered sufficient to offset the decline that would accompany a negative debate. In this issue of *CJS*, Lacroix, Mahoney and Knoll[12] have estimated that use of NHBDs would increase cadaveric kidney transplantation by 30%–87%. The experience in the USA suggests that the yearly increase would vary between 0 and 16.5%.[5] An average of 2.5 organs are retrieved from NHBDs; if Canada matched the best region in the USA, this would translate into an additional 70 donors and 175 organs for transplantation.[5]

It is a natural human phobia that we might be buried before we are dead — hence the French law to wait for a full day. Opposition to NHBDs principally rests on a modern version of this phobia: that we might become an organ donor before we have had a chance to recover from a critical illness or injury. Physicians too have a phobia about mistaking death; Maimonides recommended waiting for the body to cool before declaring death. House doctors have for years unwittingly followed his advice to allay their own fears. Nevertheless, such a delay would prevent organ donation. The American Collage of Critical Care Medicine recommends an interval of only 2–5 minutes.[6] It is more accurate to consider the matter from the point where the decision, independent of transplantation, is made to withdraw life support. Once a critically sick patient is thought to be dead, the process of transplantation delays the withdrawal of mechanical care by 12–36 hours — the modern equivalent of Maimonides's cooling period. In 1967, *CMAJ* advised that "change will only be possible if there is widespread acceptance … [which] would imply a long educational campaign."[4] Such a campaign today will have to account for the public's new faith in brain death. It should also demonstrate that the increased scrutiny of organ donation makes the improbable misdiagnosis of death even less likely.

Competing interests: None declared.

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