



Ethical considerations in controlled donation after circulatory death

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In medical ethics, the doctrine of double effect permits actions that morally have both good and bad consequences, provided the intention is to achieve the good outcome and the bad effect is unintended.

Withdrawal of life-sustaining treatment with the intention of allowing natural death to provide the potential for organ donation after circulatory death (DCD) has expanded the heart donor pool and provided additional opportunities to honour the wishes of donors when brain death criteria are not met. Pre-mortem interventions, when permissible, aim to optimise organ viability but should be ethically justified, balancing benefit against harm or distress to the patient (1).

Critics, however, argue that the criteria for declaring death after cessation of circulation lack clarity and vary raising concerns about the potential for premature organ retrieval. Some consider that the potential for reduced function of DCD hearts is disquieting, and that donation practice may cause moral and emotional distress for healthcare providers.

Advances in techniques such as normothermic regional perfusion (NRP) and direct procurement with *ex vivo* heart perfusion (DPP) have improved organ viability, making them broadly comparable to donors after brain death (DBD) in terms of function and outcomes, supporting the ethical principle of proportionality. However, this practice raises several ethical considerations that require careful examination and remain controversial.

General ethical principles in DCD heart transplantation

Respect for autonomy emphasises the right of individuals to make informed decisions about their own lives. In this context, we must ensure that consent is based on a clear understanding of the implications of the timing of treatment withdrawal, criteria for determining death, and organ retrieval procedures. These factors are sometimes poorly understood by families, but premature discussion must be avoided. Communication is therefore best managed by a designated liaison to ensure clarity, consistency, and respect for cultural or religious requirements, which is vital for societal acceptance.

Beneficence involves actions that promote the well-being of others, while non-maleficence requires that we do no harm. In heart transplantation from DCD donors, these principles apply to both donor and recipient. For the recipient, given current constraints on donor organs, the primary benefit is the potential for a life-saving operation to occur. The use of DCD hearts has significantly increased the availability of donor organs and reduced waiting list times and mortality. However, there are concerns about the viability and function of DCD hearts. Whilst short- and medium-term survival appears equivalent to DBD, increased rates of primary graft dysfunction and need for mechanical support have been observed. Long-term data are not yet available. Appropriate and specific consent for potential recipients is therefore essential. For the donor,

non-maleficence requires careful handling of treatment withdrawal and death determination to prevent suffering or premature death, necessitating standardisation.

Justice in medical ethics engages fairness in the distribution of resources and treatments. For DCD heart transplantation, this principle requires equitable access to donor organs. The introduction of DCD hearts into the donor pool aims to address the disparity between supply and demand. However, justice also requires that the criteria for organ allocation do not unfairly disadvantage certain groups. Distribution therefore must be carefully monitored.

Practical and ethical challenges in DCD heart donation

The determination of death remains a significant ethical and practical issue. Unlike brain death, with widely accepted criteria, circulatory death involves more subjective judgments. The duration of the “stand-off” period varies, ranging from 2 to 20 minutes (2). In general, 2 to 5 minutes of absent circulation are used to confirm the irreversible loss of respiration and brain function. No resumption of cardiac activity has ever been observed after 4 minutes 20 seconds, but in some countries, the period remains less than this. The use of terms such as irreversible (the end of vital functions cannot be undone) and permanent (conscious intent not to resume these functions) as criteria for declaring death needs careful consideration.

The primary techniques of DCD heart retrieval are NRP and DPP. Both aim to reanimate the donor heart rapidly. Some argue that this contradicts the concept of irreversible cardiac death and violates the ‘dead donor’ rule. However, once death is declared, resuscitation of the heart outside the body is considered ethically sound. NRP respects the criteria for declaring death by ensuring that brain functions are not permanently resumed by clamping the innominate and carotid arteries and venting the aorta, allowing retrieval without reversing the declared state of death and the permanent cessation framework.

While in DPP the removal of the heart ensures permanent cessation of brain perfusion, concern remains that in NRP, this may occur if arterial occlusion is not performed correctly or collateral circulation potentially perfuses the brain. Therefore, both ethical and legal concerns exist whether NRP invalidates the death of the donor. Some reassurance has come from recent studies in Spain, showing that cerebral blood flow does not resume

during NRP (3), but further studies are needed.

Public perception and cultural values significantly influence the acceptance of medical practices like NRP. The potential shift towards emphasising donor autonomy over the traditional ‘dead donor’ rule requires enhanced public education and legal frameworks to support end-of-life decisions, reflecting a significant evolution in the ethics of donation. We must balance surgical practices with societal and cultural sentiment to maintain public trust in DCD. In parallel, legal definitions of death have and will evolve to align with clinical practice and ethical standards (4,5). Using euthanasia for organ donation, whilst physiologically optimal, raises significant ethical concerns. Although processes can separate euthanasia from donation, combining them can blur ethical boundaries, and public attitudes may not yet be ready.

Conclusions

A complex interplay of ethical principles, arguments and challenges exists. Ethical and legal frameworks are critical to protecting patients and practitioners alike (6). Although the potential to increase the donor pool is compelling, significant concerns must be addressed. Advances in organ preservation processes and technology will continue to affect this balance.

The continued success and ethical acceptability of DCD heart transplantation will depend on ongoing research and collaboration among healthcare professionals, ethicists, policymakers and the public.

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Footnote

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