

# Kidneys from cardiac-death patients perform as well as those from brain-dead patients

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The number of people on the kidney transplant waiting list in the UK continues to increase with over 7000 patients currently waiting for transplant and only 1600 kidney transplants performed from deceased donors each year. Until recently, most donated kidneys came from donors who were brain dead—meaning people whose hearts were still beating but had suffered brain-stem death. However the number of these donors has fallen over the last decade, probably due to improvements in the treatment of head injuries and a reduction in deaths on the road. As a result there has been a corresponding surge in the number of cardiac-death donors (non-beating heart donors), rising from 3% of all donations in 2000 to 32% in 2009.

Concerns have been raised that kidneys transplanted from cardiac death donors do not perform as well as those from brain-dead donors; but an Article published Online First in The *Lancet* concludes that the two types of transplant are equivalent. Furthermore, cardiac-death donor kidneys, which fall outside of the UK's national allocation policy (they are currently distributed locally), should now be treated in the same way as kidneys from brain-dead donors.

Kidneys donated in either fashion acquire some degree of injury—for brain-death, there are substantial hormonal and [metabolic changes](#), while for cardiac-death the kidneys suffer warm ischaemia (injury caused when the organs are deprived of a blood supply, before being cooled to minimise the damage) between the heart stopping and the kidneys being flushed with cold preservation solution. In the UK, most cardiac-death

donors are controlled donors, who have suffered massive irreversible [brain injury](#) but do not fulfil the criteria for brain-stem death. Death is certified by when the heart stops beating after a decision to withdraw life support.

In this study, Professor J Andrew Bradley, University of Cambridge, Addenbrooke's Hospital, Cambridge, UK, and colleagues looked at outcomes for kidneys after controlled cardiac death versus brain death, and aimed to identify factors affecting graft survival and function. They used data from the UK transplant registry to select a cohort of deceased kidney donors and the corresponding transplant recipients (aged  $\geq 18$  years) for transplants done between Jan 1, 2000, and Dec 31, 2007.

A total of 9134 kidney transplants were done in 23 centres; 8289 kidneys were donated after brain death and 845 after controlled cardiac death. First-time recipients of kidneys from cardiac-death donors ( $n=739$ ) or brain-death donors ( $n=6759$ ) showed no difference in graft survival up to 5 years, or in kidney function (filtration rate) at 1 to 5 years after transplantation. For recipients of kidneys from cardiac-death donors, increasing age of donor and recipient, repeat transplantation, and cold ischaemic time of more than 12 h were associated with worse graft survival; grafts from cardiac-death donors that were poorly matched for HLA (a blood antigen) had a non-statistically significant association with inferior outcome, and delayed graft function and warm ischaemic time had no effect on outcome.

The authors say: "The shortage of donor organs remains one of the key challenges faced by the international transplant community. In view of our findings, cardiac-death donors represent an extremely important and overlooked source of high-quality donor kidneys for transplantation and have the potential to increase markedly the number of kidney transplants performed in the UK."

They also point out that allocation policy for kidneys from brain-death donors aims to ensure equity of access to donor kidneys irrespective of the geographical location of those on the waiting list, to ensure good tissue matching for those in whom it matters most, to favour those who have waited longest, and to avoid large disparities in age between donor and recipient. In view of their findings, the authors suggest that a similar policy should be considered for kidneys from cardiac-death donors, ie, the findings strengthen the case for a national sharing scheme. (See notes to editors below).

They conclude: "Kidneys from controlled cardiac-death donors provide a good outcome in terms of both graft survival and graft function in first-time recipients and should be regarded as equivalent to kidneys from brain-death donors. The factors shown to affect transplant outcome for kidneys from cardiac-death donors will help to guide clinical decision-making and inform future allocation policy."

In an accompanying Comment, Professor Sir Peter J Morris, Centre for Evidence in Transplantation, Royal College of Surgeons of England and London School of Hygiene and Tropical Medicine, London, UK, says: "Today's report is an important contribution to the problem of increasing the supply of donor kidneys for transplantation. The results are persuasive that the use of controlled cardiac-death donors is an acceptable practice. More importantly, potential recipients of kidneys from [cardiac-death](#) donors can be reassured that their transplant outcome is not jeopardised by the source of the kidney."

Provided by Lancet

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