

TRANSPLANTATION

Kidneys donated after cardiac death provide good graft survival and function up to 5 years

Use of kidneys donated after controlled cardiac death for renal transplantation provides equivalent graft survival and function to renal transplantation using kidneys donated after brain death, according to a study recently published in *The Lancet*.

“Historically, retrieving organs from donors after cardiac death was the usual approach used to obtain organs for transplantation,” notes Dominic Summers, an author on the paper. “After the Harvard criteria for the determination of brain death were set out in 1968, however, organs for transplantation were instead primarily removed from deceased donors that met the neurologic criteria for death.”

A key problem facing the transplantation community is the shortage of donor organs, and the imbalance between the supply of donor organs and the number of patients on the waiting list for renal transplantation is fuelling efforts to expand the donor pool. The use of organs obtained from cardiac-death donors is one way to expand the donor

pool, and use of such organs has increased massively in the UK during the past few years. The use of kidneys donated after cardiac death is thought to be associated with an increased incidence of delayed graft function, however, and concerns have been raised that use of such organs might be associated with inferior transplant outcome, although data are limited.

In the recently published study, Summers *et al.* used data from the UK transplant registry to compare outcomes of kidneys donated after cardiac death with outcomes of kidneys donated after brain death. The analysis of cardiac-death kidneys was limited to kidneys donated after controlled cardiac death (Maastricht category 3 donation—the most common type of cardiac-death donation in the UK), which is when the kidney is removed after cardiac activity has stopped in the donor following the withdrawal of circulatory and respiratory support.

The researchers analyzed data from renal transplantations from deceased donors between January 2000 and December 2007: 8,289 kidneys donated after brain death and 845 kidneys donated after controlled cardiac death. They found that delayed graft function occurred in 50% of kidneys donated after cardiac death and 25% of kidneys donated after brain death ($P < 0.0001$). The incidence of delayed graft function was much higher in recipients of repeat renal transplants than in recipients of first renal transplants, for both donor types. Graft survival was also worse in recipients of second grafts than in recipients of first grafts for both donor types. Restricting the analysis to first-time renal transplant recipients, Summers *et al.* found that estimated glomerular filtration rate (eGFR) was worse in kidneys obtained from cardiac-death donors than in kidneys obtained from brain-death donors at 3 months after transplantation; however, at 12 months after transplantation, eGFR was no different between the groups.

The researchers also found that graft survival up to 5 years was no different between first-time recipients of kidneys donated after cardiac death and first-time recipients of kidneys donated after brain death (hazard ratio 1.01, 95% CI 0.83–1.19). Factors associated with poor transplantation outcome were: donor age ≥ 60 years, recipient age ≥ 60 years, cold ischemic time > 12 h, and repeat transplantation, findings that the authors state could be used to improve organ allocation.

“A surprising finding of our study was that acute rejection rates were lower in kidneys donated after cardiac death than in kidneys donated after brain death,” states Summers. “Animal studies investigating brain death have suggested that brain death is itself intrinsically harmful to other organs and might trigger host immune mechanisms that could lead to acute rejection.”

Kidneys donated after cardiac death are not currently allocated through the national organ sharing scheme in the UK, but Summers states that the National Health Service Blood and Transplant (NHSBT) has now set up a working group to review existing guidelines and discuss possible changes to the national allocation scheme.

In an editorial accompanying the study, Peter Morris from the Royal College of Surgeons of England describes the recent report as “an important contribution to the problem of increasing the supply of donor kidneys” and says that “the results are persuasive that the use of controlled cardiac-death donors is an acceptable practice.”

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Original article Summers, D. M. *et al.* Analysis of factors that affect outcome after transplantation of kidneys donated after cardiac death in the UK: a cohort study. *Lancet* doi:10.1016/S0140-6736(10)60827-6 (2010)

