

Non-heart beating donors

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Abstract

Background. Several groups have demonstrated that non-heart beating donation is a viable source of organs for transplantation. However, the theoretically worse graft function and survival of the kidneys obtained from non-heart beating donors (NHBDs) is still a matter of debate that has led to consider them as marginal donors for kidney transplantation.

Methods. In this report, we compare the outcome and course of 83 kidney transplants from NHBDs with those corresponding to 3177 adult cadaveric heart beating donor (HBD) transplants performed over the same period in our country. Graft and patient survival were estimated by means of Kaplan–Meier analysis. In addition, groups were compared using Cox proportional regression.

Results. The delayed graft function (DGF) rate was higher on NHBD transplants than in HBD kidneys (58.8 vs 28.9%, $P < 0.0001$). However, in 1998, where the highest number of NHBD transplants was performed, graft function estimated by serum creatinine levels at 3 months and 1 year, was significantly better in the NHBD transplant group (1.42 ± 0.45 vs 1.66 ± 0.66 and 1.45 ± 0.59 vs 1.62 ± 0.64 , respectively, $P = 0.01$ and 0.07). Graft survival at 2 years was 97%, 95% at 4 years and 84% at 6 years for NHBDs and 97, 90 and 84%, respectively, for HBDs. Interestingly, DGF was a risk factor for worse graft survival in HBDs but not on NHBDs.

Conclusions. We conclude that, in our study, both graft function and graft survival of NHBD kidney transplants are at least similar to those from HBD transplants. Therefore, NHBDs should be considered as a viable source of non-marginal kidneys for transplant.

Keywords: graft function; heart beating donor; kidney transplantation; non-heart beating donor; patient survival

Introduction

Owing to an ever-increasing number of patients receiving treatment for end-stage renal disease and the adoption of less restrictive criteria for inclusion in the kidney transplant waiting list, there is a growing need for cadaveric kidney donors. Numerous efforts have been made to increase organ donation, and cadaveric kidney donations in Spain have risen, particularly among the older age groups [1]. These measures have led to reduced waiting times as the waiting list gets shorter [1]. At different centres, the shortage of kidneys has prompted the use of non-heart beating donors (NHBDs). The aim of this paper was both to compare the survival of transplant kidneys from NHBDs with those of kidneys procured from heart beating donors (HBDs) and to conduct a study of the survival and renal function of transplant kidneys from NHBDs and HBDs, taking into consideration the inter-relationship with delayed graft function (DGF).

Subjects and methods

In this report, we compare the outcome and course of 83 kidney transplants from NHBDs with those corresponding to 3177 adult cadaveric HBD transplants performed over the same period in our country.

Graft and patient survival were estimated by means of Kaplan–Meier analysis. In addition, groups were compared using Cox proportional hazards regression.

Results

Table 1 provides the incidence of HBDs/NHBDs for each year of transplantation (no significant differences were found).

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Table 4. Risk factors for DGF (multiple logistic regression)

	%	95% CI	OR	95% CI	<i>P</i>
HCVAb					0.0019
Negative	26.4	(24.6%, 28.3%)	1	–	
Positive	33.9	(29.5%, 38.6%)	1.429	(1.141, 1.790)	
Donor age					<0.0001
≤60 years	26.0	(24.2%, 27.9%)	1	–	
>60 years	37.5	(32.7%, 42.5%)	1.704	(1.350, 2.151)	
Donor sex					0.0001
Male	30.0	(27.9%, 32.2%)	1	–	
Female	23.0	(20.4%, 25.9%)	0.698	(0.581, 0.838)	
Cause of death					<0.0001
ACV	32.5	(29.9%, 35.2%)	1	–	
TCE	23.7	(21.6%, 26.0%)	0.645	(0.542, 0.769)	
Prior transplantation					0.0007
No	26.5	(24.7%, 28.3%)	1	–	
Yes	35.6	(30.5%, 41.0%)	1.534	(1.197, 1.967)	
Donor type					<0.0001
Non-heart beating	61.1%	(49.4%, 71.7%)	1	–	
Heart beating	26.7	(25.1%, 28.5%)	0.232	(0.143, 0.378)	
Immunosuppressive treatment					<0.0001
Pre + Aza + CsA	11.8	(3.0%, 36.7%)	1.282	(0.802, 2.048)	0.2998
Pre + Aza + CsA + Ab	29.4%	(25.8%, 33.2%)	0.781	(0.473, 1.288)	0.3324
Pre + CsA	40.6	(34.4%, 47.0%)	2.047	(1.239, 3.381)	0.0051
Pre + CsA + Ab	20.7	(16.5%, 25.5%)	1.459	(0.830, 2.564)	0.1889
Pre + MMF + CsA	26.8	(20.4%, 34.2%)	1.690	(1.053, 2.712)	0.0296
Pre + MMF + CsA + Ab	24.0%	(20.3%, 28.0%)	0.934	(0.540, 1.616)	0.8071
Pre + MMF + Tac (with/without Ab)	36.3	(28.6%, 44.9%)	1	–	–
Pre + ANTIL + Aza + CsA	21.9	(17.7%, 26.8%)	3.988	(0.864, 18.412)	0.0763
Other	27.6	(25.9%, 29.3%)	1.898	(1.161, 3.104)	0.0106
Cold ischaemia time					<0.0001
≤24 h	25.7	(24.0%, 27.6%)	1	–	
>24 h	37.1	(32.7%, 41.7%)	1.703	(1.372, 2.113)	
Centre					<0.0001

Table 5. Risk factors for graft survival

	RR	95% CI	<i>P</i>
HCVAb (ref. 'no')	1.365	(1.103, 1.688)	0.0042
DGF (ref. 'no')	1.747	(1.368, 2.230)	<0.0001
Cause of death (ref. 'ACV')	0.782	(0.654, 0.935)	0.0070
Donor age (ref. '<60 years')	1.504	(1.246, 1.816)	<0.0001
Peak panel reactive Ab. (ref. '≤15%')	1.287	(1.053, 1.573)	0.0139
Year of transplantation	–	–	0.0126
Centre	–	–	<0.0001

Living donors were excluded from this analysis. Ref., reference.

From our results, it may be concluded that the NHBDs represent a viable source of non-marginal kidneys for transplant. Although the use of brain-dead donors with beating hearts could be extended, there is still much need for additional sources. The authors feel that every effort should be made to encourage transplant centres that have not yet considered the use of NHBDs to do so. This may permit a substantial reduction in the ever-growing list of patients waiting for transplant.

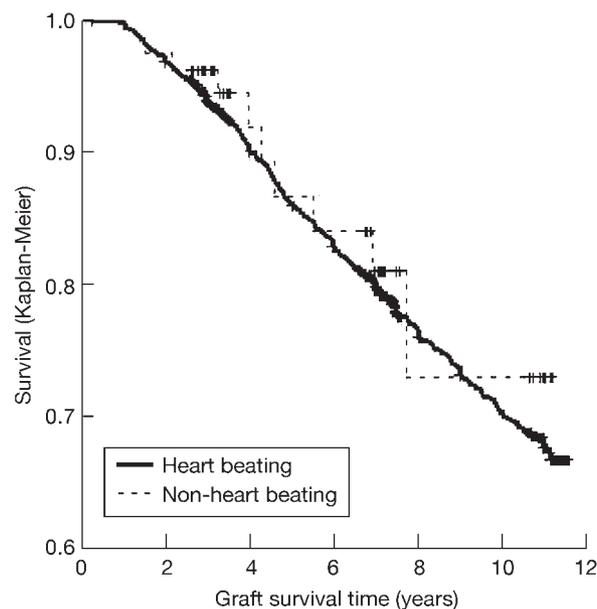


Fig. 1. Actuarial graft survival in NHBD and HBD transplants. HBD transplants (solid line), NHBD transplants (broken line). Survival rates were estimated by Kaplan–Meier analysis. The log-rank test was used to calculate the *P*-values.

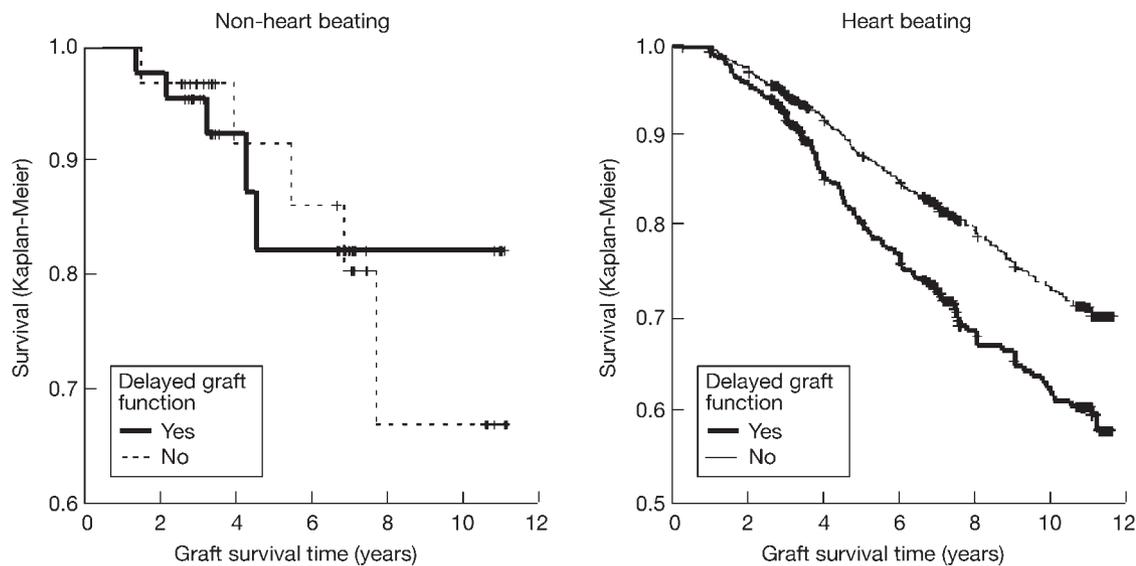


Fig. 2. Actuarial graft survival in renal transplants according to the presence (solid line) or absence (broken line) of DGF. Right, HBD transplants; left, NHBD transplants. Survival rates were estimated by Kaplan–Meier analysis. The log-rank test was used to calculate the *P*-values.

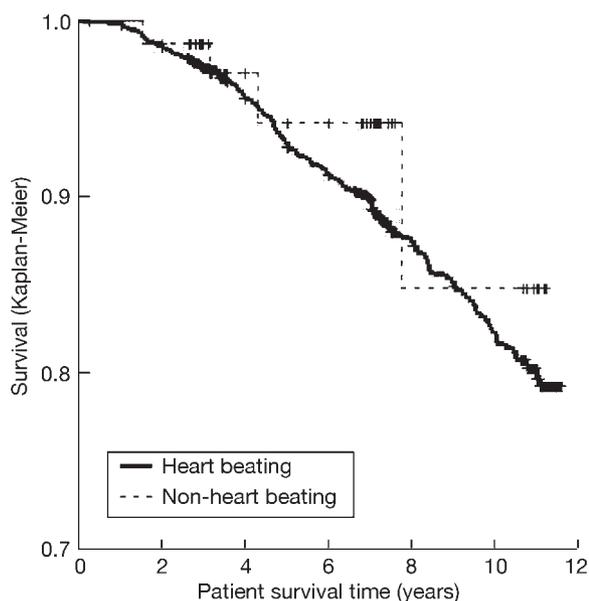


Fig. 3. Actuarial patient survival in NHBD and HBD transplants. HBD transplants (solid line), NHBD transplants (broken line). Survival rates were estimated by Kaplan–Meier analysis. The log-rank test was used to calculate the *P*-values.

Conflict of interest statement. None declared.

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