



ORIGINAL ARTICLE

Uncontrolled non-heartbeating donors (types I–II) with normothermic recirculation vs. heartbeating donors: Evaluation of functional results and survival[☆]



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Donation after the circulatory determination of death (DCDD);
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Primary non-function;
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Delayed graft function;
Graft survival;
Renal transplant

Abstract

Objective: Non-heartbeating donors (NHBD) are an alternative to heartbeating donors (HBD). Our objective was to compare functional results and kidney survival from NHBDs and HBDs.

Material and methods: A retrospective study comparing the results of 236 normothermally preserved kidneys from type I and type II NHBDs with the results of 250 from HBDs that were transplanted in our center between 2005 and 2012. Homogeneity between groups was tested and we evaluated the presence of delayed graft function (DGF) associated with pretransplant variables of the donor and recipient.

Results: Both groups show homogeneity in pretransplant characteristics in terms of: age, HLA incompatibilities, and recipient hemodialysis time. Average follow-up time was 33 months (range 0–87) for NHBDs and 38 months (range 0–90) for HBDs. 5.5% of NHBDs showed primary non-function (PNF) vs. 4% of HBDs ($p=0.42$) and 80.9% of DGF vs. 46.8% of HBDs ($p<0.001$). At the end of the follow-up, there were no statistically significant differences in the survival of grafts (92.8% for NHBD vs. 93.6% for HBD, $p=0.71$) and recipients (99.1% NHBD vs. 98.6% HBD, $p=0.28$).

Conclusions: Although the DGF percentage was greater for NHBDs, final creatinine as well as graft and recipient survival were similar for both groups. Therefore, in our experience, kidneys from NHBDs have similar results to those from HBDs and are an excellent source of organs for transplantation.

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PALABRAS CLAVE

Donación en asistolia;
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 Trasplante renal

Donantes en asistolia no controlada (tipos I-II) con recirculación normotérmica versus donantes en muerte cerebral: evaluación de resultados funcionales y supervivencia

Resumen

Objetivo: El donante en asistolia (DA) es una alternativa al donante en muerte cerebral (DMC). Nuestro objetivo es comparar los resultados funcionales y la supervivencia de riñones procedentes de DA y DMC.

Material y métodos: Realizamos un estudio retrospectivo comparando los resultados de 236 riñones de DA tipos I y II preservados en normotermia con 250 procedentes de DMC, trasplantados en nuestro centro entre 2005 y 2012. Se comprueba la homogeneidad entre grupos y evaluamos si la presencia de retraso en la función del injerto (RFI) de asocia a las variables pretrasplante de donante y receptor.

Resultados: Ambos grupos muestran homogeneidad en las características pretrasplante en cuanto a: edad, incompatibilidades HLA, tiempo del receptor en hemodiálisis. El tiempo medio de seguimiento es de 33 meses (rango 0–87) los DA y 38 meses (rango 0–90) para DMC. Los DA mostraron un 5,5% de no función primaria (NFP) frente a un 4% en los DMC ($p=0,42$) y un 80,9% de RFI frente a un 46,8% de los DMC ($p<0,001$). Al final del seguimiento, no hubo diferencias estadísticamente significativas en la supervivencia del injerto (92,8% DA vs. 93,6% DMC, $p=0,71$) y receptores (99,1% DA vs. 98,6% DMC, $p=0,28$).

Conclusiones: Aunque el porcentaje de RFI es mayor para los DA, tanto la creatinina final como la supervivencia del injerto y el receptor son similares para ambos grupos. Por tanto, en nuestra experiencia los riñones procedentes de DA tienen resultados similares a aquellos de DMC y constituyen una excelente fuente de órganos para trasplante.

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Introduction

Kidney transplantation (KT) is the treatment of choice for terminal renal disease. According to the Organ Procurement and Transplantation Network/United Network for Organ Sharing, it is estimated that there are 119,481 patients in the waiting list for a KT in the United States and in the first 6 months of 2013, 14,105 KT were performed.¹

In 1965 the first KT in Spain was made and since then 52,000 patients have stopped renal dialysis thanks to KT. According to the National Transplant Organization (ONT), 2552 KT were made in 2013, improving the donation numbers for third year in a row and placing our country among those with best cadaveric KT for one million of the population (46.1). On the other hand, during the last few years, the kidney waiting list has remained steady and it is estimated that there are 4328 patients waiting for a KT. This data exposes the difference between the organs for transplant demand and the existing offer. Therefore, it is necessary to identify organ alternative sources that improve the donation numbers.

Asystolic donor (AD) appears as an alternative to the traditional brain-dead organ donor (BDOD). The start-up of AD programs suppose a challenge for the transplant teams, as these grafts have a higher warm ischemia duration and its minimization is essential to reduce the damaging effects of ischemia on the graft and its functionality. In this context, the obtaining of kidneys from AD is limited to certain centers, and in 2013 this was barely 10.8% of the total of the kidneys produced in Spain.

An important aspect to take into account in the AD is the type of donor. In Spain, unlike what happens in the rest of the world, most of the donors are type I and II according to the classification proposed by Kootstra in the Maastricht group in 1995.^{3,4} That is, uncontrolled donors whose cardiac arrest happens outside the hospital, which implies transportation time and, therefore, longer ischemia time in many cases.

In our hospital, the AD program started in July 2005. The aim of the study is to compare the functional and survival results of the transplanted kidney in our institution from uncontrolled AD to normothermic recirculation as opposed to the traditional BDOD.

Material and methods

We perform a retrospective study comparing the results of 236 kidneys from AD as opposed to a control group of 250 BDOD kidneys which fulfill the age criteria used in the AD, transplanted in our center in the same period, from July 2005 to December 2012.

The inclusion criteria to consider a BDOD are: (1) irreversible coma and known etiology; (2) clinical evidence or with destructive injuries in the central nervous system neuroimage testing; (3) hemodynamic stability, appropriate artificial breathing, oxygenation, temperature $>32^{\circ}\text{C}$; (4) metabolic or endocrine disorder absence; (5) no evidence of drug use, central nervous system depressants or neuromuscular block, and (6) no age criteria.

The inclusion criteria to consider an AD are: (1) age from 18 to 55; (2) known cardiac arrest time; (3) the duration between the cardiac arrest and the resuscitation must

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