Expanded Donor Criteria Due to Age: An Effort Rewarded

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ABSTRACT

The life expectancy of the current Spanish population is 78 years, with some 20% of the population aged over 65 years. The continuing increase in the demand for transplants has led to widening of the criteria for acceptance of donors without worsening the results, but without reducing transplant waiting lists or mortality. This has resulted in the need to include the concept of the expanded criteria donor (ECD). We undertook a retrospective study of 77 donors from a hospital with no neurosurgery service from January 2000 to December 2005. Four of the donors younger than 60 years of age ($n = 38$) were not appropriate (10.5%), whereas five of the donors older than 60 years of age ($n = 39$) were not appropriate (12.8%; P = NS). The older donors provided 47 used kidneys (60.2%) and 22 livers (56.4%), slightly fewer than those obtained from the younger donors, though the difference was not significant. Thus, ECDs, those older than 60 years of age, did not result in a significant loss of kidneys or livers available for transplantation. Other factors associated with systemic vascular disease and accompanying disorders could be determinant when predicting the usefulness of organs for transplantation.

THE PROFILE OF THE TYPICAL organ donor in Spanish hospitals is different from that of 15 years ago. The current life expectancy of the Spanish population is 78 years; some 20% of the population are aged over 65 years. This aging of the population has led to changes in some of the considerations regarding organ donation and transplantation, including the placement on waiting lists of older persons, as well as assessing the possibility of older persons being organ donors.

Campaigns aimed at road and work safety have led to a notable reduction in severe cranioencephalic injuries leading to brain death in young, otherwise healthy persons. The average age of the current organ donor is 52 years, with 40% over 60 years, and brain death in 62% of cerebrovascular accidents, mainly of hemorrhagic origin.[1] Furthermore, advances in surgical techniques and perioperative management, together with improvements in immunosuppression and life expectancy, have also widened transplant indications and lengthened the age of the recipients, with an associated rise in the demand for organs.

The changing profile of the organ donor, together with the increased demand for organs, has necessitated changes in the criteria for evaluation and acceptance of donors by transplant coordinators and teams to reduce waiting lists and death. This has led to the concept of expanded criteria donors (ECDs), characterized as older with accompanying diseases, dying of nontraumatic cerebrovascular events.

Until recently, most donors were derived from hospitals with neurosurgery services. However, hospitals without a neurosurgery service are nowadays making great contributions to the activity of transplant programs. These changes have come about with the progressive acceptance of ECDs. The aim of this study was to assess the potential for kidney and liver donation by ECDs whose cause of death was not related to neurological trauma in a hospital with no neurosurgery service.

MATERIALS AND METHODS

We undertook a retrospective study of all patients with brain death in a hospital with no neurosurgery service from January 2000 until December 2005. The study included only those persons who had died with brain death, who had no medical contraindications for donation, and whose bodies were taken to the operating room for organ extraction. Statistical analysis included the demographic characteristics of the donors, the effectiveness of the donation, and the number of kidneys and livers that were finally suitable for transplantation, according to whether the organs were from donors

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Table 1. Characteristics of the Donors Older or Younger Than 60 Years of Age

Groups, *n* (y)		Age (y)	CVA/Anoxia (%)	Male (%)	Noneffective Donors, *n*, (%)	Valid Kidneys, *n*, (%)	Valid Livers, *n*, (%)
<60	38	45.3 ± 12.4	92.1	44.7	4 (10.5%)	56 (73.6%)	26 (68.4%)
>60	39	68.2 ± 4.8*	100	61.5	5 (12.8%)	47 (60.2%)	22 (5.4%)

CVA, cerebrovascular accident. Values expressed as the mean ± SD. χ^2 for kidney donation in both groups: 3.13, $P = .07$; χ^2 for liver donation in both groups: 1.18, $P = .27$.
*$P < .05$.

older or younger than 60 years of age. The analysis used SPSS 12.0 with the Wilcoxon and the χ^2 tests (Table 1).

RESULTS

Over the six study years the 77 donors, included 38 younger than 60 years (49.4%) and 39 older than 60 years (50.6%). The mean age of the younger donors was 45.3 ± 12.4 years (range, 16 to 59), with 44.7% men. The cause of brain death was acute cerebrovascular accident (CVA) in 81.6% of the cases, anoxic encephalopathy in 10.5%, trauma in 5.3%, and central nervous system tumors in 2.6%. These younger donors produced 56 useable kidneys and 26 livers (73.6% and 68.4% of all the possible organs, respectively). In this group there were four donors (10.5%) who, despite fulfilling all the donation criteria, produced no organ considered suitable for transplantation (noneffective donors). The mean age in the older group was 68.2 ± 4.8 years (range, 60 to 77), with 61.5% being men. The cause of brain death was CVA in 94.9% of the cases and anoxic encephalopathy in the remaining 5.1%. There was no case of trauma or tumor. This older group of donors produced 47 useable kidneys and 22 livers (60.2% and 56.4% of the possible organs, respectively). In this group were 5 (12.8%) noneffective donors.

No significant differences were detected between the two groups in the cause of brain death, with nontraumatic CVA being the main cause in both groups. Two patients in the younger group had severe cranioencephalic trauma (work and road accident). They were not referred to a neurotrauma center, due to instability, eventually developing brain death in this hospital, becoming organ donors. No significant differences were observed when comparing the potential for kidney and liver donation between the two groups (χ^2 for kidney donation in both groups: 3.13, $P = .07$; χ^2 for liver donation in both groups: 1.18, $P = .27$), despite the group younger than 60 years including two traumatic donations. The findings were against the initial hypothesis. Nor were any significant differences seen in noneffective donors.

DISCUSSION

Donor age in this sample was not a discriminative factor for obtaining kidneys and livers considered suitable for transplantation. Patients who develop brain death as a result of arteriosclerotic vascular disease, mainly hemorrhagic or ischemic CVA, or else as acute coronary events resulting in resuscitated cardiac arrest and severe anoxic encephalopathy, usually have accompanying diseases associated with diabetes mellitus, hypertension, dyslipidemia, smoking, or previous vascular or coronary events that have repercussions on the organs and affect their suitability for transplantation. The profile of the donors included in this study probably led to the accompanying diseases being distributed evenly in the two age groups. This was probably the determinant factor to predict the usefulness of the organs for transplantation, an opinion shared by others.[2]

We believe that the objective information gained from the postextraction liver and kidney biopsies is key to assess these organs for transplantation. All ECD kidneys were studied with an emergency preimplantation biopsy by the pathologist, who classified the renal alterations into five types: glomerular sclerosis, hyaline arteriolopathy, vascular intimal fibrosis, tubular atrophy, and interstitial fibrosis. This approach has been useful in the assessment of older donors.[3] To this extent, the diagnostic procedures should be improved to assess each organ extracted from an ECD, in order not to discard an organ without a justified reason.[4]

Finally, the age of the ECD, as an individual variable, was not predictive of the possibility of being a noneffective donor nor of the number of useable kidneys or livers. Transplant coordinators should perform an exhaustive evaluation of the medical history of all potential donors, irrespective of age. Table 1.

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