Epidemiological and Clinical Changes of Deceased Kidney Donation between 1999 and 2013 in a Region of Northern Italy

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Introduction

The growing gap between demand and supply of kidneys available for transplant has resulted in multiple efforts to expand the criteria to define a suitable deceased organ donor and to increase the number of potential donors [1].

Objectives

The aim of this study was to investigate changes in clinical parameters among potential deceased donors in the 15 years from 1999 to 2013 in the Emilia-Romagna region of Italy, and to evaluate their impact on transplantation procedure.

Methods

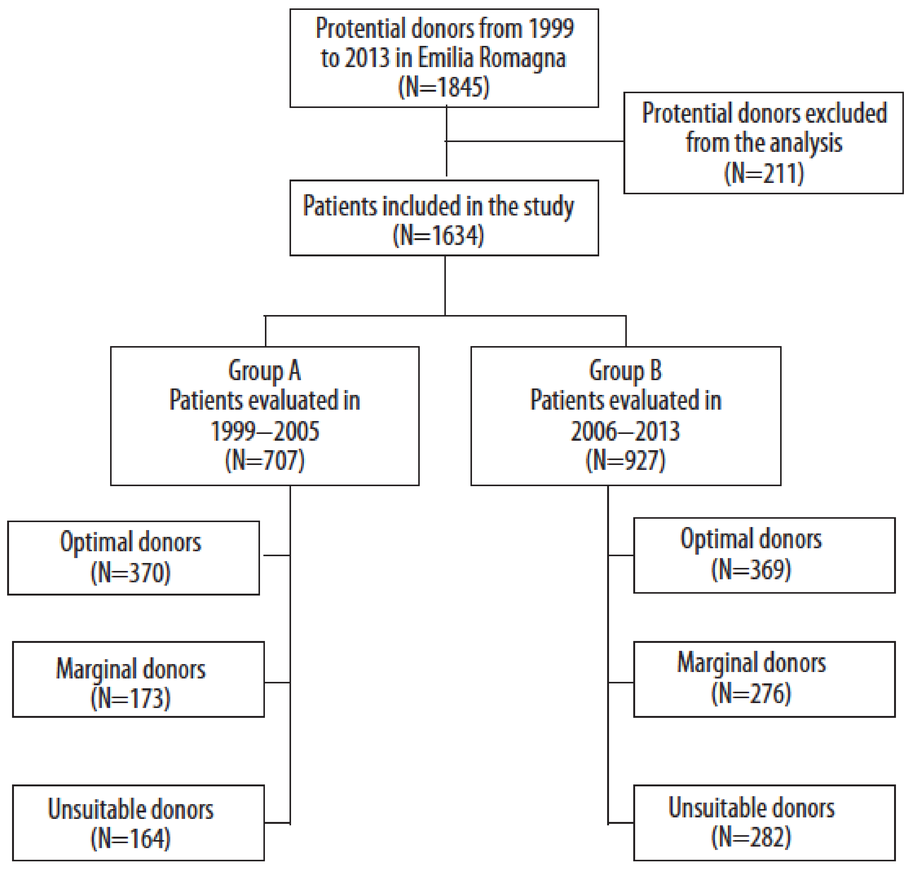
This was an observational retrospective data analysis; potential donors by the Intensive Therapy Units in Emilia-Romagna between January 1999 and December 2013 were included in the analysis.

The study population was divided into 2 groups: patients identified as potential donors in the period 1999 to 2005 (Group A) and patients identified between 2006 and 2013 (Group B). Donors were further divided into 3 categories: standard criteria donors (SCD), expanded criteria donors (ECD), and unsuitable donors.

We compared the main clinical features of potential deceased donors between the two groups to assess the changes over time. Exclusion criteria were age below 18 years and interruption of the donation procedure due to lack of consensus or death.

Results

A total number of 1634 potential deceased donors were examined: 707 in Group A and 927 in Group B.



Comparing the potential donors in Group A vs Group B, we found a significant increase over time of donor age (54.6 ± 17.2 vs 58.8 ± 16.3, p<0.001), a lower percentage of standard donors (52.3% vs 39.8%, p<0.001), a wider utilization of organs from marginal donors and a greater number of comorbidities, particularly cardiovasculae and dyslipidemia.

Moreover, over the years there was a decrease among the potential donors dead for traumatic brain injury and a rise of deaths due to post-anoxic encephalopathy.

Results

Renal function parameters and the bioptic scores did not change significantly over time.

	SCD (N=739)			ECD (N=449)			Unsuitable (N=446)		
	Group A (N=370)	Group B (N=369)		Group A (N=173)	Group B (N=276)		Group A (N=164)	Group B (N=282)	
Cause of death									
Cerebral hemorrhage	167 (45.1%)	176 (47.7%)	n.s.	123 (71.1%)	170 (61.6%)	0.042	117 (73.6%)	155 (63.8%)	0.001
Ictus	26 (7.0%)	25 (6.8%)	n.s.	22 (12.7%)	42 (15.2%)	n.s.	4 (2.5%)	22 (9.1%)	0.021
Traumatic brain injury	148 (40.0%)	118 (32.0%)	0.023	21 (12.1%)	44 (15.9%)	n.s.	29 (18.2%)	45 (18.5%)	n.s.
Post-anoxic encefalopathy	16 (4.3%)	27 (7.3%)	n.s.	4 (2.3%)	12 (4.3%)	n.s.	7 (4.4%)	18 (7.8%)	n.s.
Bullet wounds at the head	8 (2.2%)	8 (2.2%)	n.s.	2 (1.2%)	1 (0.4%)	n.s.	1 (1.2%)	1 (0.4%)	n.s.
Suicide	1 (0.3%)	4 (1.1%)	n.s.	1 (0.6%)	2 (0.7%)	n.s.	1 (0.6%)	2 (0.4%)	n.s.
Risk factors									
Arterial hypertension	64 (17.3%)	79 (21.4%)	n.s.	95 (54.9%)	163 (59.1%)	n.s.	82 (50.0%)	106 (37.6%)	0.012
Cardiovascular disease	13 (3.5%)	20 (5.4%)	n.s.	38 (22.0%)	101 (36.6%)	0.012	34 (20.7%)	70 (24.8%)	n.s.
Smoking	85 (23.0%)	91 (24.7%)	n.s.	36 (20.8%)	39 (14.1%)	n.s.	22 (13.4%)	42 (14.9%)	n.s.
Dyslipidemia	3 (0.8%)	20 (5.4%)	<0.001	11 (6.4%)	46 (16.7%)	0.001	4 (2.4%)	25 (8.9%)	0.009
Diabetes	5 (1.4%)	4 (1.1%)	n.s.	21 (12.1%)	32 (11.6%)	n.s.	24 (14.6%)	36 (12.8%)	n.s.

	SCD (N=739)			ECD (N=449)			Unsuitable (N=446)		
	Group A (N=370)	Group B (N=369)		Group A (N=173)	Group B (N=276)		Group A (N=164)	Group B (N=282)	
Sex (F)	155 (41.9%)	160 (43.4%)	n.s.	75 (43.3%)	110 (39.9%)	n.s.	66 (40.2%)	140 (49.6%)	n.s.
Age (>65 years)	111 (30.0%)	149 (37.9%)	0.048	47 (27.2%)	118 (42.8%)	0.027	50 (30.5%)	112 (39.7%)	<0.001
Age (years)	44.9±15.7	46.6±13.6	n.s.	64.8±9.6	68.5±8.8	<0.001	65.9±12.9	65.3±15.1	n.s.
BMI (kg/m²)	24.8± 3.8	25.2±3.9	n.s.	26.3±3.8	26.2±3.6	n.s.	25.7±3.9	25.9±3.8	n.s.
Serum creatinine (mg/dL)	0.91±0.35	0.87±0.33	n.s.	0.93±0.37	0.93±0.47	n.s.	1.23±0.90	1.08±0.71	n.s.
GFR Cockcroft-Gault (mL/min)	104.8±33.9	111.4±40.1	0.018	83.9±26.8	81.9±31.2	n.s.	70.5±29.0	79.2±38.4	0.024
GFR CKD-EPI (mL/min)	93.9±22.2	95.6±23.5	n.s.	78.1±18.1	78.0±20.7	n.s.	71.5±23.9	78.0±22.9	<0.001
Cold ischemia time K1 (hours)	15.5±4.7	13.0±4.5	<0.001	16.0±4.3	14.1±4.3	<0.001	/	/	/
Cold ischemia time K2 (hours)	17.3±5.6	13.9±4.9	<0.001	18.0±5.1	15.5±4.5	<0.001	/	/	/
Bioptic score right kidney	n.a.	n.a.	/	3.03±1.18	3.09±1.35	n.s.	5.26±1.15	5.31±1.26	n.s.
Bioptic score left kidney	n.a.	n.a.	/	3.45±1.23	3.41±1.39	n.s.	5.40±1.38	5.55±1.34	n.s.

BMI – body mass index; CKD – chronic kidney disease; ECD – expanded criteria donors; GFR – glomerular filtration rate; n.a. – not applicable; n.s. – not significant; SCD – standard criteria donors.

Conclusions

The current demand for kidneys available for transplantation and the increasing number of patients in waiting lists has resulted in several efforts to identify and optimize novel strategies and specific allocation policies of expanded criteria donors [2-3].

These data suggest the possibility of broadening the criteria to expand the pool of potential donors eligible for organ donation, especially among elderly and marginal donors. We confirmed that donor age alone may be not an independent and predictive factor in decision making of organ classification and allocation

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