

WHAT IS THE BENEFIT OF RENAL TRANSPLANTATION FOR A COHORT OF PATIENTS AGED 70 YEARS AND OLDER STARTING A RENAL REPLACEMENT THERAPY?

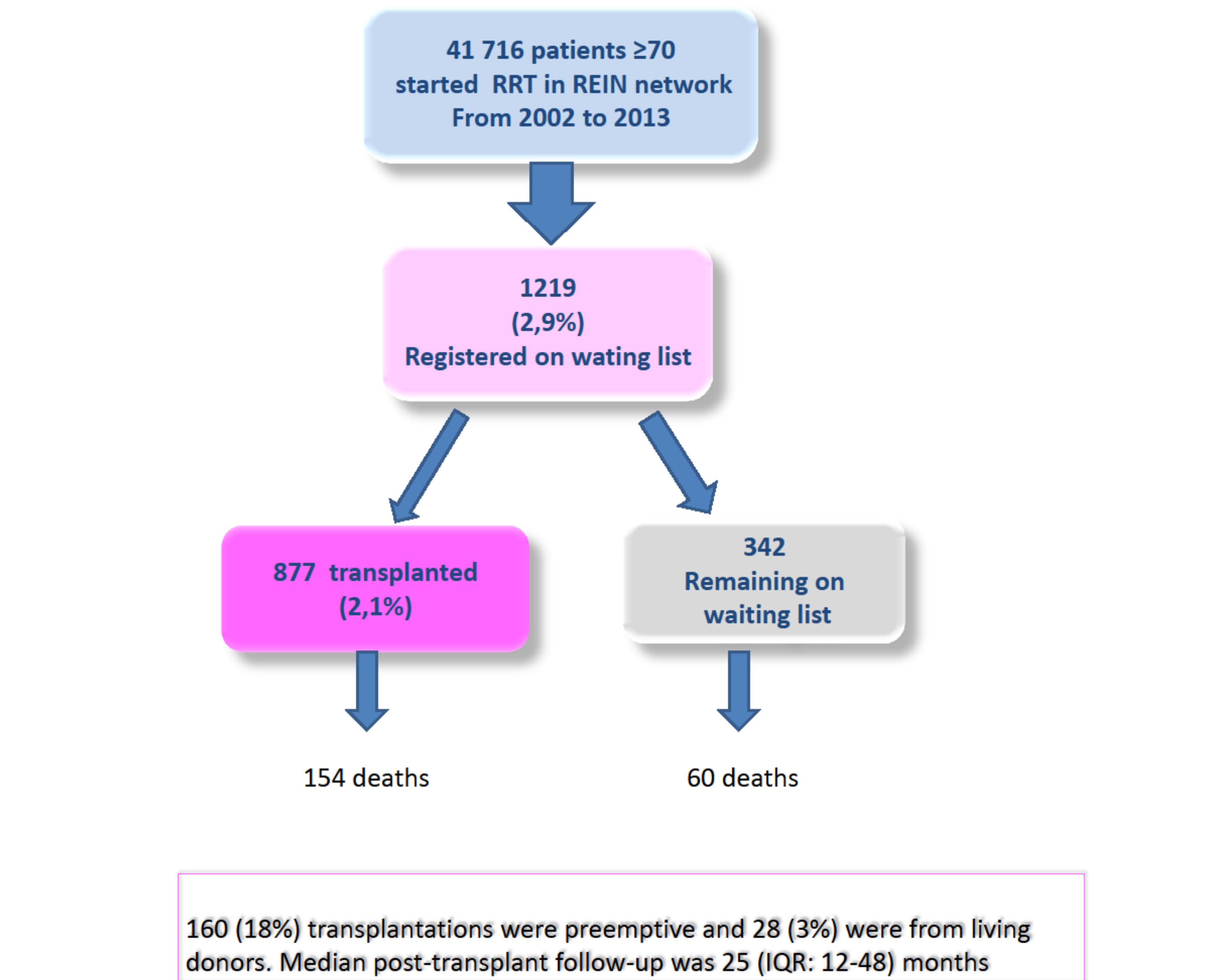
RM Andrianasolo¹, C Legeai¹, O Moranne², R Snaoujdj³, M Hourmant⁴, C Jacquelinet¹, C Couchoud¹, MA Macher¹

¹ Agence de la biomédecine, Saint Denis La Plaine, France; ² Nîmes university hospital, Nîmes, France; ³ Necker university hospital, Paris, France; ⁴ Hotel Dieu-Nantes university hospital, Nantes, France.

Background: Elderly patients are a growing population among those starting renal replacement therapy (RRT) but rarely registered on waiting list even if age per se are not a contra indication for kidney transplantation.

Objectives. To evaluate the benefit of kidney transplantation and identify risk factors for post-transplant mortality among a cohort of patients from metropolitan France, who were aged 70 or over at the initiation of RRT.

Methods. 41716 patients from the French Renal Epidemiology and Information Network (REIN), started RRT between 2002-2013, at the age of 70 and over. Among them 1219 (2.9%) had been registered on the waiting list of renal transplantation and 877 (2.1%) were transplanted. Transplanted patients were matched to a sample of not-transplanted ones on age, gender, comorbidities and time spent on dialysis (n=2183). Survival benefit of transplantation was assessed firstly among dialyzed patients (matched cohort) and secondly among wait-listed patients (n=1219), using Cox regression models with transplantation as a time dependent variable.



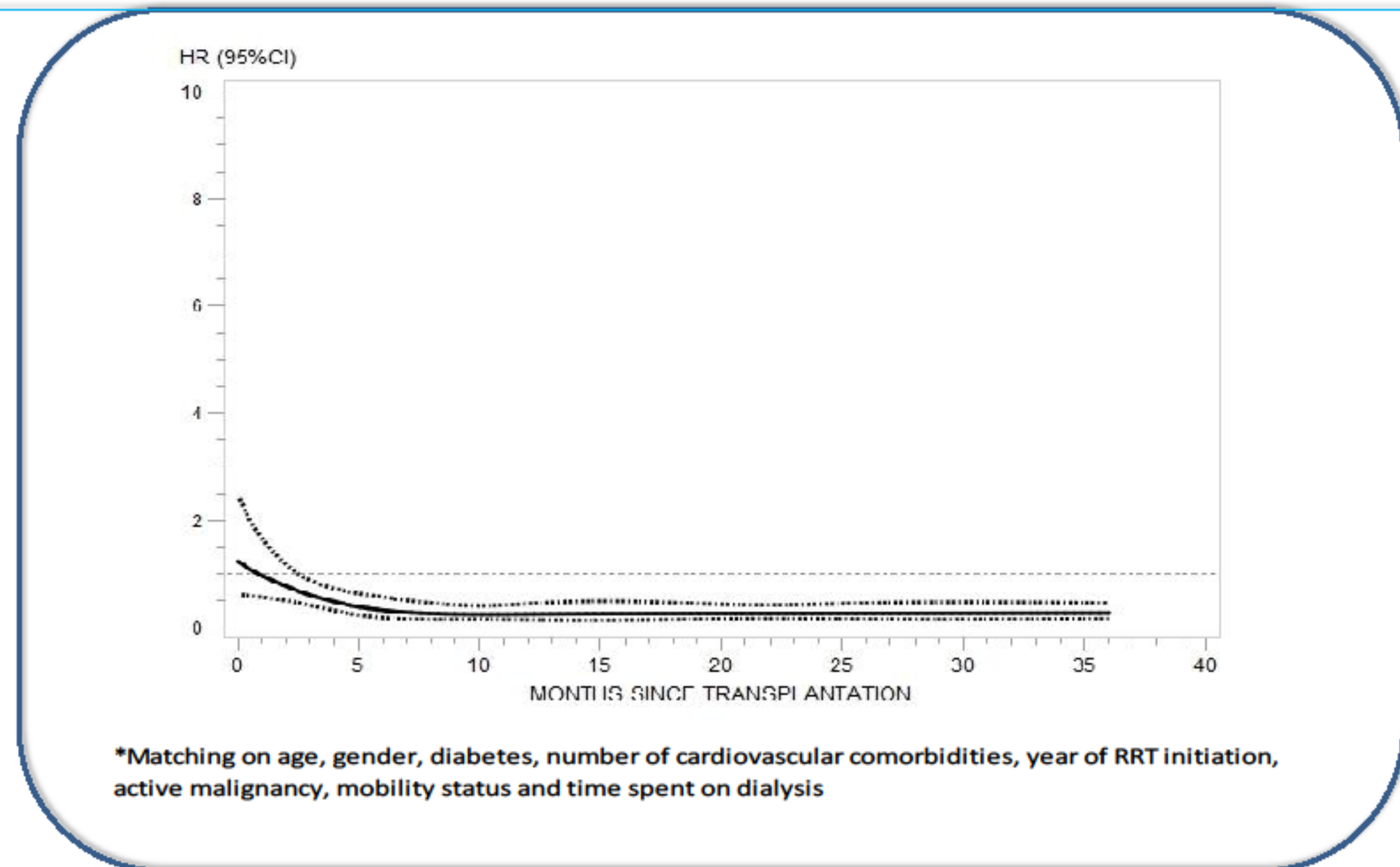
160 (18%) transplantations were preemptive and 28 (3%) were from living donors. Median post-transplant follow-up was 25 (IQR: 12-48) months

Baseline characteristics of patients according to their status at the cut-off point, before matching and imputation

Characteristics	Total (N=41716)	% missing data	Dialysis		Transplant (n=877)	p ¹	p ²
			All (n=40839)	On the waiting list (n=342)			
Age (years)		0,0	79,5 (5,5)	73,4 (2,9)	73,0 (2,4)	<0,001	0,07
Gender		0,0				<0,001	0,28
Male	25740		25145 (61,6)	243 (71,1)	595 (67,8)		
Female	15976		15694 (38,4)	99 (28,9)	282 (32,2)		
BMI (kg/cm ²)		26,1				<0,001	0,06
Underweight	1408		1396 (4,6)	8 (3,1)	12 (2,0)		
Normal	13873		13607 (45,0)	98 (37,5)	266 (45,5)		
Overweight	10067		9842 (32,5)	103 (39,5)	225 (38,5)		
Obese	5490		5408 (17,9)	52 (19,9)	82 (14,0)		
Hemoglobin (g/dL)		23,2				<0,001	0,51
Diabetes		2,1				<0,001	<0,001
No	23611		22959 (57,4)	198 (59,3)	652 (76,0)		
Yes	17234		17028 (42,6)	136 (40,7)	206 (24,0)		
Cardiovascular comorbidities ³		7,7				<0,001	0,04
0	12108		11659 (30,8)	187 (58,4)	449 (65,3)		
1	10889		10714 (28,3)	88 (27,5)	175 (25,4)		
[2-5]	15491		15427 (40,8)	45 (14,1)	64 (9,3)		
Chronic respiratory disease		4,7				<0,001	0,94
No	33631		32983 (84,4)	304 (93,0)	648 (92,8)		
Yes	6138		6088 (15,6)	23 (7,0)	50 (7,2)		
Active malignancy		4,2				<0,001	0,02
No	34784		34109 (86,9)	304 (92,7)	675 (96,2)		
Yes	5189		5162 (13,1)	24 (7,3)	27 (3,8)		
Paraplegia/hemiplegia		8,9				<0,01	1,00
No	37443		36753 (98,5)	326 (100,0)	690 (99,9)		
Yes	569		568 (1,5)	0 (0,0)	1 (0,1)		
Cirrhosis		4,2				<0,01	0,10
No	39415		38714 (98,6)	326 (99,4)	701 (100,0)		
Yes	539		539 (1,4)	2 (0,6)	0 (0,0)		
hepatitis B		4,1				0,42	0,48
No	39789		39091 (99,5)	324 (98,8)	698 (99,3)		
Yes	210		205 (0,5)	4 (1,2)	5 (0,7)		
hepatitis C		4,4				0,99	0,37
No	39465		38770 (99,0)	322 (98,2)	695 (99,0)		
Yes	396		389 (1,0)	6 (1,8)	7 (1,0)		
Blindness		8,8				<0,01	0,67
No	37057		36370 (97,4)	325 (99,7)	687 (99,3)		
Yes	989		984 (2,6)	1 (0,3)	5 (0,7)		
Severe behavioral disorder		8,7				<0,001	1,00
No	36764		36073 (96,5)	326 (100,0)	691 (99,9)		
Yes	1327		1326 (3,5)	0 (0,0)	1 (0,1)		
Mobility status		17,6				<0,001	0,58
Walks without help	24954		24345 (72,1)	295 (97,7)	609 (98,2)		
Needs assistance for transfer	9432		9421 (27,9)	7 (2,3)	11 (1,8)		

Values are mean (SD) or percent with p-values derived from chi-square, Fisher exact test or Student t test, as appropriate.
¹ Transplant vs. all dialysis patients
² Transplant vs. dialysis patients registered on the waiting list
³ congestive heart failure, coronary vascular disease/myocardial infarction, dysrhythmia, cerebrovascular disease and peripheral vascular disease

Hazard ratios of mortality (95%CI), after imputation, months after transplantation, **transplanted versus matched* dialysis patients**

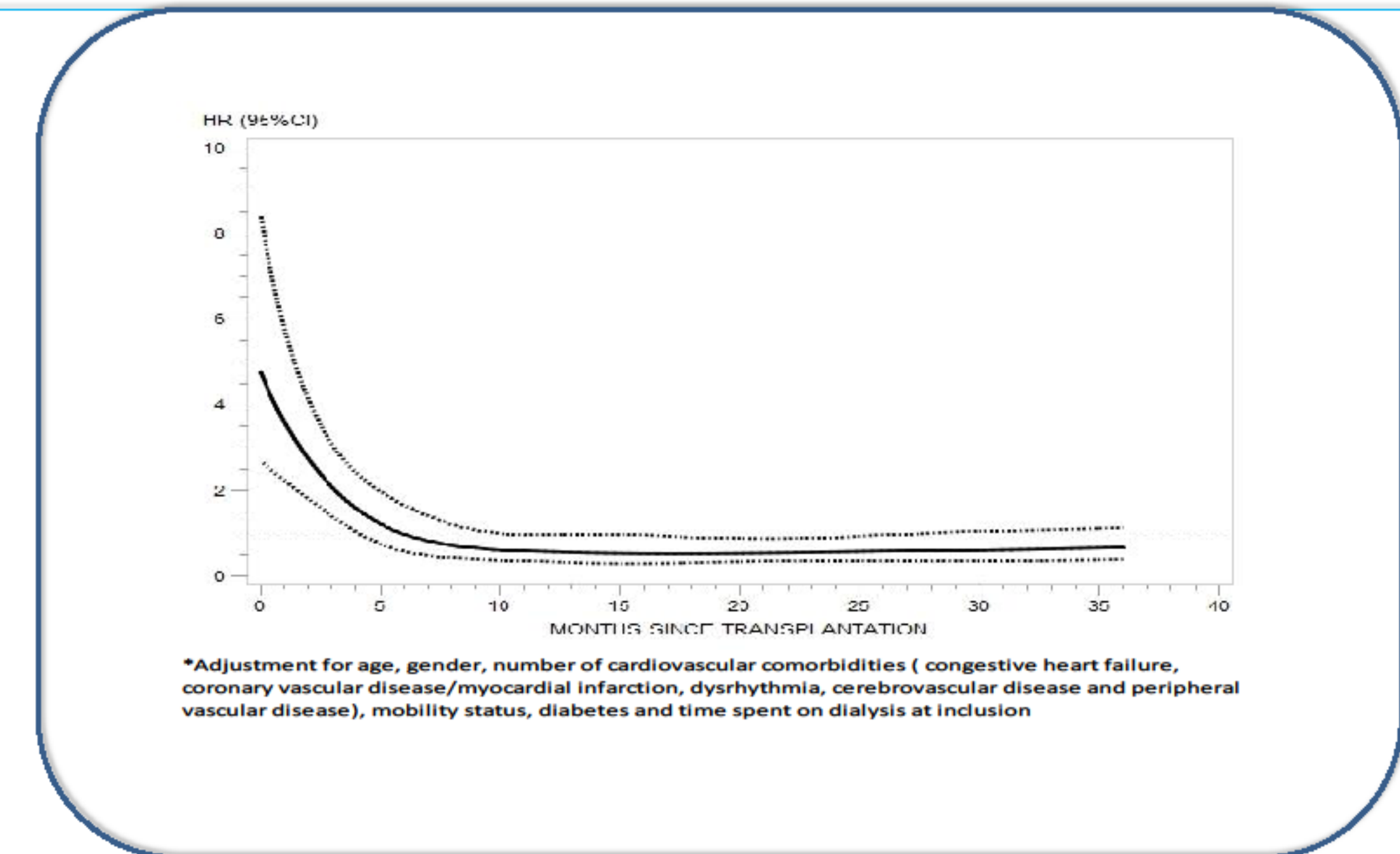


*Matching on age, gender, diabetes, number of cardiovascular comorbidities, year of RRT initiation, active malignancy, mobility status and time spent on dialysis

Characteristics	HR (95%CI)	p
Not transplanted	1	
0-3 months post transplantation	1,1 (0,6-2,0)	0,80
3-6 months post transplantation	0,3 (0,1-0,7)	<0,01
6-9 months post transplantation	0,5 (0,2-1,1)	0,08
9-12 months post transplantation	0,1 (0,03-0,5)	<0,01
12-24 months post transplantation	0,2 (0,1-0,5)	<0,001
24-36 months post transplantation	0,2 (0,1-0,5)	<0,01
>36 months post transplantation	0,4 (0,2-0,7)	<0,01

*transplant and non-transplant patients were matched on age, gender, diabetes, number of cardiovascular comorbidities, year of RRT initiation, active malignancy, mobility status and time spent on dialysis

Adjusted hazard ratios of mortality (95% CI), after imputation, months after transplantation, **transplanted versus patients remaining on the waiting list**



*Adjustment for age, gender, number of cardiovascular comorbidities (congestive heart failure, coronary vascular disease/myocardial infarction, dysrhythmia, cerebrovascular disease and peripheral vascular disease), mobility status, diabetes and time spent on dialysis at inclusion

Characteristics	Model 1		Model 2	
	HR (95%CI)	p	HR (95%CI)	p
Not transplant	1		1	
0-3 months post transplantation	2,8 (1,8-4,5)	<0,001	3,0 (1,9-4,8)	<0,001
3-6 months post transplantation	1,0 (0,5-1,9)	0,95	1,0 (0,5-2,0)	0,93
6-9 months post transplantation	1,3 (0,7-2,3)	0,41	1,4 (0,8-2,5)	0,30
9-12 months post transplantation	0,4 (0,1-1,0)	0,05	0,4 (0,1-1,0)	0,06
12-24 months post transplantation	0,5 (0,3-0,9)	0,01	0,6 (0,3-0,9)	0,03
24-36 months post transplantation	0,5 (0,3-0,9)	0,03	0,5 (0,3-1,0)	0,05
>36 months post transplantation	0,8 (0,5-1,5)	0,58	0,9 (0,5-1,6)	0,65

Model 1: unadjusted
 Model 2: adjusted for gender and age, number of cardiovascular comorbidities (congestive heart failure, coronary vascular disease/myocardial infarction, dysrhythmia, cerebrovascular disease and peripheral vascular disease), mobility status, diabetes and time spent on dialysis at inclusion

Unadjusted and adjusted risk of death (Cox regression) in transplanted patients, after imputation

Characteristics	% deaths	Univariate		Multivariate	
		HR (95%CI)	p	HR (95%CI)	p
Age		1,0 (1,0-1,1)	0,17	1,1 (1,0-1,1)	0,06
Gender					
Male	19,0	1		1	
Female	14,5	0,7 (0,5-1,0)	0,049	0,8 (0,5-1,1)	0,21
BMI					
Underweight	12,5	1,0 (0,4-2,9)	0,98		
Normal	17,8	1			
Overweight	15,8	0,9 (0,6-1,4)	0,61		
Obese	22,9	1,2 (0,7-1,9)	0,54		
Diabetes					
no	15,7	1		1	
yes	23,3	1,7 (1,2-2,4)	<0,001	1,6 (1,1-2,3)	0,01
Cardiovascular comorbidity*					
0	15,0	1		1	
1	20,8	1,6 (1,1-2,3)	0,02	1,7 (1,2-2,4)	<0,01
[2-5]	21,1	1,8 (1,1-2,9)	0,02	2,0 (1,2-3,5)	0,01
Chronic respiratory disease					
no	17,6	1		1	
yes	17,6	1,6 (0,8-2,9)	0,16	1,6 (0,8-3,0)	0,16
Active malignancy					
no	17,4	1			
yes	20,0	1,4 (0,7-3,0)	0,39		
Mobility status					
walks without help	16,6	1			
needs assistance for transfer	27,6	1,4 (0,8-2,6)	0,23		
Time spent on dialysis (months)					
0	15,6	1		1	
0 to 6	19,4	1,2 (0,6-2,2)	0,65	1,8 (0,9-3,6)	0,12
6 to 12	16,9	1,1 (0,6-2,0)	0,78	1,5 (0,9-2,8)	0,20
12 to 24	14,7	1,0 (0,6-1,7)	0,99	1,4 (0,8-2,4)	0,26
>24	21,5	1,9 (1,2-3,1)	<0,01	2,6 (1,6-4,4)	<0,001
Donor Age					
no expanded criteria brain-death donor	26,3	1		1	
expanded criteria brain-death donor or cardiac-death donor	17,3	1,0 (0,5-1,8)	0,91	0,5 (0,2-1,1)	0,16
living donor	7,1	0,4 (0,1-2,0)	0,30	0,3 (0,1-1,6)	0,17
Dual kidney transplantation					
no	16,2	1			
yes	25,6	1,2 (0,8-1,8)	0,33		
Number of HLA-A mismatches					
0	21,7	1			
1	17,3	0,8 (0,5-1,2)	0,27		
2	16,6	0,8 (0,5-1,3)	0,40		
Number of HLA-B mismatches					
0	18,3	1			
1	17,6	0,8 (0,4-1,6)	0,51		
2	17,4	0,8 (0,4-1,6)	0,58		
Number of HLA-DR mismatches					
0	15,5	1			
1	17,0	1,0 (0,6-1,6)	0,97		
2	20,3	1,0 (0,6-1,7)	0,91		
Allo-immunized patient					
no	19,3	1			
yes	20,9	0,9 (0,5-1,4)	0,53		

*congestive heart failure, coronary vascular disease/myocardial infarction, dysrhythmia, cerebrovascular disease and peripheral vascular disease

Independent risk factors for post-transplant mortality were diabetes, presence of cardiovascular comorbidity and a time spent on dialysis at transplantation greater than 2 years. No donor's characteristics were associated with mortality of the recipient.

Conclusion. Being transplanted for elderly patients aged 70 years and over is associated with a reduction of mortality risk when compared to dialyzed patients matched on age, gender, comorbidities and time spent on dialysis. Nevertheless our results suggested an early mortality risk for transplanted patients when compared to very selected wait-listed patients. Renal transplantation seems to be a way to increase life expectancy and to improve quality of life, provided that potential candidates are well clinically evaluated and clearly informed about risks incurred.

references.

- Bayat, M. A. Macher, C. Couchoud et al. On behalf of REIN registry Individual and Regional Factors of Access to the Renal Transplant Waiting List in France in a Cohort of Dialyzed Patients. *Am J of Transplant* 2015; 15: 1050-1060
- Lassalle M, Ayav C, Frimat L, Jacquelinet C, Couchoud C. The essential of 2012 results from the French Renal Epidemiology and Information Network (REIN) ESRD registry. *Nephrol Ther.* 2015;11(2):78-87.
- Lassalle M, Ayav C, Frimat L, Jacquelinet C, Couchoud C. The essential of 2012 results from the French Renal Epidemiology and Information Network (REIN) ESRD registry. *Nephrol Ther.* 2015;11(2):78-87.
- Rao PS, Merion RM, Ashby VB, Port FK, Wolfe RA, Kayler LK. Renal transplantation in elderly patients older than 70 years of age: results from the Scientific Registry of Transplant Recipients. *Transplantation.* 2007;83(8):1069-1074.
- Gill JS, Schaeffner E, Chathan S et al. Quantification of the early risk of death in elderly kidney transplant recipients. *Am J Transplant.* 2013;13(2):427-432.