

Supplementary material - Table S1: Association of 3- and 12-month eGFR with death and non-death censored graft failure (including patient death)

	Single-center cohort				Multicenter cohort			
	Unadjusted		Adjusted*		Unadjusted		Adjusted**	
	HR (CI 95%)	p-value	HR (CI 95%)	p-value	HR (CI 95%)	p-value	HR (CI 95%)	p-value
Outcome: death								
3-month eGFR (for 10 mL/min/1.73m ² increase)	0.87 (0.76 - 1.01)	0.064	1.09 (0.93 - 1.28)	0.27	0.88 (0.83 - 0.95)	0.0003	1.02 (0.94 - 1.11)	0.60
3-month eGFR < 45 mL/min/1.73m ²	1.65 (1.09 - 2.50)	0.018	1.01 (0.63 - 1.60)	0.98	1.94 (1.52 - 2.46)	<0.0001	1.39 (1.03 - 1.88)	0.031
12-month eGFR (for 10 mL/min/1.73m ² increase)	0.82 (0.70 - 0.96)	0.014	1.05 (0.88 - 1.25)	0.59	0.85 (0.79 - 0.91)	<0.0001	1.01 (0.92 - 1.11)	0.80
12-month eGFR < 45 mL/min/1.73m ²	1.84 (1.20 - 2.83)	0.005	1.03 (0.65 - 1.64)	0.90	1.66 (1.29 - 2.13)	<0.0001	1.10 (0.81 - 1.50)	0.54
Outcome: graft failure (including patient death)								
3-month eGFR (for 10 mL/min/1.73m ² increase)	0.80 (0.73 - 0.88)	<0.0001	0.92 (0.83 - 1.02)	0.13	0.77 (0.73 - 0.80)	<0.0001	0.82 (0.77 - 0.87)	<0.0001
3-month eGFR < 45 mL/min/1.73m ²	1.84 (1.43 - 2.38)	<0.0001	1.32 (0.99 - 1.76)	0.060	2.39 (2.05 - 2.78)	<0.0001	2.01 (1.67 - 2.43)	<0.0001
12-month eGFR (for 10 mL/min/1.73m ² increase)	0.73 (0.66 - 0.81)	<0.0001	0.81 (0.73 - 0.91)	0.0004	0.71 (0.68 - 0.75)	<0.0001	0.77 (0.72 - 0.82)	<0.0001
12-month eGFR < 45 mL/min/1.73m ²	2.05 (1.57 - 2.69)	<0.0001	1.53 (1.14 - 2.06)	0.005	2.56 (2.18 - 2.99)	<0.0001	2.06 (1.70 - 2.51)	<0.0001

* Adjusted for: recipient's age, history of heart failure, donor type (living, standard criteria donor, expanded criteria donor), delayed graft function, immunization, number of A-B-DR-DQ HLA incompatibilities (<5, ≥5), induction treatment, graft rejection (prior to the considered variable, i.e. prior to 3 or 12 months).

**Adjusted for: recipient's age, cardiovascular history, type of donor (living, deceased), delayed graft function, anti-HLA immunization class I and/or II, number of A-B-DR HLA incompatibilities (<5, ≥5), induction treatment graft rejection (prior to the considered variable, i.e. prior to 3 or 12 months).

Supplementary material - Table S2: Interaction between 3-month eGFR and the occurrence of graft rejection after 3 months for graft failure in the single-center cohort

Effect of 3-month eGFR (per 10mL/min/1.73m ²)	Unadjusted			Adjusted*		
	N _{events} /N (%)	HR (CI 95%)	p-value	N _{events} /N (%)	HR (CI 95%)	p-value
Rejection after 3 months						
No	70/558 (12.5%)	0.51 (0.42 - 0.62)	<0.0001	69/552 (12.5%)	0.56 (0.46 - 0.68)	<0.0001
Yes	75/196 (38.3%)	1.04 (0.90 - 1.20)	0.58	75/196 (38.3%)	1.07 (0.92 - 1.25)	0.36
		Interaction p-value	<0.0001		Interaction p-value	<0.0001
Rejection after 3 months (excluding borderline and undetermined rejections)						
No	88/634 (13.9%)	0.61 (0.52 - 0.72)	<0.0001	87/628 (13.9%)	0.67 (0.56 - 0.79)	<0.0001
Yes	57/120 (47.5%)	1.08 (0.91 - 1.27)	0.40	57/120 (47.5%)	1.11 (0.94 - 1.32)	0.21
		Interaction p-value	<0.0001		Interaction p-value	<0.0001
Humoral rejection after 3 months						
No	119/713 (16.7%)	0.70 (0.62 - 0.80)	<0.0001	118/707 (16.7%)	0.76 (0.66 - 0.88)	0.0003
Yes	26/41 (63.4%)	1.05 (0.80 - 1.39)	0.72	26/41 (63.4%)	1.15 (0.87 - 1.52)	0.31
		Interaction p-value	0.010		Interaction p-value	0.007

* Adjusted for recipient's age, history of heart failure, donor type (living, standard criteria donor, expanded criteria donor), delayed graft function, immunization, number of A-B-DR-DQ HLA incompatibilities ≥ 5 , induction treatment, graft rejection (prior to the considered variable, i.e. prior to 3 or 12 months).

Supplementary material - Table S3: Interaction between 3-month eGFR and risk factors of alloimmune damage for graft failure in the single-center cohort

Effect of 3-month eGFR (per 10mL/min/1.73m ²)	Unadjusted			Adjusted*		
	N _{events} /N (%)	HR (CI 95 %)	p-value	N _{events} /N (%)	HR (CI 95 %)	p-value
HLA immunization positive class I or II						
No	112/629 (17.8%)	0.79 (0.69 - 0.90)	0.0004	112/627 (17.9%)	0.82 (0.71 - 0.95)	0.007
Yes	33/122 (27.0%)	0.68 (0.51 - 0.90)	0.008	32/121 (26.4%)	0.75 (0.56 - 1.01)	0.055
		Interaction p-value	0.33		Interaction p-value	0.60
HLA A-B-DR incompatibilities ≥ 4						
No	77/399 (19.3%)	0.74 (0.63 - 0.87)	0.0002	77/398 (19.3%)	0.79 (0.66 - 0.94)	0.007
Yes	68/354 (19.2%)	0.79 (0.66 - 0.94)	0.007	67/351 (19.1%)	0.82 (0.69 - 0.99)	0.034
		Interaction p-value	0.56		Interaction p-value	0.71
HLA A-B-DR-DQ incompatibilities ≥ 5						
No	79/416 (19.0%)	0.75 (0.64 - 0.88)	0.0004	79/415 (19.0%)	0.81 (0.68 - 0.96)	0.014
Yes	66/336 (19.6%)	0.77 (0.64 - 0.92)	0.004	65/333 (19.5%)	0.80 (0.66 - 0.96)	0.019
		Interaction p-value	0.87		Interaction p-value	0.94

* Adjusted for: recipient's age, history of heart failure, donor type (living, standard criteria donor, expanded criteria donor), delayed graft function, immunization, number of A-B-DR-DQ HLA incompatibilities (<5, ≥5), induction treatment, graft rejection (prior to the considered variable, i.e. prior to 3 or 12 months).

Supplementary material - Table S4: Prognostic accuracy of eGFR and proteinuria at 3, 6 and 12 months for the risk of death-censored graft failure

	C-index for baseline model	C-index for baseline model + eGFR/Proteinuria	Δ C-index		NRI	
			Value (IC 95 %)	p-value	Value (IC 95 %)	p-value
eGFR variables						
3-month eGFR (linear)	63.9	68.3	4.4 (1.1 to 7.7)	0.009	12.6 (0.8 to 24.0)	0.040
3-month eGFR (<45)	63.9	66.1	2.2 (0.1 to 4.3)	0.038	19.9 (2.8 to 29.4)	0.032
6-month eGFR (linear)	62.8	66.2	3.4 (-0.2 to 7.0)	0.061	13.9 (-0.9 to 23.7)	0.070
6-month eGFR (<45)	62.8	64.3	1.5 (-0.5 to 3.5)	0.14	15.9 (-3.8 to 26.8)	0.084
12-month eGFR (linear)	63.9	72.1	8.3 (3.3 to 13.2)	0.001	29.9 (13.5 to 38.6)	<0.0001
12-month eGFR (<45)	63.9	67.3	3.4 (0.4 to 6.4)	0.025	24.7 (9.5 to 35.3)	0.008
Proteinuria variables						
3-month proteinuria (linear)	64.1	70.8	6.8 (2.1 to 11.5)	0.005	24.5 (13.4 to 38.5)	<0.0001
3-month proteinuria (>0.5)	64.1	66.7	2.7 (-0.8 to 6.2)	0.14	17.5 (5.0 to 28.3)	0.016
6-month proteinuria (linear)	63.5	73.5	10.0 (4.6 to 15.4)	0.0003	37.1 (23.0 to 48.1)	<0.0001
6-month proteinuria (>0.5)	63.5	71.4	7.9 (3.2 to 12.6)	0.001	29.9 (16.6 to 42.0)	<0.0001
12-month proteinuria (linear)	64.5	75.0	10.5 (5.2 to 15.9)	0.0001	39.2 (23.7 to 49.9)	<0.0001
12-month proteinuria (>0.5)	64.5	73.3	8.8 (4.0 to 13.6)	0.0003	31.5 (12.2 to 43.1)	<0.0001
eGFR and Proteinuria variables						
3-month eGFR and proteinuria (linear)	64.1	72.1	8.0 (3.4 to 12.7)	0.0006	27.0 (13.5 to 39.6)	<0.0001
3-month eGFR and proteinuria (<45 and >0.5)	64.1	67.5	3.5 (0.0 to 6.9)	0.049	13.7 (4.7 to 29.1)	0.012
6-month eGFR and proteinuria (linear)	63.5	73.7	10.1 (4.4 to 15.8)	0.0005	33.3 (20.2 to 47.3)	<0.0001
6-month eGFR and proteinuria (<45 and >0.5)	63.5	71.4	7.8 (3.0 to 12.6)	0.001	29.5 (14.1 to 41.5)	<0.0001
12-month eGFR and proteinuria (linear)	64.4	77.0	12.6 (6.4 to 18.8)	<0.0001	34.2 (21.3 to 47.7)	<0.0001
12-month eGFR and proteinuria (<45 and >0.5)	64.4	74.3	9.9 (4.3 to 15.5)	0.0005	34.5 (19.1 to 44.8)	<0.0001

Baseline clinical model included the following variables: recipient's age, history of heart failure, donor type, delayed graft function, immunization, HLA incompatibilities, induction treatment, graft rejection (prior to the considered variable, i.e. prior to 3, 6 or 12 months).

Supplementary material - Table S5: Association of 3- and 12-month eGFR and proteinuria with death-censored graft survival in the single-center and the multicenter cohorts

		Single-center local cohort				Multicenter validation cohort			
		Univariable		Adjusted*		Univariable		Adjusted**	
		HR (CI 95 %)	p-value	HR (CI 95 %)	p-value	HR (CI 95 %)	p-value	HR (CI 95 %)	p-value
3-months	eGFR (for 10 mL/min/1.73m ² increase)	0.76 (0.67-0.85)	<0.0001	0.80 (0.70-0.92)	0.001	0.69 (0.65 - 0.73)	<0.0001	0.70 (0.65 - 0.75)	<0.0001
	eGFR < 45 mL/min/m ²	1.98 (1.42-2.74)	<0.0001	1.66 (1.14-2.40)	0.008	2.73 (2.25 - 3.33)	<0.0001	2.55 (2.00 - 3.25)	<0.0001
	Proteinuria (for 1 g/day increase)	1.24 (1.14-1.34)	<0.0001	1.25 (1.14-1.36)	<0.0001	1.19 (1.14 - 1.24)	<0.0001	1.19 (1.14 - 1.25)	<0.0001
	Proteinuria > 0.5 g/day	2.69 (1.84-3.94)	<0.0001	2.45 (1.65-3.63)	<0.0001	2.47 (1.98 - 3.09)	<0.0001	2.22 (1.69 - 2.90)	<0.0001
12-months	eGFR (for 10 mL/min/1.73m ² increase)	0.67 (0.59-0.77)	<0.0001	0.69 (0.60-0.80)	<0.0001	0.62 (0.58 - 0.67)	<0.0001	0.63 (0.58 - 0.69)	<0.0001
	eGFR < 45 mL/min/m ²	2.21 (1.55-3.13)	<0.0001	1.95 (1.33-2.86)	0.0006	3.41 (2.77 - 4.20)	<0.0001	3.09 (2.39 - 4.00)	<0.0001
	Proteinuria (for 1 g/day increase)	1.60 (1.43-1.79)	<0.0001	1.57 (1.38-1.77)	<0.0001	1.57 (1.48 - 1.67)	<0.0001	1.54 (1.42 - 1.67)	<0.0001
	Proteinuria > 0.5 g/day	4.04 (2.75-5.92)	<0.0001	3.39 (2.25-5.11)	<0.0001	2.98 (2.38 - 3.73)	<0.0001	3.21 (2.47 - 4.16)	<0.0001

* Adjusted for: recipient's age, history of heart failure, donor type (living, standard criteria donor, expanded criteria donor), delayed graft function, immunization, number of A-B-DR HLA incompatibilities, induction treatment, graft rejection (prior to the considered variable, i.e. prior to 3 or 12 months).

** Adjusted for: recipient's age, cardiovascular history, type of donor (living, deceased), delayed graft function, anti-HLA immunization class I and/or II, number of A-B-DR HLA incompatibilities (<5, ≥5), induction treatment graft rejection (prior to the considered variable, i.e. prior to 3 or 12 months).

Supplemental material - Table S6: C-indices of eGFR at 3 and 12 months with the MDRD formula and the CKD-EPI formula for the risk of death-censored graft failure

	C-index (CI 95%) Single-center cohort	C-index (CI 95%) Multicenter cohort
3-month eGFR MDRD (linear)	62.6 (57.2 - 68.1)	69.3 (66.4 - 72.1)
3-month eGFR CKD-EPI (linear)	62.4 (56.9 - 67.9)	69.2 (66.3 - 72.1)
3-month eGFR MDRD < 45 mL/min/m ²	59.9 (55.6 - 64.2)	63.7 (61.3 - 66.1)
3-month eGFR CKD-EPI < 45 mL/min/m ²	60.5 (56.2 - 64.7)	63.6 (61.2 - 66.0)
12-month eGFR MDRD (linear)	66.0 (60.1 - 71.9)	71.7 (68.7 - 74.6)
12-month eGFR CKD-EPI (linear)	65.7 (59.7 - 71.6)	71.4 (68.4 - 74.3)
12-month eGFR MDRD < 45 mL/min/m ²	61.3 (56.8 - 65.8)	65.6 (63.2 - 68.1)
12-month eGFR CKD-EPI < 45 mL/min/m ²	61.6 (57.0 - 66.1)	65.2 (62.7 - 67.6)

Supplementary material - Table S7: Association of 3- and 12-month eGFR with the MDRD formula and the CKD-EPI formula with death-censored graft failure

	Single-center cohort				Multicenter cohort			
	Unadjusted		Adjusted*		Unadjusted		Adjusted**	
	HR (CI 95%)	p-value	HR (CI 95%)	p-value	HR (CI 95%)	p-value	HR (CI 95%)	p-value
3-month eGFR MDRD (for 10 mL/min/1.73m ² increase)	0.76 (0.67 - 0.85)	<0.0001	0.80 (0.70 - 0.92)	0.001	0.69 (0.65 - 0.73)	<0.0001	0.70 (0.65 - 0.75)	<0.0001
3-month eGFR CKD-EPI (for 10 mL/min/1.73m ² increase)	0.79 (0.71 - 0.88)	<0.0001	0.82 (0.73 - 0.93)	0.002	0.71 (0.67 - 0.75)	<0.0001	0.71 (0.66 - 0.77)	<0.0001
3-month eGFR MDRD < 45 mL/min/m ²	1.98 (1.42 - 2.74)	<0.0001	1.66 (1.14 - 2.40)	0.008	2.73 (2.25 - 3.33)	<0.0001	2.55 (2.00 - 3.25)	<0.0001
3-month eGFR CKD-EPI < 45 mL/min/m ²	2.02 (1.46 - 2.81)	<0.0001	1.74 (1.20 - 2.54)	0.004	2.73 (2.24 - 3.32)	<0.0001	2.54 (1.98 - 3.25)	<0.0001
12-month eGFR MDRD (for 10 mL/min/1.73m ² increase)	0.67 (0.59 - 0.77)	<0.0001	0.69 (0.60 - 0.80)	<0.0001	0.62 (0.58 - 0.67)	<0.0001	0.63 (0.58 - 0.69)	<0.0001
12-month eGFR CKD-EPI (for 10 mL/min/1.73m ² increase)	0.71 (0.63 - 0.81)	<0.0001	0.72 (0.62 - 0.82)	<0.0001	0.65 (0.61 - 0.69)	<0.0001	0.65 (0.60 - 0.71)	<0.0001
12-month eGFR MDRD < 45 mL/min/m ²	2.21 (1.55 - 3.13)	<0.0001	1.95 (1.33 - 2.86)	0.0006	3.41 (2.77 - 4.20)	<0.0001	3.09 (2.39 - 4.00)	<0.0001
12-month eGFR CKD-EPI < 45 mL/min/m ²	2.25 (1.59 - 3.20)	<0.0001	2.06 (1.41 - 3.02)	0.0002	3.29 (2.68 - 4.04)	<0.0001	2.96 (2.28 - 3.83)	<0.0001

* Adjusted for: recipient's age, history of heart failure, donor type (living, standard criteria donor, expanded criteria donor), delayed graft function, immunization, number of A-B-DR-DQ HLA incompatibilities (<5, ≥5), induction treatment, graft rejection (prior to the considered variable, i.e. prior to 3 or 12 months).

**Adjusted for: recipient's age, cardiovascular history, type of donor (living, deceased), delayed graft function, anti-HLA immunization class I and/or II, number of A-B-DR HLA incompatibilities (<5, ≥5), induction treatment graft rejection (prior to the considered variable, i.e. prior to 3 or 12 months).