

Supplemental data to

Association of left atrial diameter with survival among renal allograft recipients

A Kainz, G Goliasch, F Wiesbauer, T Binder, G Maurer, HJ Nesser,
R Mascherbauer, C Ebner, R Kramar, J Wilflingseder,
R Oberbauer

Supplemental table 1. Comparing demographics between study cohort and subjects without echocardiographic evaluation.

variable	population without echocardiography	population with echocardiography	p-value
	n=2406	n=553	
Deaths per 100 PYR	3.86	2.61	n.a.
Functional graft loss per 100 PYR	3.82	3.24	n.a.
donor age (years)	40 (22)	46 (15)	<0.001
donor last creatinine (mg/dl)	1.0 (0.7)	1.0 (0.4)	0.57
recipient sex (female)	887 (36.9%)	230 (41.6%)	0.04
renal diagnosis			0.05
glomerular nephritis	565 (23.5%)	126 (22.8%)	
vascular	205 (8.5%)	47 (8.5%)	
diabetes	235 (9.8%)	76 (13.7%)	
else	1401 (58.2%)	304 (55.0%)	
immunosuppression			0.53
standard	1005 (41.8%)	222 (40.1%)	
steroidfree	118 (4.9%)	23 (4.2%)	
else	1283 (53.3%)	308 (55.7%)	
cerebro vascular disease	116 (4.8%)	27 (4.9%)	0.43
peripher vascular disease	184 (7.6%)	72 (13.0%)	<0.001
coronary heart disease	246 (10.2%)	81 (14.6%)	<0.001
diabetes	222 (9.2%)	99 (17.9%)	<0.001
cause of death			0.21
cardio vascular	180 (7.5%)	50 (9.0%)	
infection	139 (5.8%)	22 (4.0%)	
malign	43 (1.8%)	9 (1.6%)	
else	127 (5.3%)	25 (4.5%)	

variable	population without echocardiography n=2406	population with echocardiography n=553	p-value
donor type			0.005
deceased	2079 (86.4%)	500 (90.4%)	
living	327 (13.6%)	53 (9.6%)	
ASR	523 (21.7%)	189 (34.2%)	<0.001
MMA	1 (0, 1)	1 (0, 1)	0.02
MMB	1 (0, 1)	1 (0, 1)	0.002
MMDR	1 (0, 1)	1 (0, 1)	0.39
sum of HLA mismatch	2 (0, 3)	3 (2, 3)	<0.001
panel reactive antibody (%)	0 (0, 2)	0 (0, 2)	0.18
maximal panel reactive antibody (%)	0 (0, 10)	4 (0, 12)	0.01
age at transplantation (years)	49 (16)	52 (13)	<0.001
year of transplantation	2001 (1996, 2005)	2000 (1996, 2003)	<0.001
ALAT (units/l)	12 (7, 19)	10 (7, 16)	0.004
ASAT (units/l)	14 (7, 22)	10 (6, 17)	<0.001
albumin (g/l)	39 (33, 44)	39 (32, 44)	0.79
BUN (mg/dl)	45 (18)	46 (18)	0.22
C-reactive protein (mg/dl)	0.7 (0, 1.6)	0.7 (0, 1.8)	0.38
cholesterol (mg/dl)	159 (46)	162 (51)	0.31
creatinine (mg/dl)	6.7 (3.0)	7.0 (2.8)	0.07
iron (µg/dl)	61 (36)	58 (34)	0.26
ferritin (ng/ml)	251 (131, 443)	209 (98, 353)	0.04
hemoglobin (g/dl)	11.4 (1.7)	11.3 (1.7)	0.39
hematocrit (%)	34 (5)	34 (5)	0.42
HbA1c (%)	6.0 (5.5, 6.4)	6.2 (5.6, 6.6)	0.03
potassium (mmol/l)	4.7 (0.7)	4.8 (0.7)	0.65
sodium (mmol/l)	139 (137, 141)	139 (137, 141)	0.68
proteinuria (mg/mmol crea)	1 (0, 1)	1 (0, 2)	0.09
serum transferrin (mg/dl)	178 (43)	176 (46)	0.55
total plasma protein (g/dl)	61 (22)	60 (23)	0.44
transferrin saturation (%)	24 (17, 34)	25 (17, 32)	0.95

Values represent count (percentage), mean (standard deviation) or median (25th, 75th percentile). PYR, person year; standard immunosuppression regimen: steroid +

mycophenolat + calcineurin inhibitors; ASR, acute systemic rejection; BUN, blood urea nitrogen

Univariate models

Supplemental table 2. Hazard ratio and 95% confidence interval of echo parameters and demographic parameters in univariate models.

parameter	HR	95% CI		p-value
outcome mortality (n=106)				
LA2D (per mm)	1.06	1.04	1.08	<0.001
LV2D (per mm)	1.00	0.95	1.05	0.92
RA2D (per mm)	1.06	1.03	1.08	<0.001
RV2D (per mm)	1.02	0.97	1.07	0.43
LVF (<50% vs. >50%)	0.96	0.10	8.95	0.97
age at transplantation (per year)	1.04	1.02	1.06	<0.001
diabetes (yes vs. no)	2.88	1.94	4.27	<0.001
vintage of dialysis (per year)	1.01	0.94	1.09	0.76
donor age (per year)	1.00	0.99	1.02	0.48
cholesterol (per mg/dl)	1.00	0.99	1.00	0.45
hemoglobin (per g/dl)	0.83	0.74	0.92	<0.001
sum of HLA mismatch	1.03	0.89	1.20	0.68
use of CNI (yes vs. no)	1.11	0.53	2.33	0.77
mean arterial bloodpressure (per 5 mmHg)	1.00	0.94	1.06	0.98
cerebro vascular disease (yes vs. no)	0.99	0.35	2.81	0.99
peripher vascular disease (yes vs. no)	4.88	2.69	8.84	<0.001
outcome functional graft loss (n=119)				
LA2D (per mm)	1.02	1.00	1.04	0.12

parameter	HR	95% CI		p-value
LV2D (per mm)	1.01	0.98	1.04	0.45
RV2D (per mm)	1.02	0.98	1.07	0.32
RA2D (per mm)	1.03	1.00	1.05	0.05
LVF (<50% vs. >50%)	2.00	0.67	5.93	0.18
age at transplantation (per year)	0.99	0.97	1.00	0.04
diabetes (yes vs. no)	1.61	1.06	2.45	0.03
vintage of dialysis (per year)	0.99	0.91	1.07	0.78
donor age (per year)	1.01	1.00	1.03	0.03
cholesterol (per mg/dl)	0.99	0.99	1.00	0.004
hemoglobin (per g/dl)	0.72	0.65	0.80	<0.001
sum of HLA mismatch	1.09	0.95	1.26	0.23
use of CNI (yes vs. no)	0.84	0.48	1.45	0.52
mean arterial bloodpressure (per 5 mmHg)	1.01	0.98	1.05	0.44
cerebro vascular disease (yes vs. no)	1.76	0.57	5.38	0.27
peripher vascular disease (yes vs. no)	1.30	0.73	2.32	0.34

HR, hazard ratio; 95% CI, 95% confidence interval; LA2D, left atrial diameter; LV2D, left ventricular diameter; RV2D, right ventricular diameter; RA2D, right atrial diameter; LVF, left ventricular function; CNI, calcineurin inhibitor

Mortality

Supplemental table 3. Multivariate Cox model with year of transplantation added, which was not included by the purposeful selection algorithm.

parameter	HR	95% CI		p-value
outcome mortality (n=106)				
LA2D (per mm)	1.06	1.03	1.08	<0.001
RV2D (per mm)	0.96	0.90	1.02	0.14
hemoglobin (per g/dl)	0.81	0.71	0.92	0.001
peripher vascular disease (yes vs. no)	4.57	2.16	9.69	<0.001
immunosuppression (any vs. standard)	1.47	0.68	3.16	0.31
immunosuppression (AZA vs MMF)	1.29	0.62	2.67	0.48
CNI use (yes vs. no)	1.51	0.51	4.43	0.43
year of transplantation	0.97	0.91	1.04	0.43

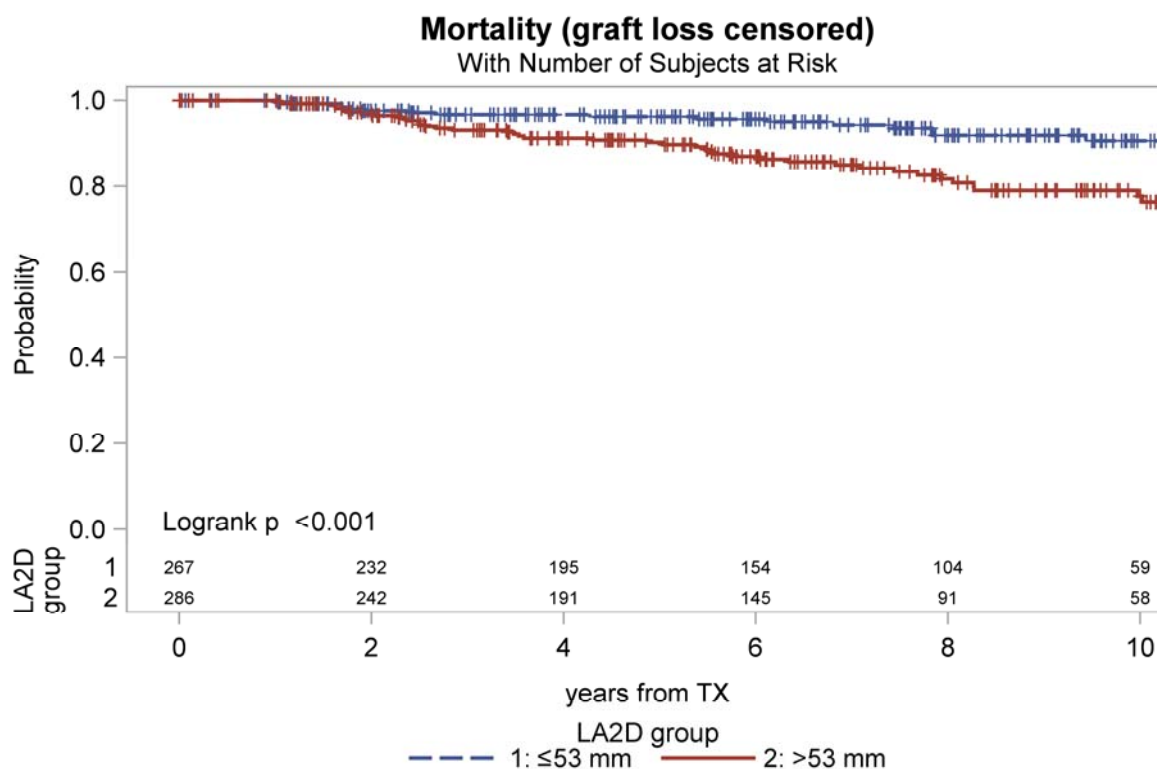
HR, hazard ratio; 95% CI, 95% confidence interval; LA2D, left atrial diameter; RV2D, right ventricular diameter; AZA, azathioprine; MMF, mycophenolate; CNI, calcineurin inhibitor; standard immunosuppression regimen: steroid + MMF + CNI

Supplemental table 4. Hazard ratio and 95% confidence interval for mortality in a cause specific model and a competing risk model (Fine and Gray model). In these analyses only cardiac death was counted as event.

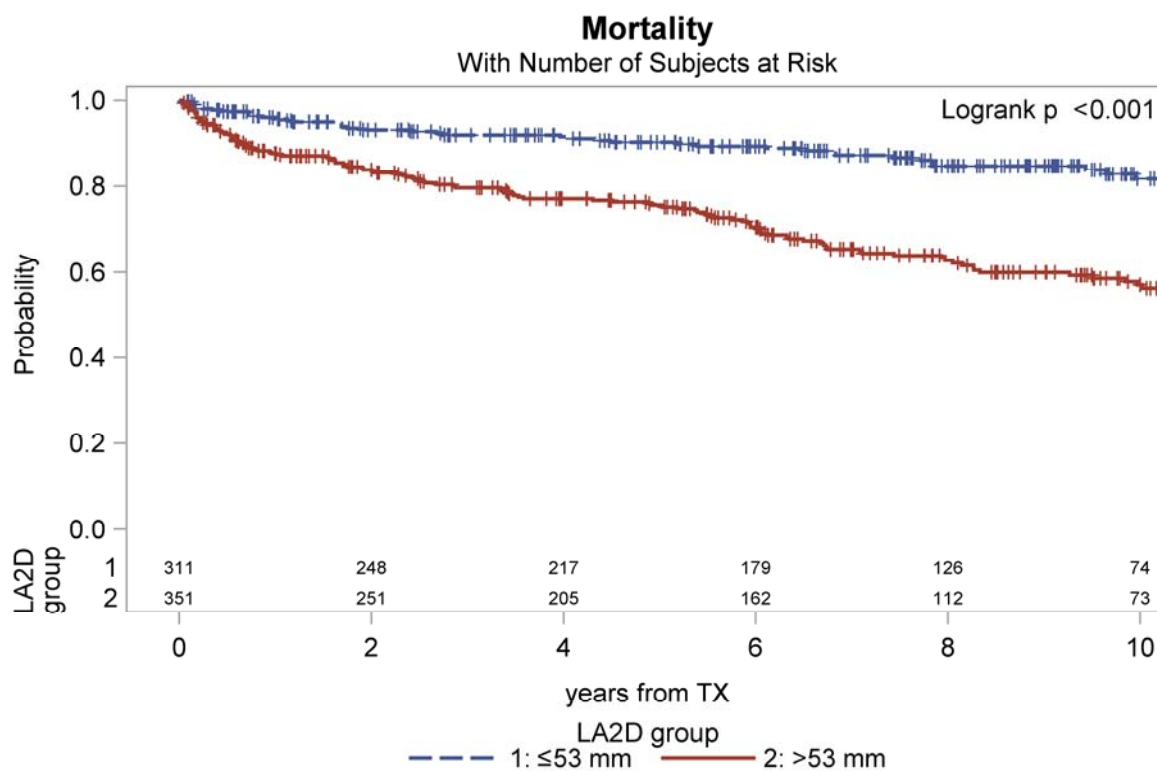
parameter	HR	95% CI		p-value
<i>Mortality (cause specific)</i>				
LA2D (per mm)	1.05	1.01	1.10	0.01
RV2D (per mm)	0.97	0.90	1.05	0.48
<i>Mortality (Fine and Gray model)</i>				
LA2D (per mm)	1.04	1.00	1.08	0.04
RV2D (per mm)	0.98	0.91	1.06	0.64

HR, hazard ratio; 95% CI, 95% confidence interval; LA2D, left atrial diameter; RV2D, right ventricular diameter

Supplemental figure 1a. Kaplan-Meier plot for mortality stratified by LA2D median and censored graft loss.



Supplemental figure 1b. Kaplan-Meier plot of mortality stratified by LA2D median (53 mm). In this plot also patients who died in the first year are included.



Supplemental figure 2. Log hazard ratio for left atrial diameter as a spline curve in the model for mortality. There is no non-linearity evident. Therefore we used the linear model for further evaluation.

