Comparison of renal volumetry and histological features between standard and marginal donors

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COI Disclosure Information

Shunta Hori

I（We) have no COI with regard to our presentation.

Introduction

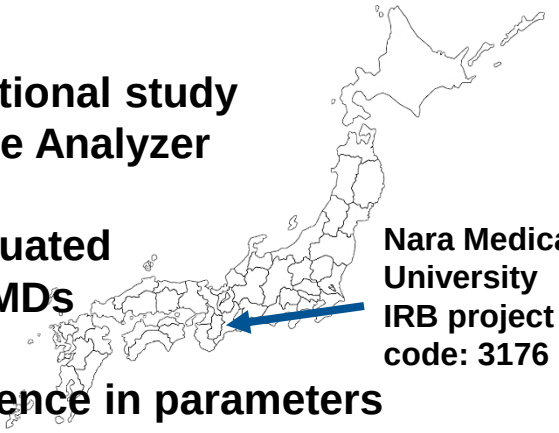
- ✓ Recently, the Japanese Dialysis Committee stated that out of 233,501 patients on dialysis, 110 (0.05%) were LKDs, and the mean interval from DN to dialysis initiation was 249 months.
- ✓ This statement came as a big shock to Japanese transplant physicians and surgeons, and served as a reminder of the importance of evaluation and follow-up assessments of LKDs.
- ✓ Despite the criteria for SDs and MDs defined in the Japanese guidelines for LKDs, screening and prognostic tools for these groups of donors remain a topic of debate.

Objective

- ✓ The present study aimed to reveal differences in the CTV features and histological findings between SDs and MDs, and to investigate the association between these objective parameters and prognosis in LKDs and LKRs.

Study design

- ✓ Single-center retrospective observational study
- ✓ CTV were analyzed using the Volume Analyzer SYNAPSE VINCENT image analysis
- ✓ One-hour allograft biopsy were evaluated
- ✓ LKDs were classified into SDs and MDs according to Japanese guidelines
- ✓ The primary outcome was the difference in parameters calculated using the CTV and histological findings between the SDs and MDs
- ✓ Multivariate binary logistic regression analysis was performed and survival curves were compared using the log-rank test



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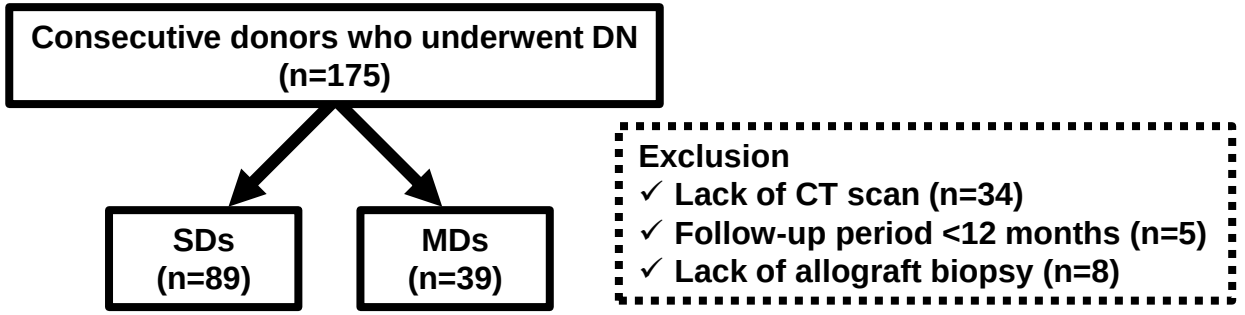


Variables		Category		*P* value
		SD (n=89)	MD (n=39)	
Age (years)	Median (IQR)	56 (49 - 63)	64 (56 - 68)	0.0012 †
Sex	Male	34 (38.2%)	19 (48.7%)	0.33 ‡
	Female	55 (61.8%)	20 (51.3%)	
Body mass index (kg/m^2)	Median (IQR)	23.0 (20.8 - 24.9)	23.4 (21.7 - 26.3)	0.14 †
Body surface area (m^2)	Median (IQR)	1.63 (1.49 - 1.72)	1.66 (1.55 - 1.77)	0.26 †
Follow-up period (months)	Median (IQR)	73 (34 - 108)	68 (25 - 109)	0.47 †
Preoperative eGFR (mL/min/1.73m^2)	Median (IQR)	80.7 (72.1 - 89.3)	72.2 (66.2 - 86.0)	0.031 †

Results: Features of CTV

Variables		Category SD (n=89)	Category MD (n=39)	*P* value
Total mGFR	Median (IQR)	92.8 (81.0 - 105.5)	86.8 (74.4 - 97.5)	0.14 †
	≥80	67 (75.3%)	24 (61.5%)	0.14 ‡
	<80	22 (24.7%)	15 (38.5%)	
Donated mGFR	Median (IQR)	47.4 (40.0 - 54.1)	42.7 (37.2 - 49.2)	0.075 †
	≥40	67 (75.3%)	24 (61.5%)	0.14 ‡
	<40	22 (24.7%)	15 (38.5%)	
Residual mGFR	Median (IQR)	46.8 (40.3 - 52.8)	43.8 (37.7 - 49.3)	0.23 †
	≥40	67 (75.3%)	25 (64.1%)	0.21 ‡
	<40	22 (24.7%)	14 (35.9%)	
TKV/BSA	Median (IQR)	180.5 (167.2 - 193.7)	178.6 (167.2 - 202.1)	0.84 †
	≥170	62 (69.7%)	28 (71.8%)	1.00 ‡
	<170	27 (30.3%)	11 (28.2%)	
DKV/BSA	Median (IQR)	90.9 (82.4 - 97.7)	92.9 (84.7 - 98.4)	0.57 †
	≥85	60 (67.4%)	28 (71.8%)	0.68 ‡
	<85	29 (32.6%)	11 (28.2%)	
RKV/BSA	Median (IQR)	88.9 (82.7 - 97.3)	88.6 (81.5 - 101.7)	0.87 †
	≥85	59 (66.3%)	24 (61.5%)	0.69 ‡
	<85	30 (33.7%)	15 (38.5%)	

Results: Features of histological findings

Variables		Category SD (n=89)	Category MD (n=39)	*P* value
Glomerulus				
thrombus/glomerular capillary congestion	No	88 (98.9%)	39 (100%)	1.00 ‡
	Yes	1 (1.1%)	0 (0%)	
sclerosis	No	65 (73.0%)	27 (69.2%)	0.67 ‡
	Yes	24 (27.0%)	12 (30.8%)	
microvascular inflammation	No	80 (89.9%)	36 (92.3%)	1.00 ‡
	Yes	9 (10.1%)	3 (7.7%)	
Vessel				
arteriolar hyalinosis/necrosis	No	81 (91.0%)	36 (92.3%)	1.00 ‡
	Yes	8 (9.0%)	3 (7.7%)	
arteriosclerosis	No	61 (68.5%)	28 (71.8%)	0.83 ‡
	Yes	28 (31.5%)	11 (28.2%)	
Tubulointerstitium				
calcification/lithiasis	No	89 (100%)	38 (97.4%)	0.30 ‡
	Yes	0 (0%)	1 (2.6%)	
interstitial inflammation	No	80 (89.9%)	29 (74.4%)	0.031 ‡
	Yes	9 (10.1%)	10 (25.6%)	
interstitial fibrosis tubular atrophy	No	78 (87.6%)	28 (71.8%)	0.041 ‡
	Yes	11 (12.4%)	11 (28.2%)	

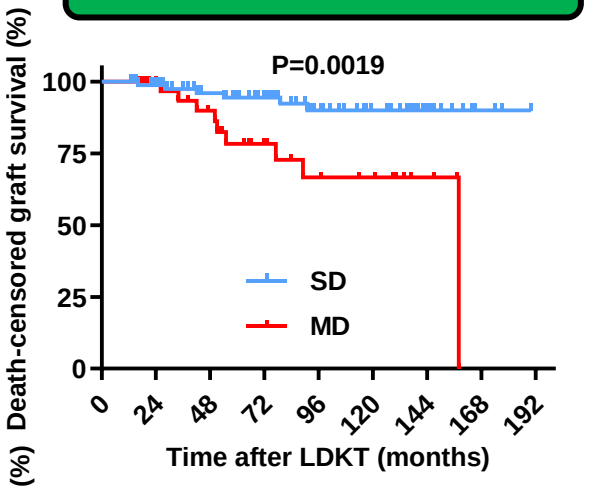
Results: Exploration of predictive factors for RRF in all LKDs

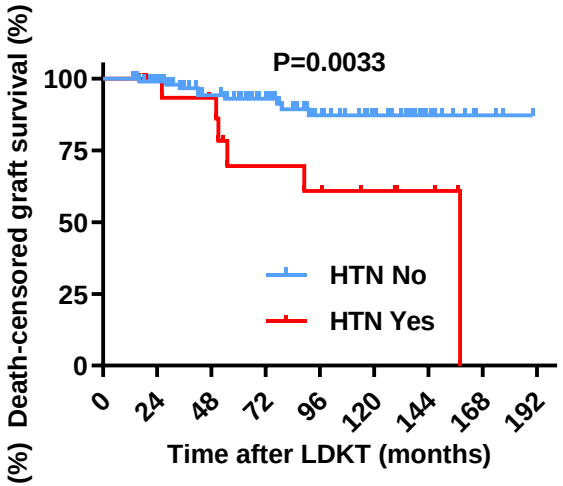
Variables		eGFR <45 Multivariate analysis OR	95%CI	*P* value
Age	≤60	1		
	>60	2.56	1.06 - 6.16	0.036
BMI	≤25	1		
	>25	2.99	1.11 - 8.05	0.031
Residual KV/BSA	≥85	1		
	<85	4.11	1.70 - 9.96	0.002
Marginal donor	No	1		
	Yes	0.95	0.28 - 3.23	0.93

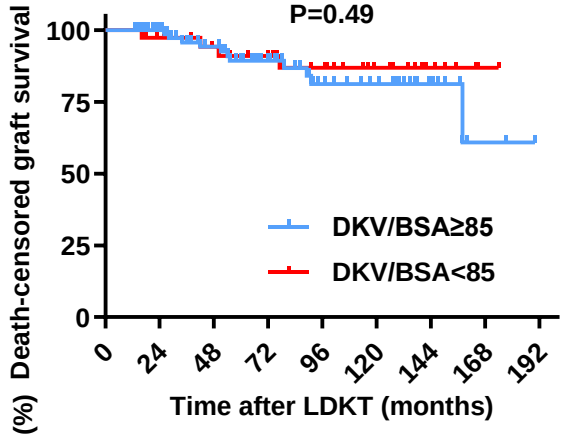
Results: Exploration of predictive factors for RRF in MDs

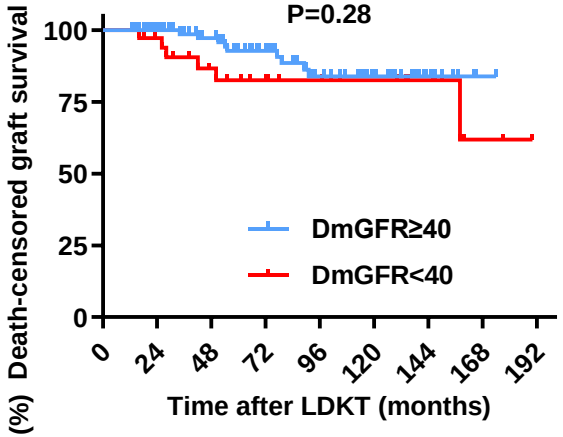
Variables		eGFR <45 Univariate analysis OR	95%CI	*P* value
Diabetes mellitus	No	1		
	Yes	2.29	1.36 - 3.55	0.0096
Residual kidney mGFR	≥40	1		
	<40	19.00	3.15 - 94.32	0.0005
Residual KV/BSA	≥85	1		
	<85	7.00	1.71 - 23.99	0.0096
Arteriosclerosis	No	1		
	Yes	4.80	1.03 - 22.29	0.045

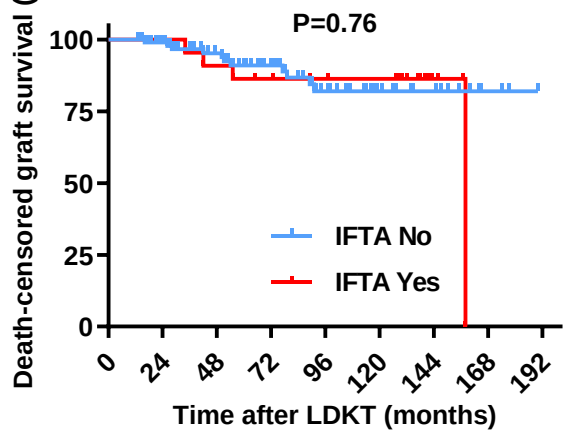
Results: Graft survival

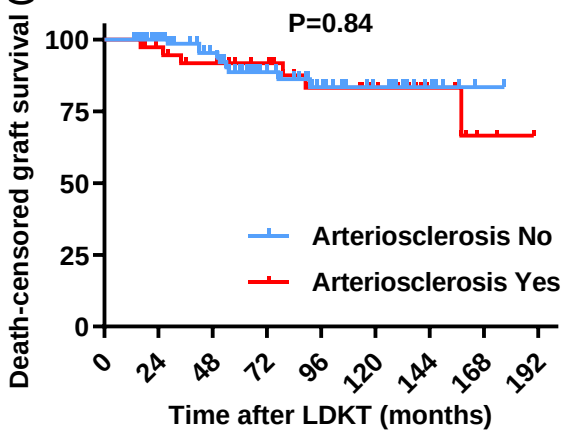




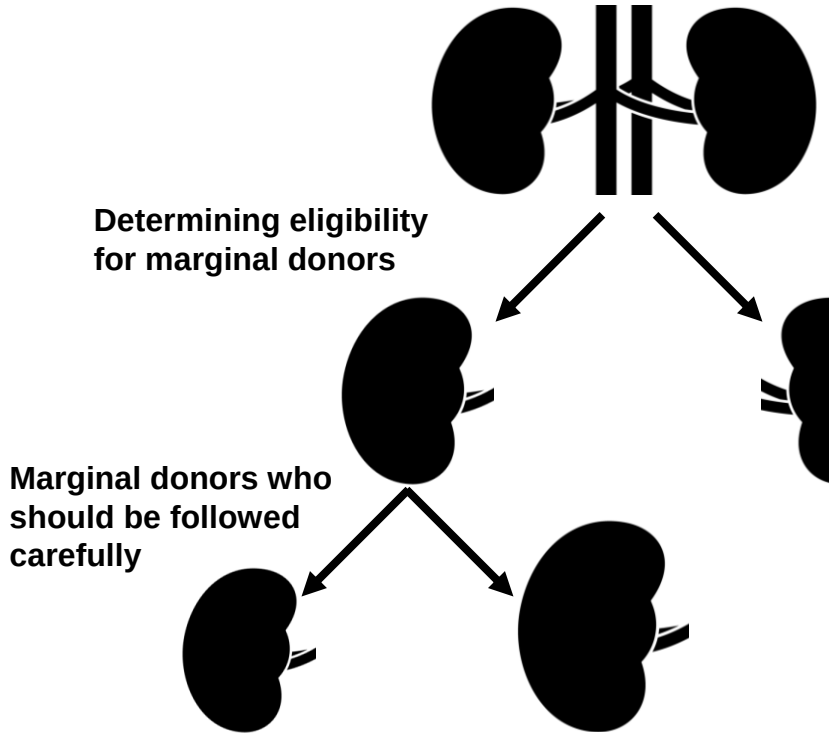








Conclusions



As described in guideline, age, BMI, and HTN are definitely important considering marginal donors, whereas RKV/BSA and RmGFR are also informative to determine eligibility as marginal donors

Donated kidney procured from marginal donors, especially with HTN, should be followed carefully in terms of both graft and patient survival

There is no room for debate that long-term follow-up is important in all donors. Particularly, personalized follow-up should be provided to improve prognosis for marginal donors with advanced age, small RKV/BSA, or arteriosclerosis.

CTV and pathological findings can be used to establish clearer marginal donor criteria and select donors that require attention during follow-up