

Serum Albumin Level has Association with Both Graft Failure and Mortality in Kidney Transplant Recipients

Hee Jung Jeon¹, Soyon Rhee¹, Dong Ho Shin¹, Jieun Oh¹, Young Hoon Kim², and Jung Pyo Lee³

¹Department of Internal Medicine, Hallym University Kangdong Sacred Heart Hospital,

²Department of Surgery, Asan Medical Center and University of Ulsan College of Medicine,

³Department of Internal Medicine, Seoul National University Boramae Medical Center, Seoul, Republic of Korea

Poster number:
MP742

ABSTRACT

Background: The studies concerned the association between post-transplant serum albumin concentration and post-transplant outcomes in kidney transplant recipients (KTRs) are scarce.

Methods: To evaluate the impact of serum albumin level on graft and patient survival, we performed a retrospective multi-center cohort study. A total of 2779 KTRs who underwent renal transplantation from Jan 1997 to Jan 2012 were classified into two groups according to the level of serum albumin at 1 year after transplantation (higher albumin group, ≥ 4.0 g/dL, n=1955 vs. lower albumin group, < 4.0 g/dL, n=824). The Cox proportional hazard model was adjusted with age and gender of recipient, donor type, age of donor, diabetes mellitus, and estimated glomerular filtration rate (eGFR) at 1 year after transplantation.

Results: The mean age of the recipients was 41.9 ± 11.4 (range, 18-73) years, and 59.2% were male. The rate of graft failure was higher in lower albumin group compared to higher albumin group (Hazard ratio [HR] 1.840, 95% confidence interval [CI] 1.370-2.470, $P < 0.001$), even though eGFR at 1 year after transplantation was not different between the two groups (61.8 ± 19.8 vs. 62.0 ± 15.8 mL/min, $P = 0.722$). Both all-cause mortality and non-cardiovascular mortality rates were higher in lower albumin group (HR 2.110, 95% CI 1.189-3.743, $P = 0.011$, and HR 2.621, 95% CI 1.177-5.834, $P = 0.018$, respectively). Every 1.0 g/dL higher serum albumin concentration was associated with 68.2% lower all-cause mortality (HR 0.318, 95% CI 0.201-0.504, $P < 0.001$).

Conclusion: Serum albumin level at 1 year after transplantation is a prognostic factor for graft failure and patients' mortality in KTRs. Therefore, evaluation and management for hypoalbuminemia should be considered to improve outcomes in KTRs.

INTRODUCTION

As in dialysis patients, hypoalbuminemia is frequently found in patients with kidney transplantation and is associated with all-cause mortality.

It has been reported that inflammation, malnutrition, and the use of steroids may lead to hypoalbuminemia after kidney transplantation.

Guijarro C et al. Am J Kidney Dis 1996;27:117-123.
Becker BN et al. Transplantation 1999;68:72-75.
Dahlberg R et al. J Ren Nutr 2010;20:392-397.
Franch-Arcas G Clin Nutr 2001;20:265-269.
Hwang JH et al. BMC Nephrol 2015;16:109-120.

PURPOSE

To evaluate the impact of post-transplant serum albumin level on graft and patient survival in kidney transplant recipients

METHODS

A Retrospective multi-center study

- Kangdong Sacred Heart Hospital (Hallym University College of Medicine)
- Seoul National University Hospital (Seoul National University College of Medicine)
- Asan Medical Center (Ulsan University College of Medicine)

Endpoint : Graft Failure, All-cause Mortality & Non-Cardiovascular Mortality

Inclusion

- Adult patients more than 18 year-old
- Patients who have serum albumin levels at 1 year after kidney transplantation
- From Jan 1997 to Jan 2012



Baseline characteristics of study population

	Albumin <4g/dL (n=824)	Albumin ≥ 4 g/dL (n=1955)	Total (N=2779)	P-value
Age (years)	45.0 \pm 11.1	40.5 \pm 11.2	41.9 \pm 11.4	<0.001
Sex, male (%)	430 (52.2%)	1215 (62.1%)	1645 (59.2%)	<0.001
Cause of ESRD (%)				<0.001
Glomerulonephritis	132 (17.6%)	471 (25.7%)	603 (23.4%)	
Diabetes mellitus	141 (18.8%)	243 (13.3%)	384 (14.9%)	
Hypertension	41 (5.5%)	164 (9.0%)	205 (7.9%)	
Others	162 (21.7%)	310 (17.0%)	472 (18.3%)	
Unknown	273 (36.4%)	644 (35.2%)	917 (35.5%)	
Type of dialysis (%)				0.954
Pre-emptive	35 (9.9%)	105 (9.6%)	140 (9.7%)	
Hemodialysis	243 (69.0%)	765 (69.9%)	1008 (69.7%)	
Peritoneal dialysis	61 (17.3%)	179 (16.4%)	240 (16.6%)	
Both	13 (3.7%)	45 (4.1%)	58 (4.0%)	
Living donor (%)	585 (72.4%)	1490 (77.4%)	2075 (75.9%)	0.006
Acute Rejection (%)	124 (15.0%)	255 (13.0%)	379 (13.6%)	<0.001
Calcineurin inhibitor (%)				<0.001
Cyclosporin	358 (54.8%)	731 (46.2%)	1089 (48.7%)	
Tacrolimus	295 (45.2%)	850 (53.8%)	1145 (51.3%)	
Anti-metabolite (%)				<0.001
Mycophenolate	364 (64.8%)	1057 (75.5%)	1421 (72.4%)	
Azathioprine	166 (29.5%)	269 (19.2%)	435 (22.2%)	

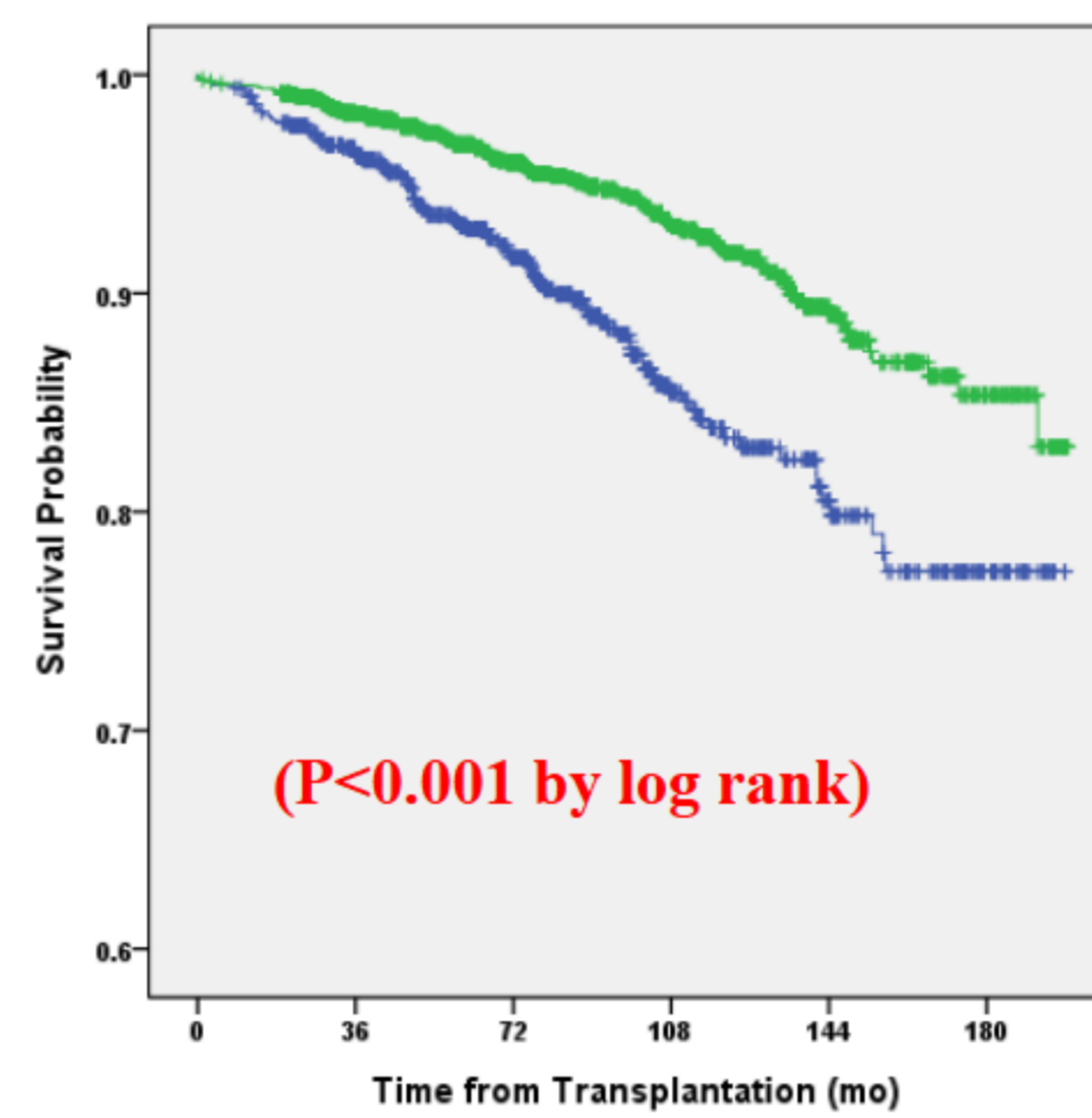
RESULTS

Clinical and Laboratory findings of study population

	Albumin <4g/dL (n=824)	Albumin ≥ 4 g/dL (n=1955)	Total (N=2779)	P-value
Hypertension (%)	679 (82.4%)	1673 (85.6%)	2352 (84.7%)	0.036
Diabetes mellitus (%)	191 (23.2%)	324 (16.6%)	515 (18.5%)	<0.001
Body mass index (kg/m ²)*	22.5 \pm 3.2	22.2 \pm 3.1	22.3 \pm 3.1	0.038
Smoking (%)				0.076
Never	659 (80.0%)	1524 (78.0%)	2183 (78.6%)	
Current smoker	71 (8.6%)	224 (11.5%)	295 (10.6%)	
Ex-smoker	94 (11.4%)	205 (10.5%)	299 (10.8%)	
Hemoglobin (g/dL)*	12.6 \pm 2.2	13.6 \pm 1.9	13.3 \pm 2.0	<0.001
Creatinine (mg/dL)*	1.3 \pm 1.1	1.3 \pm 0.6	1.3 \pm 0.8	0.133
eGFR (ml/min)*	61.8 \pm 19.8	62.0 \pm 15.8	62.0 \pm 17.0	0.722
Calcium (mg/dL)*	9.2 \pm 0.6	9.5 \pm 0.6	9.4 \pm 0.6	<0.001
Phosphorus (mg/dL)*	3.6 \pm 0.7	3.6 \pm 0.7	3.6 \pm 0.7	0.020
Intact PTH (ng/pg)*	85.1 \pm 93.5	104.2 \pm 139.9	98.2 \pm 127.2	0.119
Cholesterol (mg/dL)*	177.1 \pm 36.1	178.8 \pm 33.1	178.3 \pm 34.0	0.233
Triglyceride (mg/dL)*	129.5 \pm 67.2	125.5 \pm 57.9	126.8 \pm 61.0	0.198
LDL (mg/dL)*	104.0 \pm 26.4	100.4 \pm 27.4	101.5 \pm 27.1	0.020
HDL (mg/dL)*	57.8 \pm 15.8	58.7 \pm 15.9	58.4 \pm 15.9	0.274

* measured at 1 year post-transplant

1-year serum Albumin & Graft survival

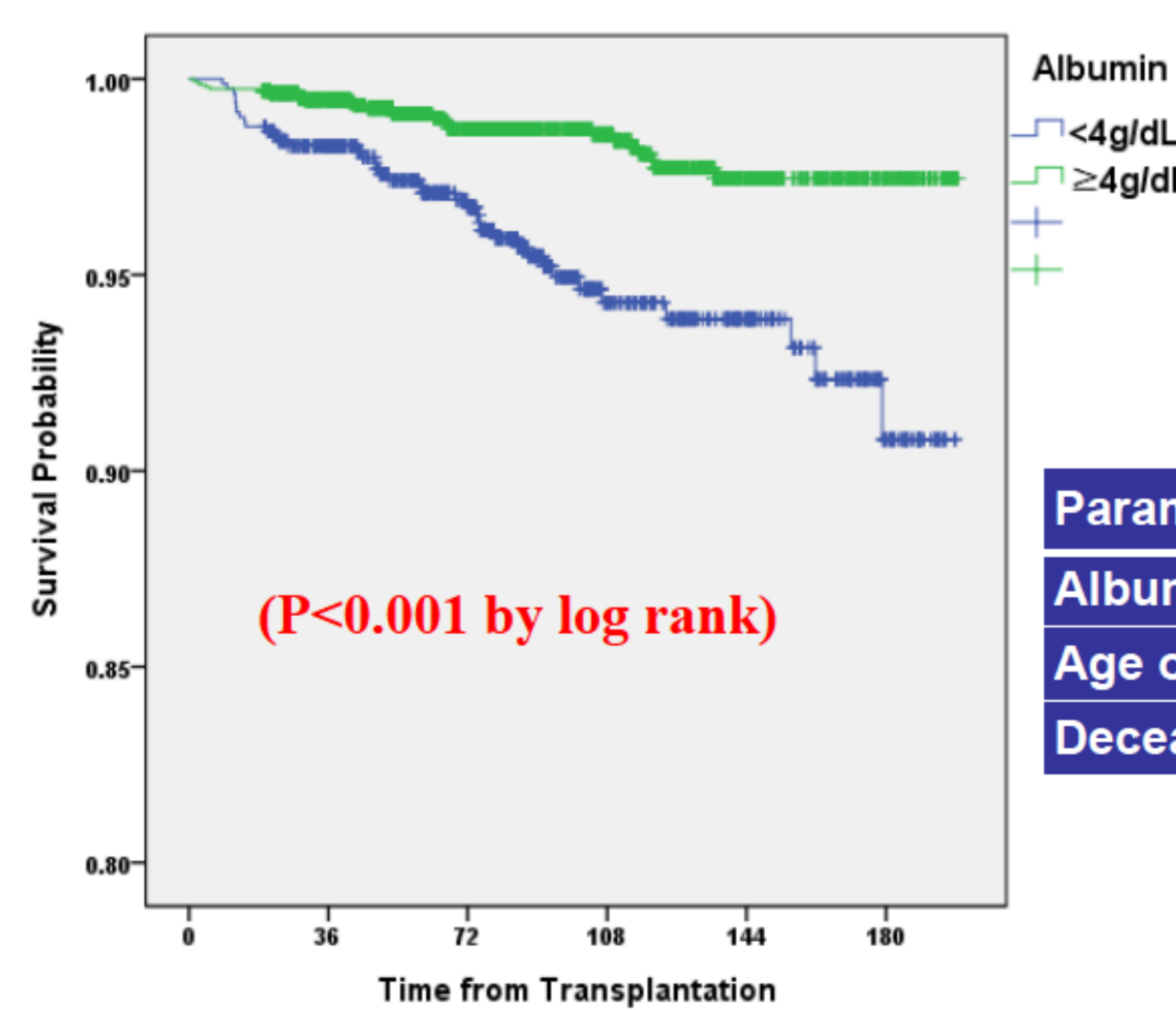


Multivariate analysis

Parameters		P-value	Hazard Ratio	95% CI
Albumin <4g/dL	vs. ≥ 4 g/dL	<0.001	1.840	1.370-2.470
Male gender	vs. Female	0.004	1.572	1.155-2.140
Deceased donor	vs. Living donor	0.018	1.478	1.068-2.045
1-year eGFR		<0.001	0.972	0.964-0.980

Cox proportional hazard model by backward stepwise regression adjusted with age and gender of recipient, donor type, age of donor, diabetes mellitus, and estimated glomerular filtration rate (eGFR) at 1 year after transplantation

1-year serum Albumin & All-cause Mortality

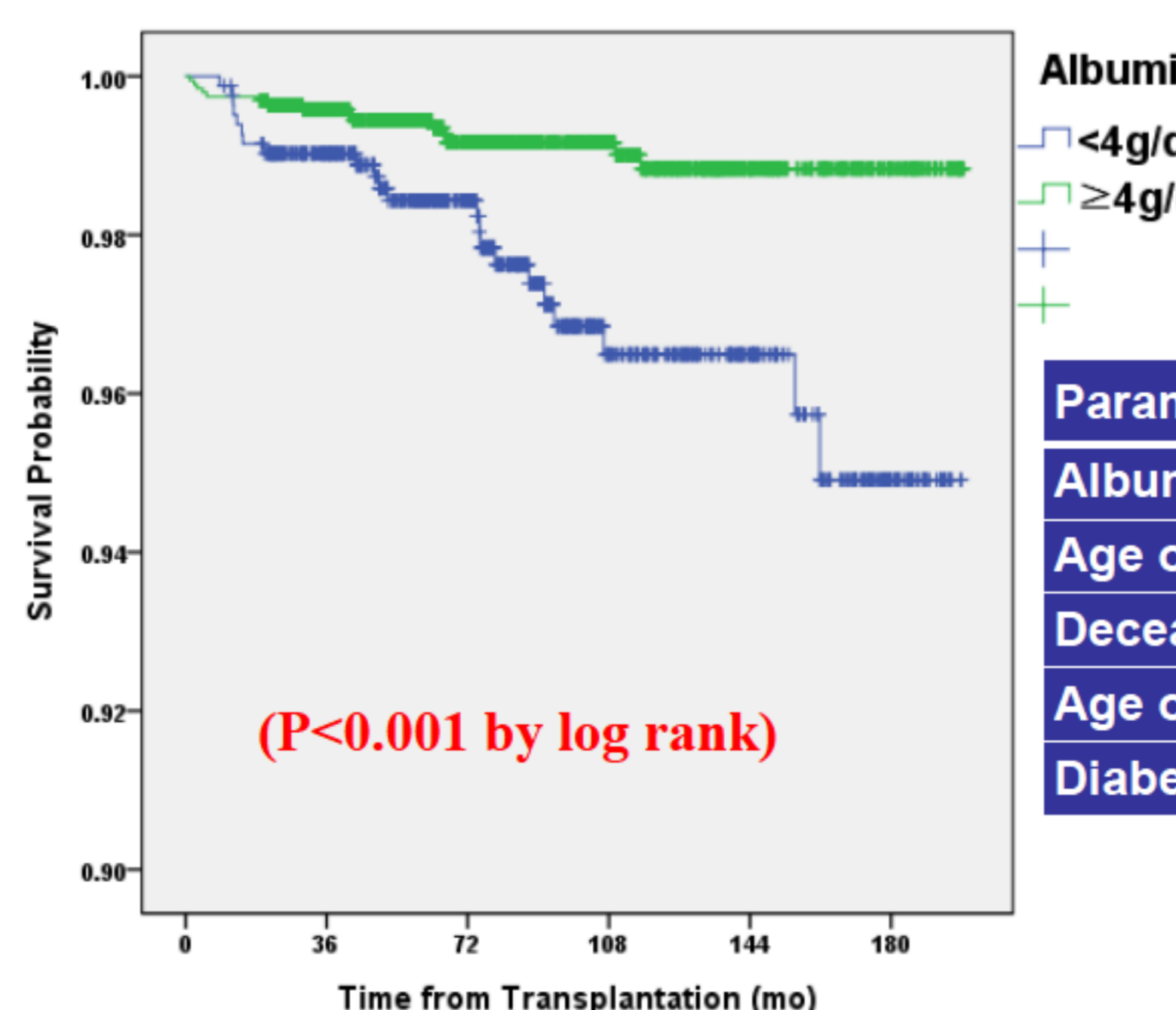


Multivariate analysis

Parameters		P-value	Hazard Ratio	95% CI
Albumin <4g/dL	vs. ≥ 4 g/dL	0.011	2.110	1.189-3.743
Age of recipient		<0.001	1.064	1.036-1.093
Deceased donor	vs. Living donor	0.013	2.055	1.161-3.638

Cox proportional hazard model by backward stepwise regression adjusted with age and gender of recipient, donor type, age of donor, diabetes mellitus, and estimated glomerular filtration rate (eGFR) at 1 year after transplantation

1-year serum Albumin & Non-Cardiovascular Mortality



Multivariate analysis

Parameters		P-value	Hazard Ratio	95% CI
Albumin <4g/dL	vs. ≥ 4 g/dL	0.018	2.621	1.177-5.834
Age of recipient		0.054	1.037	0.999-1.075
Deceased donor	vs. Living donor	0.067	2.090	0.950-4.598
Age of donor		0.076	1.030	0.997-1.064
Diabetes	vs. no diabetes	0.015	2.716	1.217-6.061

Cox proportional hazard model by backward stepwise regression adjusted with age and gender of recipient, donor type, age of donor, diabetes mellitus, and estimated glomerular filtration rate (eGFR) at 1 year after transplantation

CONCLUSION

Serum albumin level at 1 year after transplantation is a prognostic factor for graft failure and patients' mortality in kidney transplant recipients. Therefore, evaluation and management for hypoalbuminemia should be considered to improve outcomes in kidney transplant recipients.

