Geriatric Nutritional Risk Index may be a significant nutritional factor in renal transplantation patients according to the presence or absence of chronic kidney disease

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Background

Evaluation of nutritional status is essential clinical procedures for managing renal transplantation patients, especially in status of chronic kidney disease (CKD). However, no standard method for assessing the nutritional status in renal transplantation patients with CKD exists. The GNRI is a very simple and objective method to assess nutritional condition, using only three objective parameters: body weight, height and serum albumin values.

Methods

We examined the GNRI scores of 184 renal transplantation patients (50.2 ± 11.3 years; 115 men and 69 women). The GNRI is calculated based on the serum albumin level and total lymphocyte count and uses the following equation: GNRI= [14.89 X albumin (g/dL)]+[41.7 X (weight/ideal body weight)]. Logistic regression analysis was performed for predicting malnutrition in renal transplantation patients.

Results

The average GNRI value was 104.8 ± 10.6, and GNRI values were normally distributed. According to logistic regression for predicting malnutrition, serum albumin and CKD predicted malnutrition in renal transplantation patients.

Conclusions

These results suggest that GNRI may be a significant nutritional marker in renal transplantation patients. The simple GNRI method is a clinically useful marker for the assessment of nutritional status in renal transplantation patients

TABLES

Table 3. Logistic regression for predicting malnutrition

Variable	OR (95% CI)	P value
Age > 60 years	1.422 (0.522-3.870)	0.491
Male	1.072 (0.442-2.602)	0.877
Diabetes Mellitus	0.572 (0.137-2.393)	0.445
Chronic Kidney Disease	2.939 (1.224-7.057)	0.016
Duration after kidney trans-plantation (Mo.) > 100	0.775 (0.317-1.894)	0.576
Serum Albumin < 3.5 g/dL	10.218 (2.479-42.114)	0.001

TABLES

Table 1. Clinical characteristics of 184 kidney transplantation patient s according to GNRI

Variables	GNRI ≥ 100 (n=138)	GNRI < 100 (n=46)	P value
Male/Female (n)	88/50	19/27	0.538
Diabetes (−/+)	123/21	32/8	0.378
Chronic Kidney Disease (−/+)	87/51	10/36	0.001
Tacrolimus/Cyclosporin	32/106	4/42	0.032
Age (years)	49.7 ± 11.1	51.9 ± 11.8	0.246
Duration after kidney tran-splantation (months)	112.9 ± 66.1	133.0 ± 67.4	0.076
GNRI	109.4 ± 7.4	91.8 ± 6.7	0.001
Body mass index	23.9 ± 3.4	20.0 ± 2.6	0.001
Body weight (kg)	64.5 ± 11.3	54.5 ± 8.3	0.001
Systolic blood pressure (mmHg)	122.7 ± 16.5	124.7 ± 22.6	0.527
Dystolic blood pressure (mmHg)	76.2 ± 9.3	76.3 ± 13.3	0.936
Hemoglobin (g/dL)	12.4 ± 1.6	11.2 ± 1.6	0.001
Iron (ug/dL)	95.8 ± 38.6	69.5 ± 32.2	0.001
TIBC (ug/dL)	322.3 ± 71.0	288.3 ± 105.6	0.062
TSAT (%)	33.4 ± 16.6	29.5 ± 13.0	0.361
Ferritin (ng/mL)	185.8 ± 329.0	348.9 ± 385.1	0.033
Blood urea nitrogen (mg/dL)	26.8 ± 21.8	36.3 ± 18.0	0.004
Creatinine (mg/dL)	2.5 ± 4.4	3.8 ± 3.6	0.043
eGFR (mL/min/1.73m^2)	61.4 ± 28.8	36.0 ± 27.2	0.001
Sodium (mEq/L)	139.7 ± 2.6	138.4 ± 3.4	0.022
Potassium (mEq/L)	4.4 ± 0.6	4.5 ± 0.6	0.571
Calcium (mg/dL)	9.5 ± 0.6	8.9 ± 0.8	0.001
Phosphorus (mg/dL)	3.6 ± 1.0	4.1 ± 1.2	0.005
Albumin (g/dL)	4.1 ± 0.3	3.5 ± 0.6	0.001
Total cholesterol (mg/dL)	180.2 ± 38.2	162.2 ± 42.8	0.016
HDL (mg/dL)	54.2 ± 15.1	49.5 ± 21.8	0.203
Low density Lipid (mg/dL)	91.5 ± 28.4	81.2 ± 29.0	0.070
Uric acid (mg/dL)	6.6 ± 1.6	6.9 ± 1.8	0.193
CRP (mg/dL)	0.1 ± 0.1	1.0 ± 1.4	0.001
Level of cyclosporine	95.6 ± 55.4	96.2 ± 57.7	0.965
Level of tacrolimus	5.9 ± 4.0	4.7 ± 1.3	0.248

Tab 2. Comparisons of baseline characteristics of patients according to the presence or absence of CKD

Characteristics	No CKD(n=97)	CKD(n=87)	P value
Sex (male/female)	65/32	50/37	0.182
Immunosuppresive agent (Tacrolimus/Cyclosporin)	19/78	17/70	0.994
Age (years)	49.8 ± 11.2	50.7 ± 11.5	0.609
Duration after kidney transplantation (Mo.)	117.4 ± 63.5	118.5 ± 70.6	0.911
GNRI	108.6 ± 8.8	100.8 ± 10.9	0.001
Blood urea nitrogen (mg/dL)	18.7 ± 5.1	40.7 ± 26.1	0.001
Creatinine (mg/dL)	1.0 ± 0.2	2.8 ± 5.5	0.001
eGFR (mL/min/1.73m^2)	78.6 ± 15.8	28.7 ± 19.1	0.001
Sodium (mEq/L)	140.0 ± 2.6	138.7 ± 3.1	0.003
Potassium (mEq/L)	4.3 ± 0.4	4.6 ± 0.7	0.002
Calcium (mg/dL)	9.5 ± 0.5	9.1 ± 0.8	0.001
Phosphorus (mg/dL)	3.2 ± 0.6	4.3 ± 1.3	0.001
Albumin (g/dL)	4.2 ± 0.3	3.8 ± 0.5	0.001
CRP (mg/dL)	0.1 ± 0.1	0.5 ± 1.0	0.009

51ERA-EDTA
265--MP
N) Renal Transplantation. N2) Clinical epidemiology of renal transplantation.
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DOI: 10.3252/pso.eu.51era.2014
Poster presented at: 51 ERA-EDTA CONGRESS AMSTERDAM THE NETHERLANDS MARCH JUNE 2014