The correlation between Geriatric Nutritional Risk Index and nutritional status in hemodialysis patients

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Introduction

Malnutrition is highly prevalent in maintenance HD patients (Fouque D et al., 2008) and is associated with increasing risk of mortality (Pifer TB et al., 2002).Regular nutritional assessment is recommended for all dialysis patient (Fouque D et al., 2008; Pifer TB et al., 2002; K/DOQI et al.,2000).

Geriatric Nutritional Risk Index (GNRI) was developed as simple method to assess nutritional and reported that GNRI is a useful tool for assessment of nutritional status, not only for elder patients but also for chronic hemodialysis (HD) patients (Yamada et al.,2008).Malnutrition and nutritional management is important for patients on chronic HD.

Objective

Examined whether GNRI could be a useful clinical predictor for nutritional status in chronic hemodialysis patients.

Subjects and Methods

This was a cross-sectional study. Subjects were HD patients with HD duration more than 3 months in Taipei Medical University Hospital and Wan Fang Hospital, Taipei in 2009. 192 subjects were recruited, patients with acute illness, significant infection or malignancy were excluded in this study. GNRI was calculated as [14.89 × albumin (g/dL)]+[41.7 × (body weight/ideal body weight)]. SAS 9.1 was used to perform Spearman rank correlation and simple linear regression to assess correlation between GNRI and subject characteristic, anthropometric data and blood biochemistry data and when $p < 0.05$ was considered as significant.

Results and Discussion

GNRI was significantly negatively correlated with age (r = -0.22, p = 0.0018), preprandial blood glucose (AC-sugar) (r = -0.42, p＜0.0001) and Kt/V (r = -0.27, p = 0.0002). GNRI was significantly positively correlated with body mass index (BMI) (r = 0.49, p ＜ 0.0001), albumin (Alb) (r = 0.83, p ＜0.0001), creatinine (Cr) (r = 0.21, p＜0.05) , total protein (TP) (r = 0.37, p＜0.0001), hemoglobin (Hb) (r = 0.22, p＜0.05), total cholesterol (TC) (r = 0.24, p＜0.05) , and triglyceride (TG) (r = 0.26, p＜0.05)(Table 1).
GNRI was significantly correlated with Cr and total TC. GNRI was significant correlated with Cr (β = 0.6502, r^2 = 0.052, p = 0.0016) and TC (β = 0.055, r^2 = 0.0691, p = 0.0002) (Figure 1 and 2).

The GNRI formula consists of serum albumin, height, and body weight. Therefore, GNRI was correlated to serum albumin and BMI in this study. GNRI can predict nutritional status and previous study showed that lower GNRI was suggested to be a poorer status (Kobayashi et al., 2010). In this study also found GNRI was correlated to nutritional marker, Cr, TP, Hb and TC.

Conclusion

GNRI was significantly negatively correlated to age, AC-sugar and Kt/V. GNRI was significantly positively correlated to BMI, Alb, Cr, TP, Hb, TC and TG. GNRI could be a useful clinical predictor for nutritional status in chronic HD patients.

Table 1. Spearman rank correlation between GNRI and subjects' characteristic, anthropometric data and and blood biochemistry data[1] (n=192)

	Sex	Age (year)	HD duration (year)	BMI	Alb (g/dL)	Cr (mg/dL)	TP (mg/dL)	Hb (g/dL)	TC (mg/dL)	TG (mg/dL)	AC-sugar (mg/dL)	Kt/V
GNRI	0.04	-0.22	-0.12	0.49	0.83	0.21	0.37	0.22	0.24	0.26	-0.42	-0.27
p-value[2]	0.6260	0.0018	0.1097	<0.0001	<0.0001	0.0044	<0.0001	0.0026	0.0009	0.0003	<0.0001	0.0002

[1]Values are correlation coefficients. Alb = albumin, TP = total protein, Cr = creatinine, Hb = hemoglobin, WBC = white blood cell, SBP = systolic blood pressure, DBP = diastolic blood pressure, TC = total cholesterol, TG = triglyceride, AC-sugar = preprandial blood glucose,GNRI=Geriatric Nutrition Risk Index ,HD=Hemodialysis duration.
[2] Statistical analysis by Spearman rank correlation at $p < 0.05$.

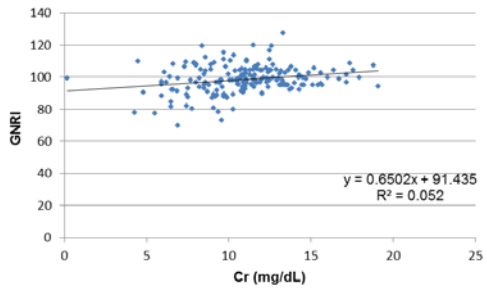

Figure 1. Relationship between GNRI and Cr.

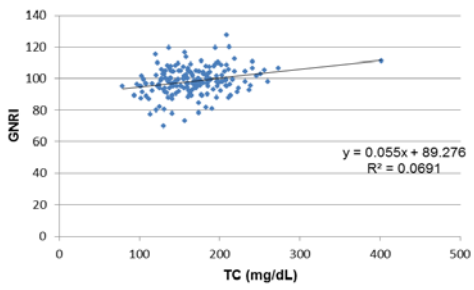

Figure 2. Relationship between GNRI and TC.