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

老人營養風險指標與血液透析患者營養狀態的相關性探討

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Abstract

The purpose of this study is to evaluate whether geriatric nutritional risk index (GNRI) could be a useful clinical predictor for nutritional status in chronic hemodialysis patients. One hundred ninety two hemodialysis patients with hemodialysis duration more than 3 months. 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. The result show that 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) and positively correlated with body mass index (BMI) (r = 0.49, p ＜ 0.0001), albumin (Alb) (r = 0.83, p ＜0.0001), creatinine (r = 0.21, p＜0.05) , total protein (r = 0.37, p＜0.0001), hemoglobin (r = 0.22, p＜0.05), total cholesterol (r = 0.24, p＜0.05), and triglyceride (r = 0.26, p＜0.05). GNRI was significant correlated with creatinine (Cr) (β = 0.6502, r^2 = 0.052, p = 0.0016) and total cholesterol (TC) (β = 0.055, r^2 = 0.0691, p = 0.0002). Conclusion: GNRI might be an indicator of nutritional status in HD patients.

Key words：Hemodialysis, geriatric nutritional risk index (GNRI).

Introduction

- Malnutrition is highly prevalent in chronic HD patients (Fouque *et al*., 2008) and is associated with increasing risk of mortality (Pifer *et al*., 2002).
- Regular nutritional assessment is recommended for all dialysis patient (Fouque *et al*., 2008; Pifer *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 nutrition 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.

Result

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. GNRI=Geriatric Nutrition Risk Index, HD=Hemodialysis duration, BMI = body mass index, Alb = albumin, Cr = creatinine, TP = total protein, Hb = hemoglobin, TC = total cholesterol, TG = triglyceride, AC-sugar = preprandial blood glucose,
[2] Statistical analysis by Spearman rank correlation at $p < 0.05$.

Result

- Subjects' characteristics, anthropometric data and blood biochemical data were collected (Table 1).
- 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) ($r = 0.26$, $p < 0.05$).

Result

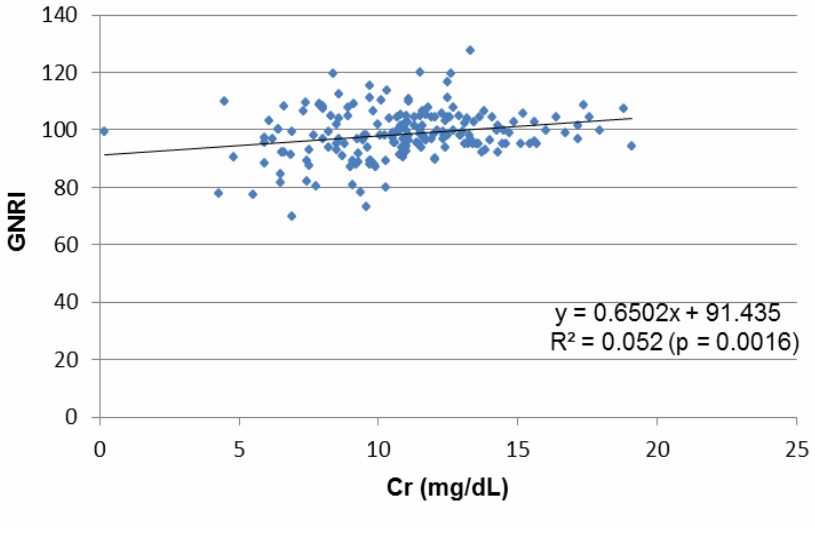

Figure 1. Linear regression between GNRI and Cr. (n = 192)

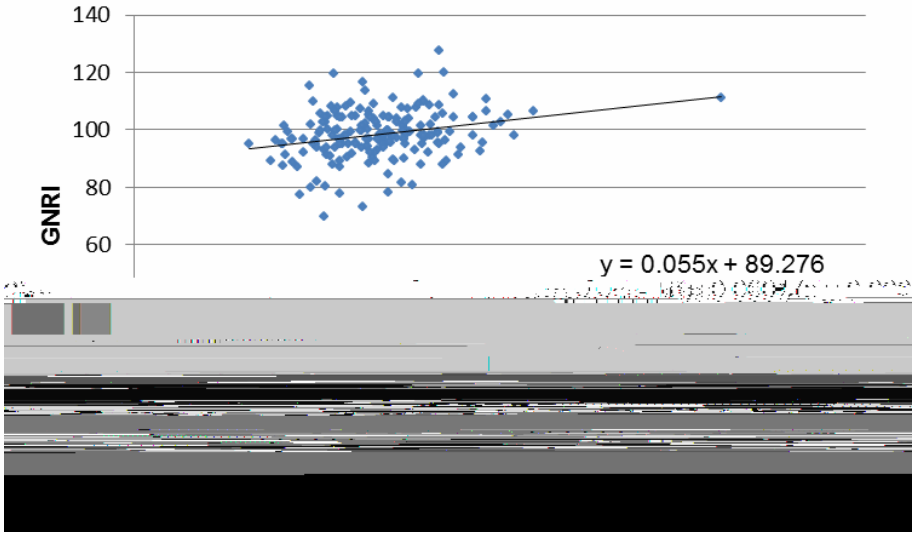

Figure 2. Linear regression between GNRI and TC. (n = 192)

Result

- GNRI was significantly correlated with creatinine (Cr) and total cholesterol (TC).
- GNRI was significant correlated with creatinine (Cr) ($\hat{e}$ = 0.6502, r^2 = 0.052, p = 0.0016) and total cholesterol (TC) ($\hat{e}$ = 0.055, r^2 = 0.0691, p = 0.0002) (Figure 1 & 2).

Conclusion

- GNRI was significantly negatively correlated to age, preprandial blood glucose (AC-sugar) and Kt/V. GNRI was significantly positively correlated to body mass index (BMI), albumin (Alb), creatinine (Cr), total protein (TP), hemoglobin (Hb), total cholesterol (TC) and triglyceride (TG).

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