척수재활

발표일시 및 장소 : 10 월 18 일(금) 14:35-14:45 Room C(5F)

OP3-2-3

Quantitative Evaluation and Clinical Considerations of Renal Function after Spinal Cord Injury

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Introduction

Most SCI patients experience renal function deterioration, which directly affect mortality as well as quality of life. Previous studies utilized technetium-99m Mercaptoacetyltriglycine (Tc-99m MAG3) renal scintigraphy as a sensitive indicator of early renal deterioration in SCI patients. However, considering the expense and complicate procedures of Tc-99m MAG3 renal scintigraphy, its usage is limited for selective SCI patients. Therefore, this study aims to analyze the quantitative correlation between 24-hr urine creatinine clearance (CCr) level and Tc-99m MAG3 renal scintigraphy results and identify clinical considerations in application each laboratory findings for SCI patients.

Methods

The medical charts of 149 SCI patients who were admitted to a tertiary university hospital for rehabilitation treatment from 2016 to 2017 were reviewed. Patients with available records of initial 24-hr urine CCr level, Tc-99m MAG3 renal scintigraphy and body composition were included. Patients who lack any records, or with prior history of kidney disease or any medical conditions which may affect renal function were excluded. Effective renal plasma flow (ERPF) was derived from Tc-99m MAG3 renal scintigraphy, and was revised considering the patient's body surface area (BSA) and age. Percent effective renal plasma flow (% ERPF) was calculated by the ratio of the patient's ERPF and normal expected EFPR value. SCI patient's body composition was assessed by a body composition analyzer (InbodyS10, Biospace, Seoul, Korea). Quantitative correlation between % ERPF and 24-hr urine CCr level were analyzed, and the contribution of age and soft lean mass (SLM) to each values were also studied. Each methods were analyzed with Spearman's rank correlation coefficient using SPSS 23.0.

Results

Total 130 patients were finally enrolled in this study. The 24-hr urine CCr level showed significant correlation with % ERPF ($r=0.298$, $p=0.001$). Each values showed negative correlation with the age of the patient ($r=-0.318$, $p<0.001$ for 24-hr urine CCr level, $r=-0.246$,

p=0.005 for % ERPF). SLM showed significant correlation with 24-hr urine CCr (r=0.235, p=0.004), whereas no correlation with %ERPF. However, 24-hr urine CCr level did not correlate with body weight change of each patient.

Conclusions

As 24-hr urine CCr level correlates with % ERPF significantly, it could be a sensitive indicator of renal function in SCI patients. On the other hand, in the SCI patients with low SLM, Tc-99m MAG3 renal scintigraphy might be more reliable for evaluation of renal function, considering 24-hr urine CCr level can be influenced by patient's muscle mass. Additionally, in older SCI patients who are expected to have more deteriorated renal function and reduced SLM, monitoring of renal function with Tc-99m MAG3 might be more helpful for accurate assess of renal function and improvement of rehabilitative outcome.

Table 1. Demographics and clinical characteristics

Characteristics (%)	N=130
Age (year, range)	50.78±14.91 (18-79)
Male/Female	103/27 (79.2/20.8)
Etiology	
Trauma	106 (60.6)
Vascular	10 (5.7)
Tumor	6 (3.4)
Infection	4 (2.3)
Others	4 (2.3)
Tetraplegia/Paraplegia	94/36 (72.3/27.7)
AIS A/B/C/D	40/15/40/35 (30.8/11.5/30.8/26.9)
Complete/Incomplete	42/88 (32.3/67.7)
Disease duration (day, range)	51.20±42.73 (9-174)
Height (cm, range)	169.07±8.10 (151-186)
Body weight (kg, range)	63.83±10.06 (42.0-95.0)
Body mass index (kg/m^2, range)	22.27±2.75 (15.4-29.5)
Soft lean mass (kg, range)	45.45±7.77 (30.4-66.5)

Values are mean ± standard deviation.

AIS, ASIA Impairment Scale; N, number

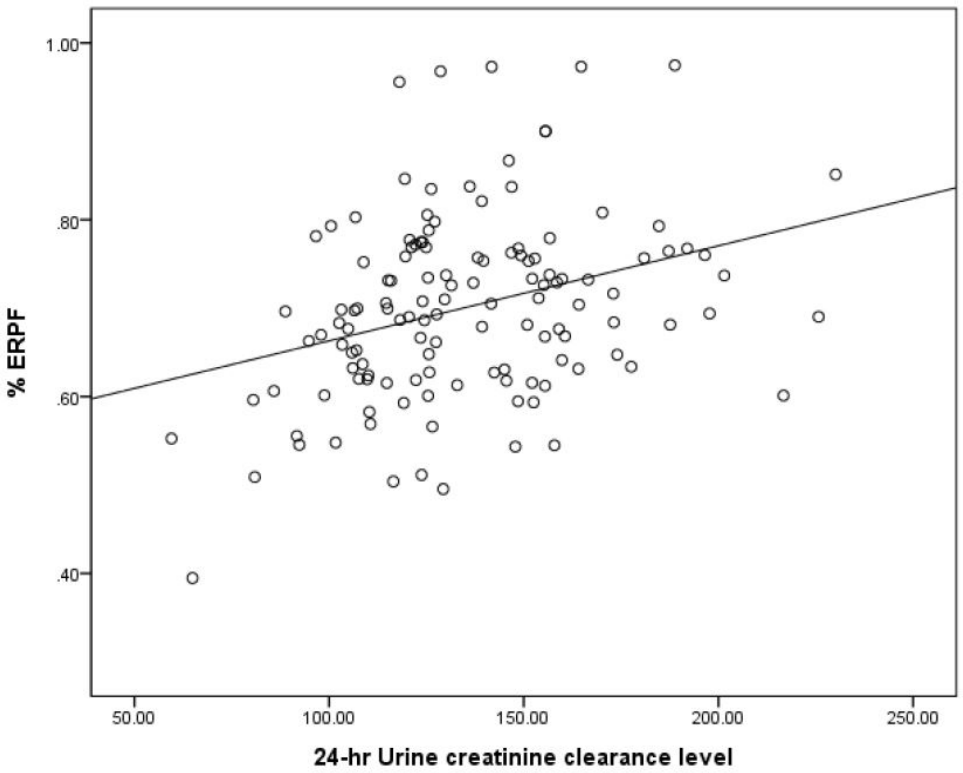

Fig 1. Correlation between 24-hr urine CCr level and % ERPF

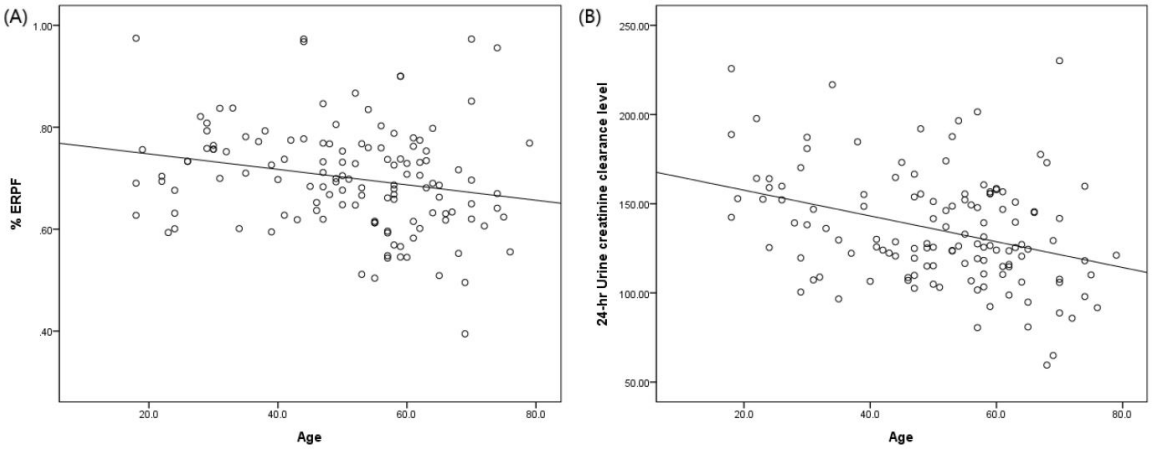

Fig 2. Contribution of age in patient's renal function estimated by (A) correlation between age and % ERPF (B) correlation between age and 24-hr Urine CCr level