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혈액투석환자에서 Onodera 예후영양지표는 사망률의 의미있는 예측인자이다

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김예나, 구상건, 신호식, 정연순, 임학, 임학

Onodera's Prognostic Nutritional Index may be a Significant Predictor of Mortality in Hemodialysis Patients

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Background: Nutritional risk is one of the strongest predictors of morbidity and mortality in maintenance hemodialysis (HD) patients. However, no standard method for assessing the nutritional status in HD patients exists. Onodera's Prognostic Nutritional Index (OPNI) is a method that considers serum albumin level and total lymphocyte count. This simple method may involve common measures and can be applied rapidly in a large number of patients. Validation of OPNI has been performed for patients with end-stage liver disease, active tuberculosis, and gastrointestinal malignancies.

Methods: We examined the OPNI scores of 140 maintenance HD patients (59.8±12.9 years; 64 men and 76 women) and followed these patients for 140 months. The OPNI is calculated based on the serum albumin level and total lymphocyte count and uses the following equation: OPNI=10×serum albumin (g/dL)+0.005×total lymphocyte count (/mL). Predictors of all-cause death were examined using a life table and Cox proportional analyses.

Results: The average OPNI value was 43.8±6.5, and the values were negatively correlated with age. A total of 18 patients died during the 120-month follow-up period. OPNI values were normally distributed. Life table analysis revealed that patients with an OPNI <40 (n=31) had a significantly lower survival rate than those with an OPNI ≥40 (n=109) (Wilcoxon test, p=0.044). Multivariate Cox proportional hazards analyses demonstrated that OPNI was a significant predictor of mortality (hazard ratio [HR], 6.491; 95% confidence interval [CI], 1.985-21.233; p=0.002] even after the adjustment for age, gender, presence of diabetes, and body weight.

Conclusions: These results suggest that OPNI is a significant predictor of mortality in HD patients. The simple OPNI method is a clinically useful marker for the assessment of nutritional status in Korean HD patients.

Key Words: 오노데라 예후 영양인자, 혈액투석, 영양실조, 사망률
OPNI, Hemodialysis, Malnutrition, Mortality

Table 4. Multivariate Cox proportional hazards analysis of mortality

Variable	Unit increase	Hazard ratio (95% CI)	P
Age	vs. < 65 yr	3.161 (0.965-10.353)	0.057
Gender	vs. female	0.662 (0.149-2.942)	0.588
Diabetes	vs. absence	1.321 (0.330-5.285)	0.694
OPNI	vs. ≥ 40	1.338 (1.035-3.965)	0.043
Serum albumin	vs.≥ 3.5 g/dL	8.084 (1.388-47.075)	0.020
PCR	vs.≥ 1.2	0.435 (0.108-1.754)	0.242
Kt/V	vs.≥ 1.2	0.209 (0.033-1.304)	0.094
Total lymphocyte count (low tertile)	vs.≥ 1317 (/mL)	1.789 (0.486-6.582)	0.382

Table 5. Correlation between variable markers and Kt/V or C-reactive protein

Variables	Pearson's correlation coefficient	P value
For Kt/V		
Total lymphocyte count (/mL)	-0.027	0.754
OPNI	0.203	0.016
Serum albumin (g/dL)	0.110	0.194
For CRP		
Total lymphocyte count (/mL)	-0.178	0.058
OPNI	-0.274	0.003
Serum albumin (g/dL)	-0.232	0.013

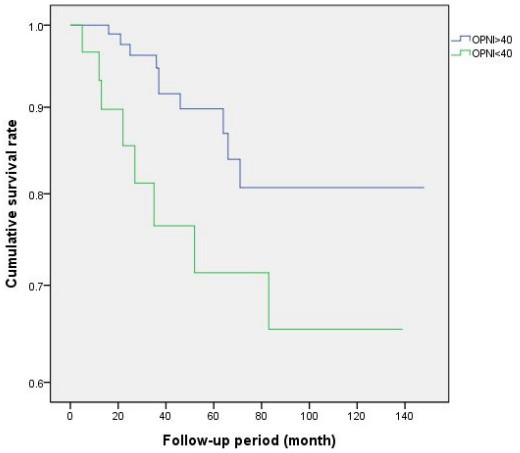

Fig. 1. Onodera's Prognostic Nutritional Index values and 140-month survival of hemodialysis patients