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혈액투석을 시작하는 환자의 사망률을 예측하기 위한 새로운 지표: Charlson comorbidity index와의 비교

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Development and Validation of a Modified Charlson Comorbidity Index to Predict Mortality in Korean Adults Starting on Hemodialysis

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Backgroud: Prediction of survival for patients with end-stage renal disease (ESRD) is difficult because many of them have comorbid conditions related to mortality. The Charlson comorbidity index (CCI) has been used to evaluate the influence of comorbidity on survival in patients with various kinds of diseases and validated in many literatures. The purpose of this study is to adjust the CCI in ESRD population to develop a new scoring system; to validate the new scoring in separate cohort; and to compare its performance with the original CCI.
Method: We used data from the Health Insurance Review & Assessment, a nationwide patient resgistry cohort to identify Korean citizens who received their first hemodialysis (HD) between January 1, 2005 and December 31, 2008 (N=24,738). They were characterized by 15 comorbidities as used in CCI. We used Cox proportional hazard model to assign severity weights to comorbidities. We then computed adjusted hazard ratios and logarithm hazard ratios, that is β coefficients, adjusting for age, sex and all 15 comorbidities simultaneously. Findings were validated in separate cohort (the Clinical Research Center for ESRD in Korea, a nationwide multi-center joint network prospective cohorts of patients with ESRD in Korea designed to improve survival rates and quality of life and to create effective treatment guidelines [clinicaltrial.gov NCT00931970], N=1309). Performance of new scoring system was measured with Harrell's C statistic and the Akaike information criterion (AIC) and results were compared with those obtained using the CCI.
Results: The new scoring system included chronic pulmonary disease (assigned weight, 1), peripheral vascular disease (1), mild and moderate to severe liver disease (2 and 9), connective tissue disease (2), myocardial infarction (2), congestive heart failure (2), diabetes mellitus with and without end-organ damage (4 and 3), hemiplegia (3), cerebrovascular disease (3), dementia (3), non-metastatic solid tumor (with leukemia and lymphoma, 5) and metastatic solid tumor (13). Mortality correlated with the new scoring system (log-rank $p<0.001$). Compared with CCI, the new scoring system showed higher C-statistic (0.658 vs. 0.621, $p=0.0009$) and lower AIC value (adjusted, 834.56 vs. 839.03).
Conclusion: We developed a new scoring system to predict mortality among patients with ESRD based on 15 comorbidities. This system had higher C-statistic and lower AIC values than the CCI. Therefore, It could be preferred method to predict mortality in ESRD population.

Key Words: 사망률, 혈액투석, 말기신부전
Mortality, Hemodialysis, End-stage renal disease