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Individualized Prediction of Mortality Using Multiple Inflammatory Markers in Patients on Dialysis: A Prospective Multicenter Cohort Study

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Objectives : This study aimed to evaluate whether the combination of inflammatory markers captured on routine clinical practice could provide predictive powers for mortality in individual patients on dialysis and develop a predictive model for mortality according to dialysis modality.

Methods : Inflammatory markers were obtained at the time of enrollment from 3,309 patients on dialysis from a prospective multicenter cohort. Net reclassification index (NRI) and integrated discrimination improvement (IDI) were calculated and time-dependent receiver operating characteristic (ROC) curves were constructed. Cox proportional hazards regression analysis was used to derive a prediction model of mortality and the integrated area under the curve (iAUC) was calculated to compare the predictive accuracy of the models.

Results : The incremental combination of albumin, hsCRP, WBC, and ferritin to the conventional risk factors showed the highest predictive powers for all-cause mortality in entire population (NRI, 21.0; IDI, 0.045) and PD patients (NRI, 25.7; IDI, 0.061). The combination of albumin and hsCRP to the conventional risk factors markedly increased predictive powers for all-cause mortality in HD patients (NRI, 19.0; IDI, 0.035). The prediction model for all-cause mortality using conventional risk factors and combination of inflammatory markers with highest NRI value (iAUC, 0.741; 95% CI, 0.722-0.761) was the most accurate in entire population compared with model with conventional risk factors alone (iAUC, 0.719; 95% CI, 0.700-0.738) or model including only significant conventional risk factors and inflammatory markers (iAUC, 0.734; 95% CI, 0.714-0.754). Reconstructed predictive models according to dialysis modality showed consistent results.

Conclusions : Multi-marker approaches using multiple inflammatory markers practically available in clinic can provide higher predictive power for all-cause mortality in dialysis patients. The predictive model for mortality based on combinations of inflammatory markers enables a stratified risk assessment. However, the optimal combination for the predictive model was different in

each dialysis modality.

Keywords : inflammatory marker, mortality, prediction, dialysis