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Pre-hemodialysis blood urea nitrogen to creatine ratio for prediction of mortality in hemodialysis patients

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Objectives: The associatetion between blood urea nitrogen to creatinine ratio (BUN/Cr ratio) and mortality remains undefined.

Methods: Retrospective analysis was performed on data from the End-Stage Renal Disease Registry of the Korean Society of Nephrology. A total of 24,852 patients starting hemodialysis were included from 2004 to 2015. The association between BUN/Cr ratio with overall survival was analyzed using a Cox regression model. Moreover, we compared the renal parameters including BUN/Cr ratio, Kt/V (single pool), pre-hemodialysis and post-hemodialysis BUN level for sensitivity and specificity using receiver operative characteristic (ROC) curve.

Results: During 10-year follow-up period, 9,008 patients died from any cause, and 10-year mortality of hemodialysis patients was 36.2 %. The increase in BUN/Cr ratio was positively associated with an increased risk for all-cause mortality (HR 1.005, 95% CI 1.003–1.007, $p < 0.001$). On the other hand, post-hemodialysis BUN level was not different between survivor and non-survivor group, and did not show any significant relevance for all-cause mortality. Crude AUC of pre-hemodialysis BUN levels was 0.533 (95% CI, 0.526 - 0.540, $p < 0.001$), post- hemodialysis BUN levels was 0.504 (95% CI, 0.497 - 0.511 $p = 0.222$), Kt/V was 0.529 (95% CI ,0.522 - 0.536, $p < 0.001$), and pre-hemodialysis BUN/Cr ratio was 0.558 (95% CI, 0.551 - 0.565, $p < 0.001$). After adustment, AUC of pre-hemodialysis BUN levels was 0.771 (95% CI, 0.726 - 0.815, $p < 0.001$), post- hemodialysis BUN levels was 0.773 (95% CI, 0.729 – 0.816 $p < 0.001$), Kt/V was 0.775 (95% CI ,0.731 - 0.819, $p < 0.001$), pre-hemodialysis BUN/Cr ratio was 0.778 (95% CI, 0.733 - 0.818, $p < 0.001$).

Conclusions: Post-hemodialysis BUN levels is not significant indicator in predicting mortalities in hemodialysis patients. Pre-hemodialysis BUN/Cr ratio is more accurate than Kt/V for prediction of mortality in hemodialysis patients.