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Metabolic Acidosis as a Risk Factor for Mortality in Peritoneal Dialysis Patients

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Background and Aims: Metabolic acidosis is common in end-stage renal disease and associated with increased mortality in hemodialysis patients. However, such relationship has not yet been determined in peritoneal dialysis (PD) patients.

Methods: This prospective observational study included a total of 441 incident patients who started PD at Yonsei University Severance Hospital and NHIS Ilsan hospital from January 2000 to December 2005. Using time-averaged serum bicarbonate levels (TA-Bic), we aimed to investigate whether metabolic acidosis can predict all-cause mortality in these patients.

Results: Among baseline parameters, serum bicarbonate levels exhibited an independent positive association with hemoglobin levels or residual glomerular filtration rates (GFR) and negative association with albumin, triglyceride, and C-reactive protein (CRP) levels in a multivariable linear regression analysis. During a median follow-up of 34.8 months, 149 deaths were recorded. After adjustment for age, diabetes, coronary artery disease, serum albumin, ferritin, CRP, residual GFR, normalized protein catabolic rate, and percentage of lean body mass, TA-Bic levels were associated with a significantly decreased risk of mortality (HR per 1 mEq/L increase, 0.83; 95% CI, 0.76-0.90; $p<0.001$). In addition, compared to patients with TA-Bic levels of 24-26 mEq/L, those with TA-Bic levels <22 and 22-24 mEq/L conferred a 15.86- and 2.08-fold increased risk of death, respectively.

Conclusions: This study showed that metabolic acidosis was an independent risk factor for mortality in PD patients. Such relationship between low bicarbonate levels and adverse outcome could be related to enhanced inflammation associated with metabolic acidosis. Large randomized clinical trials to correct acidosis are warranted to confirm our finding.

Key Words: Metabolic acidosis, Bicarbonate, Mortality, Peritoneal dialysis