

## 혈액투석환자에서 사망률 예측인자로서의 혈청 페리틴의 의의: 말기신부전 임상연구센터 자료

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### Serum Ferritin Levels Predict All-cause Mortality in Incident Hemodialysis Patients: CRC for ESRD Registry Data

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**Background:** Serum ferritin is an acute phase reactant as well as a marker of body iron storage. Increased ferritin levels have been found to be associated with a higher mortality rate in prevalent dialysis patients. Hemodialysis (HD) process causes frequent blood loss through dialysis circuit change. In addition, blood contact with dialyzers is known to produce proinflammatory cytokines which could affect erythropoiesis. Therefore, the characteristics of iron profile are different between incident and prevalent HD patients. However, little is known about the prognostic values of serum ferritin levels on patient outcomes in patients initiating dialysis.

**Methods:** A prospective cohort of incident HD patients from 36 dialysis centers of the Clinical Research Center for ESRD in Korea between August 1, 2009 and December 1, 2013 was used. Serum ferritin levels and biochemical parameters were measured at the time of HD commencement. Study subjects were classified into three groups according to log ferritin levels (group 1,  $\leq 2.16$  ng/mL; group 2, 2.16 to 2.50 ng/mL; group 3,  $> 2.50$  ng/mL). Primary outcome was all-cause mortality.

**Result:** Among the 939 incident HD patients, 573 patients (61.0%) were male and the mean age was  $60 \pm 14$  years (18-94 years). The mean values of log ferritin were as follows; Group 1:  $1.84 \pm 0.27$  ng/mL, Group 2:  $2.32 \pm 0.98$  ng/mL, Group 3:  $2.75 \pm 0.19$  ng/mL. Pearson's correlation analysis showed that log ferritin levels were positively correlated with age ( $r = 0.094$ ,  $p = 0.004$ ), log WBC ( $r = 0.068$ ,  $p = 0.038$ ), log C-reactive protein ( $r = 0.226$ ,  $p < 0.001$ ), while a negative correlation was found with serum albumin ( $r = -0.116$ ,  $p < 0.001$ ). Kaplan-Meier analysis showed that all-cause mortality rates were significantly and gradually increased in higher ferritin groups compared to lower groups (Log-rank test for overall difference,  $p < 0.001$ ). In addition, multivariate Cox proportional hazard analysis demonstrated that high log ferritin levels were inversely associated with patient survival rates after adjustment for confounding variables (hazard ratio=2.44, 95% confidence interval=1.32-4.50,  $p = 0.004$ ).

**Conclusions:** Although serum ferritin showed an association with markers for inflammation and nutrition, it was an independent risk factor of patient mortality even after adjusting for those factors. These findings suggest that baseline serum ferritin might be a prognostic biomarker of patient outcomes in patients initiating HD.

**Key Words:** 페리틴, 사망률, 혈액투석

Ferritin, Mortality, Hemodialysis