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Effects of anemia and ferritin on the all-cause mortality of hemodialysis patients.

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Objectives: Serum ferritin is clinically used as marker of iron storing and systemic inflammation. The result from previous studies that increased ferritin level is associated with all-cause mortality in hemodialysis (HD) patients has emphasized the role of ferritin as an inflammatory marker. We performed present study to evaluate the association of serum ferritin and anemia in HD patients.

Methods: Among 3,376 adult hemodialysis patients from the Clinical Research Center for End-Stage Renal Disease (CRC-ESRD), a total of 2,709 patients who performed serum ferritin more than once during the first year were enrolled. Laboratory findings were obtained within 1 year period after HD commencement. Cardiovascular (CV) death included cardio-cerebrovascular death and sudden death. Multivariate cox analysis was performed.

Results: During 67.5±26.7 months of follow up period, 1004 (37.1%) case of all-cause, 463 (17.1%) cases of CV and 177 (6.5%) cases of infection mortality was occurred. In univariate analysis, anemia (hemoglobin≤10mg/dl) and elevated ferritin (400 ng/mL≤ ferritin) were associated with increased risk of all-cause and cardiovascular mortality. Although infections related mortality was only associated with anemia. With the full adjustment, anemic patients showed increased all-cause mortality and CV mortality. However, elevated ferritin was only associated with all-cause mortality (Table 1). When analyzed in 4 groups by anemia and ferritin level, patients who had anemia and elevated ferritin concurrently had the highest risk of all-cause, CV, and infection-related mortality (Table 2, All-cause mortality: hazard ratio [HR] 2.07, confidential interval [CI] 1.69-2.52, p-value <0.001; CV mortality: HR 2.04, CI 1.53-2.72, p-value <0.001; Infection-related mortality: HR 2.04; CI 1.25-3.32, p-value <0.001).

Conclusions: Anemia and elevated serum ferritin are associated increased risk of all-cause mortality. Although more analysis is needed, considering the higher risk in the elevated ferritin than low ferritin level group, serum ferritin level is thought to be more meaningful as an inflammatory marker than iron storage.