BASAL HEMOGLOBIN PRODUCTION AND REQUIRED DOSE OF ERYTHROPOIESIS-STIMULATING AGENTS IN HEMODIALYSIS PATIENTS WITH ANEMIA

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INTRODUCTION AND AIMS: Anemia is a common comorbidity and is a major cause of morbidity and mortality among hemodialysis (HD) patients and erythropoiesis-stimulating agents (ESA) have been remarkably improving prognosis of HD patients with anemia. Nevertheless, factors related to required dose of ESA for target hemoglobin level in a certain period have been unclear. Red blood cell lifespan is reportedly related to required ESA dose with high correlation; however, measurement of red blood cell lifespan is generally difficult. Newly generated hemoglobin levels, reticulocyte hemoglobin levels, without ESA can be a key factor of ESA efficacy, because high basal level of reticulocyte generation seems quite favorable for anemia control. We aimed to investigate whether basal level of reticulocyte hemoglobin without ESA is related to required ESA dose in HD patients.

METHODS: This study was conducted within the low-dose iron study. Data of one hundred and forty-six patients were used for this analysis as a single arm. Ferritin and transferrin saturation were measured at two-month intervals. Iron was administered for two months according to assignments of low (20mg) or standard (40 mg) intravenous elemental iron per week when HD patients showed iron deficiency (transferrin saturation < 20% and ferritin < 100ng/ml). Hemoglobin and reticulocyte hemoglobin were measured every week and every two months, respectively. Short acting ESA was administrated to obtain a target hemoglobin level of 10-11 g/dL. Basal levels of reticulocyte hemoglobin were measured every week and every two month, respectively. Short acting ESA was administrated to obtain a target hemoglobin level of 10-11 g/dL. Basal levels of reticulocyte hemoglobin without ESA administrated in the previous one week were used as basal reticulocyte hemoglobin.

RESULTS: Mean age and male proportion of the whole subjects were 68.9 ± 11.8 years and 67%, respectively. Mean hemoglobin levels during the evaluation period of 6 months were 10.6 ± 0.5 g/dL and ESA doses were 3676.9 ± 2142.6 IU/week. Mean dose of iron administration per 6 months were 141.1 ± 191.8 mg. Average levels of basal reticulocyte hemoglobin were 98.1 ± 56.8 mg/dL. Basal reticulocyte hemoglobin were closely correlated with required dose of erythropoiesis-stimulating agents (r=0.642, p<0.001). Similarly, the analysis stratified by assignments of the low and standard iron supplementation showed the significant relations between basal reticulocyte hemoglobin levels and ESA dose.

CONCLUSIONS: Basal level of reticulocyte hemoglobin is closely correlated with required dose of erythropoiesis-stimulating agents in hemodialysis patients with anemia.