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혈액투석 환자에서 조혈제 저항성에 대한 위험인자로서 동맥 미세석회화

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Arterial Microcalcification as a Risk Factor for Resistance to Erythropoiesis-stimulating Agents in Hemodialysis Patients

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Objectives: Anemia is a common complication in patients with chronic kidney disease because of their relative erythropoietin deficiency. Despite treatment with erythropoiesis-stimulating agents (ESAs), some patients experienced ESA hyporesponsiveness. The aim of this study was to evaluate the relationship between arterial microcalcification and ESA hyporesponsiveness in hemodialysis patients.

Methods: Sixty-seven hemodialysis patients received with ESAs for anemia without iron deficiency were evaluated. We assessed ESA hyporesponsiveness of patients using ESA hyporesponsiveness index (EHRI), defined as the weekly ESA dose per kilogram of body weight divided by the hemoglobin level. The arterial microcalcification was diagnosed by pathologic examination of arterial specimen by von Kossa stain, which was acquired during the operation.

Results: The patients were divided into tertiles based on the EHRI. The mean EHRI values for each tertiles were 4.1±1.8 (T1), 11.4±3.3 (T2), and 28.6±9.5 (T3). There were no significant differences between 3 groups with respect to all baseline clinical characteristics except for body mass index, including age, sex, cause of chronic kidney disease, and hemodialysis duration. Body mass index was lower in T3 group (21.7±2.8) than in T1 (23.5±2.5) and T2 (24.1±3.1) groups (p=0.031). There were no significant differences in the laboratory characteristics of the 3 groups: transferrin saturation, ferritin, C-reactive protein, albumin, calcium, phosphorus, intact-parathyroid hormone, triglyceride. Total cholesterol levels were lower in T3 group (135.9±27.0) than in T1 (163.0±33.6) and T2 (172.3±45.8) groups (p=0.005). Nine (39.1%) patients in T1 group, 11 (50.0%) patients in T2 group, and 16 (72.7%) patients in T3 group showed arterial microcalcification, respectively (p=0.071). Thus, patients with arterial microcalcification showed a trend in relative resistance to erythropoietin therapy.

Conclusion: Arterial microcalcification may be a clinically relevant parameter related to ESA hyporesponsiveness in hemodialysis patients who have sufficient iron. Further large-scaled studies are needed to validate this relevance more clearly.

Key Words: 동맥 미세석회화, 조혈제 저항성, 혈액투석
Microcalcification, ESA hyporesponsiveness, Hemodialysis