Introduction and Aims: Circulating endothelial progenitor cells (EPCs) are considered to play a pivotal role in repairing endothelial damage in ischemic vascular injuries. The number of EPCs in hemodialysis (HD) patients is known to be decreased than those in healthy subjects and to correlate with cardiovascular events. Erythropoiesis-stimulating agents (ESAs) are used for the treatment of anemia, and also have direct biologic effects on proliferation and differentiation of EPCs. In this study we aimed to investigate the effect of two different types of ESAs, long-acting CERA and short-acting Epoetin-beta (Epo), on the number of circulating EPCs.

Methods: A prospective, single center, study includes 84 patients randomly assigned to CERA or Epo treatment for 6 months. All the patients who participated in this study aged between 20 and 85 years old had been treated anemia with Epo thrice per week at least 6 months. The hemoglobin (Hb) level had been controlled within 11 ± 1.0 g/dL for 3 months. Then, 84 HD patients were randomly divided into 2 groups, treated with CERA (n=42) or Epo (n=42) for 6 months. Hb concentrations were measured twice per month and maintained between 11 ± 1.0 g/dL by changing the amount of both ESA during the study period. CERA was injected once a month. At the initial and 6 months later when CERA was scheduled to inject, blood samples were obtained before starting HD. The number of EPCs was determined as the number of CD34+ cells co-expressing CD45 weakly positive by flow cytometry in peripheral blood.

Results: Baseline patient characteristics including age, sex, duration of HD, percent of diabetic patients, Hb concentration, Epo dose and the number of CD34+ cells were not different between 2 groups. After 6 months Hb concentrations in 2 groups were similar (Epo-treated group 11.3 ± 1.0 g/dL, CERA-treated group 11.1 ± 1.0 g/dL). In Epo-treated group the number of CD34+ cells did not significantly change before and after 6 months (median; 0.21/µL to 0.24/µL, p=0.14). However, in CERA-treated group it increased significantly after 6 months (median; 0.17/µL to 0.46/µL, p=0.008).

Conclusions: A standard treatment with CERA markedly enhances circulating CD34+ cells in HD patients. The use of long-acting CERA might be a better therapeutic approach in HD patients with cardiovascular co-morbidity.