The relationship between erythropoietin and endothelial dysfunction in chronic renal failure on hemodyalisis patients

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Objectives:

Atherosclerotic vascular complications, related with endothelial dysfunctions are the most important reason of mortality in chronic renal deficiency (CRD). There are various studies about the factors effecting endothelial functions in CRD. Recent researches showed that endothelial progenitor cells (EPCs) have an important role to maintain the vascular integrity and circulating endothelial cells (CECs) are good markers to assess endothelial dysfunction.

Aims:

In this study we aimed to examine the potential relationship between erythropoietin; which is frequently used in anemia in hemodyalisis patients and the numbers of CECs and EPCs.

Methods:

The numbers of resting / active CEC's and EPC's (CD34+/CD105-, CD34+/CD105+, CD133+, CD133+/146+ respectively) were measured by flow cytometric (B.D. Facs Calibur) in 55 patient. We investigated the patient's in three groups; those which having EPO therapy at least 3 months and hemoglobin (Hb>11gr/dl) (Group1), not having EPO at least 3 months and Hb>11gr/dl (Group2) and the patients to whom we started EPO therapy(Group3) (Third group were not having EPO at least 3 months but needed EPO therapy since Hb became <11gr/dl). A cohort of 20 healthy volunteers served as control. We mesaured resting / active CEC's and EPC's once in first, second and in healthy group; and three times in the third group (baseline, second week and eighth week)

Results:

No difference in resting / active CECs and EPCs was observed between the three patient groups and we didn't find any difference in circulating endothelial cells when patients compared with healthies. As we look at the third groups results to evaluate the response of EPO therapy by the time; we found an increase in resting / active CECs and a decrease in resting / active EPCs in 8. week when compared with baseline values but it wasn't confirmed statistical significance. Multivariate analysis revealed a positive correlation between high density lipoprotein (HDL) and resting EPC (r= 0.271, P= 0.019) while trygliceride (TG) and CRP were negatively correlated with resting EPCs (r= -0.270, P= 0.019 and r= -0.314, P= 0.006 respectively). Moreover, multivariate analysis showed that lower serum albumin was predictive of lower numbers of active EPCs (P=0.003).

Conclusions:

We found no significant association between the number of CECs / EPCs and therapeutic doses of EPO. Potential relationship can be revealed when used high doses of EPO or different techniques to evaluate CECs / EPCs. High TG and CRP levels and low HDL and albumin were predictive for decreased numbers of circulating EPCs.

References:

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