Resistance to erythropoiesis-stimulating agents is associated with arterial micro-calcification in early hemodialysis patients

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OBJECTIVES

Vascular calcification, which is independent risk factor of cardiovascular mortality, and anemia are very common in hemodialysis (HD) patients. Some uremic milieu such as inflammation, oxidative stress, and mineral bone disturbance may contribute to these conditions.
The aim of this study was to evaluate the relationship between arterial micro-calcification (AMC) and ESA hypo-responsiveness in hemodialysis (HD) patients.

METHODS

89 patients who received vascular access surgery between September 2010 and November 2012 in Uijeongbu St. Mary's Hospital
- They just started HD or prepared to start HD.

We included patients who received ESAs for more than 3 months.
The followings were excluded.
(1) Overt inflammation at the time of evaluation
(2) Other malignant diseases
(3) Recent blood transfusion
(4) Iron deficiency (serum ferritin level of < 200 ng/mL or transferrin saturation (TSAT) < 20%)

Finally, 82 patients were included in this study.

METHODS

<ESA hyporesponsiveness>
The ESAs darbepoetin or epoetin were administered subcutaneously at the end of dialysis.
- Target hemoglobin level : 11 g/dL
- Initial epoetin dose : 60–120 IU/kg per week in two to three doses per week
- Darbepoetin dose : 0.45 μg/kg per week given once a week
- A ratio of 1:200 was used to convert darbepoetin to the equivalent epoetin dose.
- ESA doses were recorded over 3 months from 1 month before vascular access surgery, and the mean values were used in this study.

ESA hyporesponsiveness index (EHRI)
- Weekly ESA dose per kilogram of body weight divided by the hemoglobin level (g/dL)
- Thus, higher EHRI values mean a reduced response to ESAs.

RESULTS

AMiC was detected in 33 (40.2%) of 82 patients. Patients with diabetes had a higher incidence of AMiC than patients without diabetes. The serum levels of albumin and cholesterol were higher in patients without AMiC than in patients with AMiC. The serum levels of intact parathyroid hormone were lower in patients with AMiC than in patients without AMiC. The serum levels of phosphate and calcium–phosphorus product did not differ between the two groups.
The mean EHRI value was higher in patients with AMiC than in patients without AMiC. In multivariate analyses, ESA hyporesponsiveness and diabetes showed a significant association with AMiC.

TABLE 5: Multivariate logistic regression analysis of arterial micro-calcification[1].

Parameters	Beta	Odds ratio	95% CI		P value
			Lower	Upper	
iPTH	-0.004	0.996	0.992	1.001	0.115
Diabetes	2.489	12.044	3.508	41.350	**0.001**
EHRI (T3)	1.479	4.390	1.053	18.306	**0.038**

[1]The reference category is AMiC-negative groups.

CONCLUSIONS

Vascular calcification in patients with CKD is a significant problem and is associated with cardiovascular mortality.
Therefore, investigation of factors related to vascular calcification is important.
We found that in addition to the previously well-known risk factors of abnormal mineral metabolism and diabetes, resistance to ESAs may be associated with vascular calcification in patients with CKD.

REFERENCES

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51ERA-EDTA
499--MP
M) Dialysis. M5) Anaemia in CKD 5D.
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DOI: 10.3252/pso.eu.51era.2014
Poster presented at: 51 ERA-EDTA CONGRESS AMSTERDAM 2014