THE EFFECT OF ANTI OXIDANT VITAMIN SUPPLEMENTATION ON ARTERIAL STIFFNESS IN HEMODIALYSIS PATIENTS

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Introduction

Various pathological processes such as endothelial dysfunction, oxidative stress, low grade chronic inflammation, neurohormonal changes and vascular calcification and arterial stiffness (AS) which account for the structural and functional cardiac changes predispose to excess morbidity and mortality in dialysis patients. The antioxidant treatments can reduce both the oxidative stress and the cardiovascular events in dialysis patients. At high concentrations ascorbic acid scavengers free fadicals at aqeous phase and can inhibit lipid peroxidation by showing synergistic effect with alpha-tocopherol. The effects of vitamin C and/or E usages on AS in healthy individuals, post-menopausal women and patients with essential hypertension or type 2 diabetes mellitus were investigated, but not in patients on dialysis. This study aimed to investigate the effect of the vitamin E and C supplementation on AS in chronic hemodialysis patients.

Materials and Methods

37 dialysis patients whose have not coronary artery disease and 24 healthy persons whose coronary angiography has been carried out and whose narrowness and plaque have not been detected have been included in the study. While 22 dialysis patients were taking 300 mg/day orally vitamin E for 3 months and then, intravenous vitamin C (250 or 500 mg thrice weekly after dialysis) for 2 months together, 15 of them followed up without any vitamin supplementation. Before the treatment and after 5th month, the body weight, the body mass index, systolic and diastolic blood pressures were measured. Besides all patients underwent pulse wave analysis (HDI/Pulse Wave model CR-2000) to determine large (C1) and small (C2) vessel compliances.

Results

The gender distribution, blood pressures and C1 measurements (14.4±7.2 vs 12.7±5.8, respectively) of the control and dialysis groups were similar. The mean age (49±10 vs 42±12 year), body mass indices, pulse pressures, cardiac output and C2 measurements (9.1±3.5 vs 3.5±2.4) in the control group were higher than those of all dialysis patients, and heart rate and systemic vascular resistance were lower. After the treatment, only systolic and diastolic blood pressures significantly decreased in the dialysis vitamin group. In both dialysis groups, other measured parameters did not change when compared to the baseline values.

The ages, gender, body mass indices and dialysis durations of both dialysis group were comparable. There was also no difference between the baseline and post-treatment measurements of the dialysis groups who receive or not vitamin E and C supplementation (Table 1). Additionally, the subgroup analysis did not reveal any significant difference in these parameters between the dialysis patients taking 250 (n: 12) or 500 mg (n: 10) vitamin C.

Table 1. The comparison of cardiac measurements of the groups

Variables	HD control group (n: 15)		HD vitamin group (n: 22)	
	Baseline	Post-treatment	Baseline	Post-treatment
Systolic PB, mmHg	120 ± 18	124 ± 29	128 ± 25	119 ± 24*
Diastolic PB, mmHg	75 ± 11	75 ± 15	80 ± 17	73 ± 13*
Pulse pressure	45 ± 10	48 ± 18	48 ± 12	46 ± 14
Heart rate, beat/min	82 ± 9	86 ± 10	79 ± 12	84 ± 16
Cardiac output, L/min	4.2 ± 0.6	4.5 ± 0.8	4.2 ± 0.7	4.3 ± 1.0
C1, mL/mmHgx0	12.3 ± 5.6	11.8 ± 3.8	12.1 ± 6.1	11.2 ± 4.9
C2, mL/mmHgx100	3.3 ± 1.3	3.8 ± 1.4	3.6 ± 2.9	3.6 ± 1.5
SVR, dyne.sn.cm-5	1834 ± 442	1538 ± 389	1884 ± 611	1905 ± 1161
TVI, dyne.sn.cm-5	124 ± 30	133 ± 42	142 ± 45	159 ± 77

* p<0.05 vs. baseline values of the same group

Conclusion

The indirect measurement of cardiac performance and arterial elasticity index in hemodialysis patients has deteriorated when compared to the healthy population. Short-term antioxidant vitamin supplementation did not affect these parameters. As a result, the effectiveness of antioxidant vitamins on AS in dialysis patients should be examined in more long-term research.

DOI: 10.3252/pso.eu.54ERA.2017