

The Influence of High Selenium Doses Supplementation on Markers of Nutritional Status



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Background

Plasmatic level of selenium marked decreases in patients with SIRS and/or sepsis. The usual doses of selenium (30 - 75 ug daily) does not sufficient for retention of adequate plasmatic level. The high doses of selenium (Se) – 500 - 1000 ug Se daily may improve the conditions of ICU patients by influence of antioxidative protection and could have a positive effect on the survival of some patients.

Aim

To assess the effect of high doses of Se on selected parameters of nutrition status.

Methods

Type of study: A prospective, open label, randomized one centre trial.

Patients: 102 ICU patients with SIRS and/or sepsis were divided into two groups. In addition to the elemental replacement, the study group (Se +, 52 patients) received the high selenium doses in the form of Na-selenite (1000 µg at the first day, 500 µg/day on the subsequent days), it was administered by way of 30 minutes infusion daily for 7-14 days according to the lenght of their stay in ICU. A standard substitution of selenium using parenteral nutrition on average 30-75 µg/day (0.38-0.95 µmol/day) took place during hospital stay in the control group (Se- 50 patients).

Laboratory tests were performed on the day 0, before the first dose of Na-selenite and on the 1st, 3rd, 5th, 7th, 10th and 14th day of hospital stay. These dates were assigned an APACHE and SOFA value.

Laboratory analysis: All routine biochemical parameters as albumine, prealbumine, CRP, cholesterol, were determined with standard clinical-chemistry methods recommended by the IFCC. PCT was measured by enzyme-linked immunosorbent assay Vidas Brahms, selenium by atomic absorption spectrometry with electrothermic atomisation (AAS).

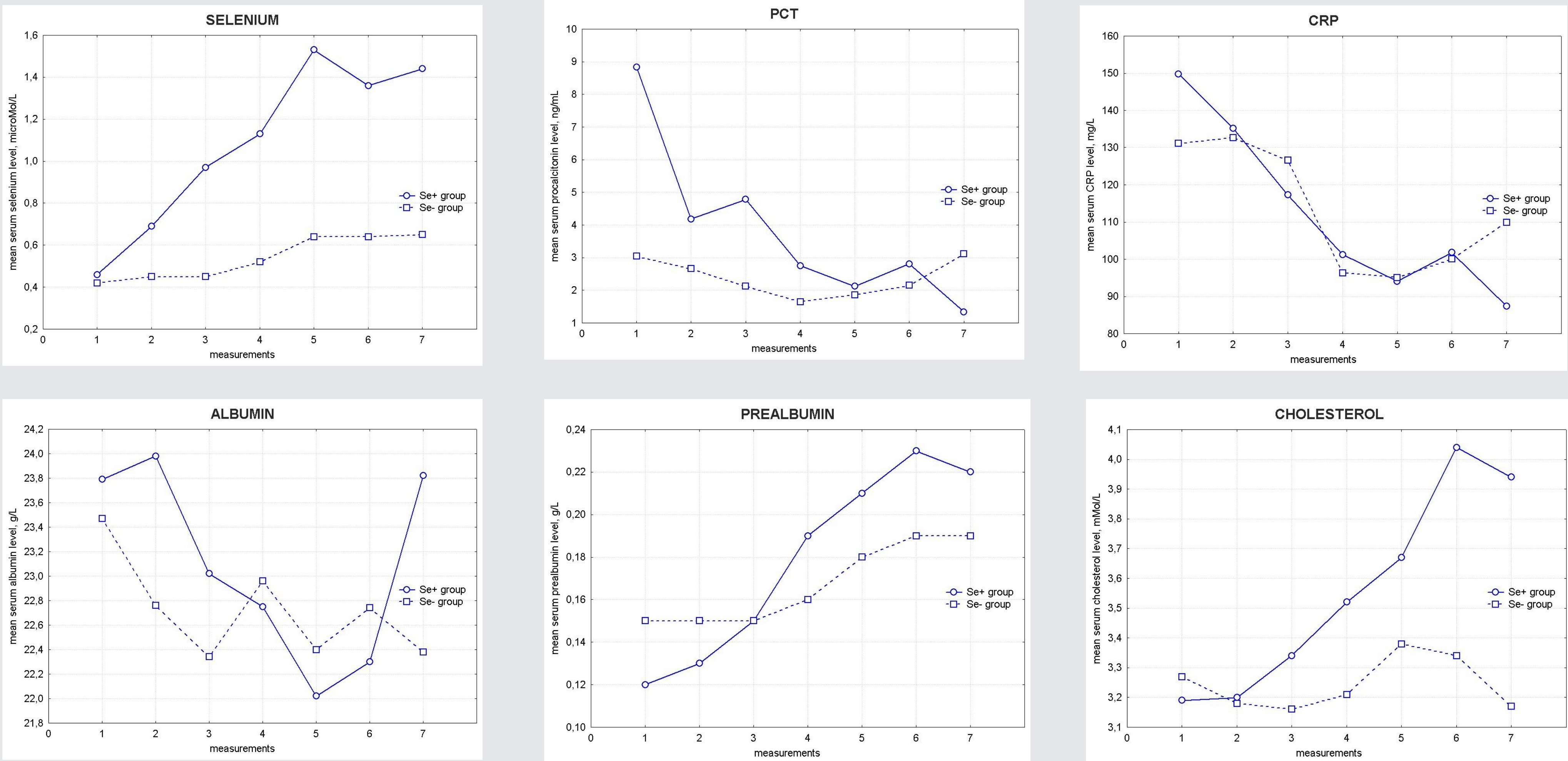
Statistical analysis was performed using the online statistical software VassarStats (Vassar College, NY, USA) and STATISTICA data analysis software system version 9.0 (StatSoft, Inc., OK, USA).

Results

	Se+ group median (IQR)	Se- group median (IQR)	p-value Mann-Whitney U-test
APACHE	30.5 (25;37)	26 (20;39)	0.066, NS
SOFA	12 (10;14)	11 (8;14)	0.345, NS
PCT	1.65 (0.50;4.40)	0.67 (0.40;2.46)	0.108, NS
CRP	132 (69;218)	103 (44;188)	0.248, NS
ALB	23.5 (21;27)	23 (20;26)	0.497, NS
PREALB	0.10 (0.08;0.16)	0.13 (0.09;0.18)	0.397, NS
CHOL	2.88 (2.30;3.60)	3.05 (2.40;3.70)	0.291, NS

FIGURE 1A-F

Mean serum levels of measured parameters in patients followed for full time (two weeks)



Se+ (n=21), Se- (n=19)

TABLE 2

The difference between initial and final (7 days) values of measured parameters in both groups

In patients in Se+ group are statistically significant differences in the level of PCT, CRP, prealbumine and cholesterol, un Se-group only in the level of CRP.

The lacking changes in the level of albumine in both groups of patients might be because of its long biological half-time.

TABLE 1

Initial values of measured parameters in both groups

There are no significant differences in selected parameters between both groups.

		Initial value median (IQR)	Final value median (IQR)	p-value Mann-Whitney U-test
SOFA	Se+ group	12 (10;14)	10 (6;14)	0.017
	Se- group	11 (8;14)	8 (4;11)	0.002
PCT	Se+ group	1.65 (0.50;4.40)	0.75 (0.25;2.40)	0.003
	Se- group	0.67 (0.40;2.46)	0.50 (0.20;1.10)	0.06, NS
CRP	Se+ group	132 (69;218)	71.5 (39.5;133)	< 0.001
	Se- group	103 (44;188)	87 (34;152)	0.001
ALBUMIN	Se+ group	23.5 (21;27)	23 (21;25)	0.124, NS
	Se- group	23 (20;26)	22 (21;25)	0.395, NS
PREALBUMIN	Se+ group	0.10 (0.08;0.16)	0.20 (0.14;0.27)	0.032
	Se- group	0.13 (0.09;0.18)	0.17 (0.13;0.24)	0.071, NS
CHOLESTEROL	Se+ group	2.88 (2.30;3.60)	3.50 (2.60;4.30)	0.041
	Se- group	3.05 (2.40;3.70)	3.10 (2.60;4.00)	0.210, NS

Conclusions

Supplementation with high doses of selenium may improve even selected parameters of nutrition and inflammation in ICU patients.

References: 1. Forceville X (2007) Effects of high doses of selenium as sodium selenite in septic shock patients: a placebo controlled, randomized, double blind, multi-center phase II study – selenium and sepsis. J Trace Elem 21, S1:62-65 2. MishraV, Baines M, Perry SE, McLaughlin PJ, Carson J, Wenstone R, Shenkin A (2007) Effect of selenium supplementation on biochemical markers and outcome in critically ill patients. Clin Nutrition 26:41-50