Abstract


Quantitative data on the magnitude of the systemic inflammatory response and its effect on micronutrient status based on plasma measurements.

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BACKGROUND: Plasma concentrations of several trace elements and vitamins decrease because of the systemic inflammatory response. Thus, low values do not necessarily indicate deficiency.

OBJECTIVE: The magnitude of this effect on plasma micronutrient concentrations was investigated to provide guidance on the interpretation of routine clinical results.

DESIGN: Between 2001 and 2011, the results (2217 blood samples from 1303 patients) of routine micronutrient screens (plasma zinc, copper, selenium, and vitamins A, B-6, C, and E) and all vitamin D results (4327 blood samples from 3677 patients) were extracted from the laboratory database. C-reactive protein concentrations were measured as a marker of the severity of inflammation and categorized into 6 groups; for each group, plasma micronutrient concentrations and percentage changes were calculated.

RESULTS: Except for copper and vitamin E, all plasma micronutrient concentrations decreased with increasing severities of the acute inflammatory response. For selenium and vitamins B-6 and C, this occurred with only slightly increased C-reactive protein concentrations of 5 to 10 mg/L. For each micronutrient, the change in plasma concentrations varied markedly from patient to patient. The magnitude of the effect was greatest for selenium and vitamins A, B-6, C, and D, for which the median plasma concentrations decreased by >40%.

CONCLUSIONS: The clinical interpretation of plasma micronutrients can be made only with knowledge of the degree of inflammatory response. A reliable clinical interpretation can be made only if the C-reactive protein is <20 mg/L (plasma zinc), <10 mg/L (plasma selenium and vitamins A and D), or <5 mg/L (vitamins B-6 and C).

PMID: 22158726