

Abstract

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

Duncan A, Talwar D, McMillan DC, Stefanowicz F, O'Reilly DS.

Scottish Trace Elements and Micronutrient Reference Laboratory, Department of Clinical Biochemistry and the Department of Surgery, Faculty of Medicine, University of Glasgow, Royal Infirmary, Glasgow, United Kingdom.

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).

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