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ORIGINAL PAPER

Circulating trace element status in vitamin B_{12} deficiency: antioxidant properties

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Abstract

It is known that vitamin B_{12} and certain trace elements possess antioxidant properties; however, the mechanisms underlying relationships between vitamin B_{12} and trace elements have not been fully elucidated. The aim of this study was to evaluate the relationship between serum levels of vitamin B_{12}, selenium (Se), cobalt (Co), copper (Cu), zinc (Zn), iron (Fe), and manganese (Mn) in patients with vitamin B_{12} deficiency compared to healthy controls. The study included a total of 50 patients with vitamin B_{12} deficiency and 40 healthy controls. Serum levels of Se, Co, Cu, Zn, Fe, and Mn were measured using inductively coupled plasma optical emission spectrometry (ICP-OES), while biochemical parameters were assessed using an automated analyzer. Statistical analysis was conducted with SPSS 21.0 statistical software (SPSS, Chicago, IL, USA), with a P-value of <0.05 considered statistically significant. Serum levels of vitamin B_{12}, Zn, Mn, Co, Fe, and iron binding capacity were significantly lower in the vitamin B_{12} deficiency group compared to controls. Positive correlations were observed between vitamin B_{12} and Se, Fe and mean corpuscular volume (MCV), Fe and ferritin, Zn and Cu, and Zn and Se. Conversely, negative correlations were found between vitamin B_{12} and Fe, Se, and Mn in the vitamin B_{12} deficiency group. Our data suggest that the interactions among circulating Zn, Mn, Co, Fe, and vitamin B_{12} are significant in the oxidant/antioxidant balance, and may play a crucial role in the antioxidant properties observed in patients with vitamin B_{12} deficiency.

Keywords: vitamin B_{12}, deficiency, trace elements, antioxidant properties

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