

Abstract

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Functional cobalamin (vitamin B12) deficiency: role of advanced age and disorders associated with increased oxidative stress.

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BACKGROUND/OBJECTIVE: Functional cobalamin (Cbl; vitamin B12) deficiency (that is, high levels of the Cbl-dependent metabolites, methylmalonic acid (MMA) and homocysteine (HCys), despite normal serum Cbl values) is common in the elderly and is associated with neurocognitive abnormalities, but its cause is unknown. As only reduced Cbls are metabolically active, the possibility that functional Cbl deficiency is associated with disorders having biomarkers indicative of increased oxidative stress (oxidant risks) was considered.

SUBJECTS/METHODS: A retrospective record review of community-dwelling adults evaluated over a 12-year period for Cbl deficiency in a primary care setting who had serum Cbl values >400 pg/ml (n=170).

RESULTS: When no oxidant risks were present, older subjects (>70 years) had higher metabolite values than younger individuals (<70 years). MMA values were even higher in the elderly when one oxidant risk was present and in younger subjects when two or more oxidant risks were present. Even at Cbl levels >800 pg/ml, MMA values were increased in 73% of elderly subjects with at least one oxidant risk. HCys values were also higher in both age groups when at least two oxidant risks were present. Cyanocobalamin therapy decreased MMA and HCys values in 86 and 76% of subjects, respectively, with nonresponders more likely to have two or more oxidant risks.

CONCLUSION: Functional Cbl deficiency is associated with disorders marked by increased oxidative stress particularly in the elderly; it occurs even when Cbl levels are high and is not consistently corrected with high-dose cyanocobalamin therapy. Thus, current approaches to recognizing and managing this disorder may be inadequate.

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