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Diagnosis of vitamin B12 deficiency in patients with myeloproliferative disorders

Demet Cekdemir
Anadolu Medical Center, Turkey

Background & Aim: Myeloproliferative disorders are characterized by proliferation of 1 or more lineage of hematologic cells. Rapid proliferation of cells may lead to depletion of vitamin B12, which may be falsely elevated by conventional assays in these disorders. We evaluated vitamin B12 status with conventional vitamin B12 assay and levels of serum methylmalonic acid (MMA), serum holotranscobalamin (holoTC) and plasma homocysteine in myeloproliferative disorders.

Methods: In 58 patients who had myeloproliferative disorders and normal serum creatinine levels, we measured levels of vitamin B12, MMA, holoTC and homocysteine. Correlations were evaluated between these tests with MMA as the reference standard for vitamin B12 deficiency.

Results: Prevalence of vitamin B12 deficiency was 69%, despite high serum vitamin B12 levels. Levels of holoTC of 40.6 pmol/L or less and homocysteine of greater than 14 mol/L were the best cutoff levels with sensitivity values of 75% and 70%, specificity values of 80% and 68% and positive predictive values of 88% and 80%. Logistic regression showed that cutoff values of holoTC of 40.6 pmol/L or less and homocysteine of greater than 14 mol/L resulted in odds ratio 15.5 for low versus high holoTC and odds ratio 5.4 for high versus low homocysteine to confirm vitamin B12 deficiency.

Conclusions: Patients who had myeloproliferative disorders had a high prevalence of vitamin B12 deficiency, despite high serum vitamin B12 levels. Therefore, vitamin B12 status should be evaluated in patients with myeloproliferative disorders. Holotranscobalamin level may be the best initial test and may replace vitamin B12 assay to accompany MMA and homocysteine levels

demetcekdemir@yahoo.com.tr