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Vitamin B12 deficiency in Metformin-treated type 2 diabetes patients, prevalence and association with peripheral neuropathy

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Context: The association between long-term metformin use and low vitamin B12 levels has been proven. However, the prevalence estimates of metformin-induced vitamin B12 deficiency showed considerable variation among the studies and have not been studied in African settings. The potential of the deficiency to cause or worsen peripheral neuropathy in T2DM patients has been investigated with conflicting results.

Objectives: The main objectives were to determine the prevalence of vitamin B12 deficiency among metformin users and to examine the association between the vitamin status and neuropathy in those patients. The secondary objective was to investigate the risk factors for vitamin B12 deficiency.

Research Design & Methods: In this cross-sectional study, consecutive T2DM patients on long-term metformin attending the diabetes clinics in two public hospitals in Pretoria, South Africa, were approached for participation. Serum vitamin B12 levels were measured and neuropathy was assessed using the Neuropathy Total Symptom Score-6 (NTSS-6) questionnaire. Records were used to obtain other data. Vitamin B12 deficiency was defined by levels <150 pmol/L. Those with NTSS-6 scores >6 were considered to have neuropathy. The percentage of vitamin B12-deficient patients was determined. The relationship between vitamin B12 and neuropathy was investigated by using Chi-square test and Spearman's correlation coefficient (rho) when the two variables were in the binary and continuous forms, respectively. Stepwise multiple logistic regression was used to determine the risk factors for vitamin B12 deficiency.

Results: Among 121 patients, the prevalence of vitamin B12 deficiency was 28.1%. There was no difference in presence of neuropathy between those with normal and deficient vitamin B12 levels (36.8% vs. 32.4%, P = 0.209). The level of vitamin B12 and the NTSS-6 scores were not correlated (rho = 0.056, P = 0.54). Stepwise multivariable logistic regression analysis showed that metformin dose (gram) (OR = 1.96, P = 0.053), HbA1c (OR = 0.71, P = 0.003) and black South African race (OR = 0.34, P = 0.033) were the only risk factors significantly associated with vitamin B12 deficiency.

Conclusions: Close to third of metformin-treated T2DM patients had vitamin B12 deficiency. The deficiency was, however, not associated with peripheral neuropathy. Black South African race was a protective factor for vitamin B12 deficiency.

Biography

Marwan Ahmed has recently completed his Master's in Pharmacology from the University of Pretoria, South Africa. He also holds Diploma in Pharmacology (University of North West, South Africa, 2011), Post-graduate Diploma in Research Methodology and Biostatistics (University of Medical Sciences and Technology, Sudan, 2007) and Bachelor of Pharmacy (University of Sanaa, Yemen, 2003).

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