

STUDY OF SERUM VITAMIN B 12 IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Introduction

Nearly 90% of all cases of diabetes mellitus (DM) are of type 2 diabetes (T2DM), which is the most prevalent type. Hyperglycemia, which commonly results from insufficient insulin production on the backdrop of insulin resistance, is a hallmark of T2DM.

Alterations in cellular homeostasis brought on by persistent hyperglycemia in diabetes mellitus (DM) result in diffuse vascular damage and the emergence of long-term micro - and macrovascular complications. Damage to small blood arteries causes microvascular complications, such as diabetic neuropathy (DN), diabetic retinopathy, and diabetic kidney disease (DKD).

Over the years, metformin has been regarded as the best and initial therapeutic option for the management of type 2 diabetes. Vitamin B12 deficiency is one of the known potential adverse effects of long-term metformin use.

Aim of the work

The aim of the study was to:

1. Assess the levels of serum vitamin B12 in patients with type 2 diabetes.
2. Study the relation between serum vitamin B12 and metformin usage index in patients with type 2 diabetes.
3. Study the relation between serum vitamin B12 and peripheral neuropathy in patients with type 2 diabetes.
4. Study the relation of vitamin B12 supplementations intake with serum vitamin B12 and peripheral neuropathy in patients with type 2 diabetes on metformin.

Subjects and Methods

This study was conducted on 200 subjects divided into three groups: Group included 100 patients with type 2 diabetes treated with metformin for at least 12 months, divided into 2 subgroups: 50 patients with type 2 diabetes treated with metformin for at least 12 months without vitamin B12 supplementation and 50 patients with type 2 diabetes treated with metformin for at least 12 months, on vitamin B12 supplementation. Group 2 consist of 50 patients with type 2 diabetes not receiving metformin. And finally 50 healthy subjects of matched age and sex as a control group.

After giving their signed informed consents, all participants underwent: full history taking, physical examination (including peripheral neuropathy assesment), laboratory assessment [complete blood count, glycated haemoglobin (HbA1c) and serum vitamin b 12).

Results

Table 1: Correlation between Serum vitamin B12 and Metformin usage index in group 1a and group 1b

	Serum vitamin B12					
	Total (n=100)		Group 1a (n=50)		Group 1b (n=50)	
	r _s	p	r _s	p	r _s	p
Metformin usage index	-0.596*	<0.001*	-0.806*	<0.001*	-0.455*	0.001*

r_s: Spearman coefficient

Group 1a: On metformin without vitamin b12

*: Statistically significant at p ≤ 0.05

Group 1b: On metformin and vitamin b 12

Table 2: Comparison between the different studied groups according to Serum vitamin B12

Serum B12 (pg/ml)	Group 1 (n=100)		Group 2 (n=50)	Group 3 (n=50)	H	p	
	Group 1a (n=50)	Group 1b (n=50)					
Min. – Max.	67.0 – 791.0	70.0 – 1143.0	150.0 – 830.0	126.0–1060.0	49.704*	<0.001*	
Mean ± SD.	323.56 ± 189.63	386.80 ± 240.87	547.56 ± 170.28	581.42 ± 179.40			
Median (IQR)	271.5 (188–415)	331 (182–501)	580 (440–662)	588 (480–689)			
p ₀	<0.001*	<0.001*	0.556				
Sig. bet. Grps	p ₁ =0.212, p ₂ <0.001*, p ₃ <0.001*						

IQR: Inter quartile range

SD: Standard deviation

H: H for Kruskal Wallis test, Pairwise comparison bet. each 2 groups was done using Post Hoc Test

(Dunn's for multiple comparisons test)

p: p value for comparing between the different studied groups

p₀: p value for comparing between Group 3 and each other group

p₁: p value for comparing between Group 1a and Group 1b

p₂: p value for comparing between Group 1a and Group 2

p₃: p value for comparing between Group 1b and Group 2

*: Statistically significant at p ≤ 0.05

Group 1a: On metformin without vitamin b12

Group 2: Not receiving metformin

Group 1b: On metformin and vitamin b 12

Group 3: Healthy subjects

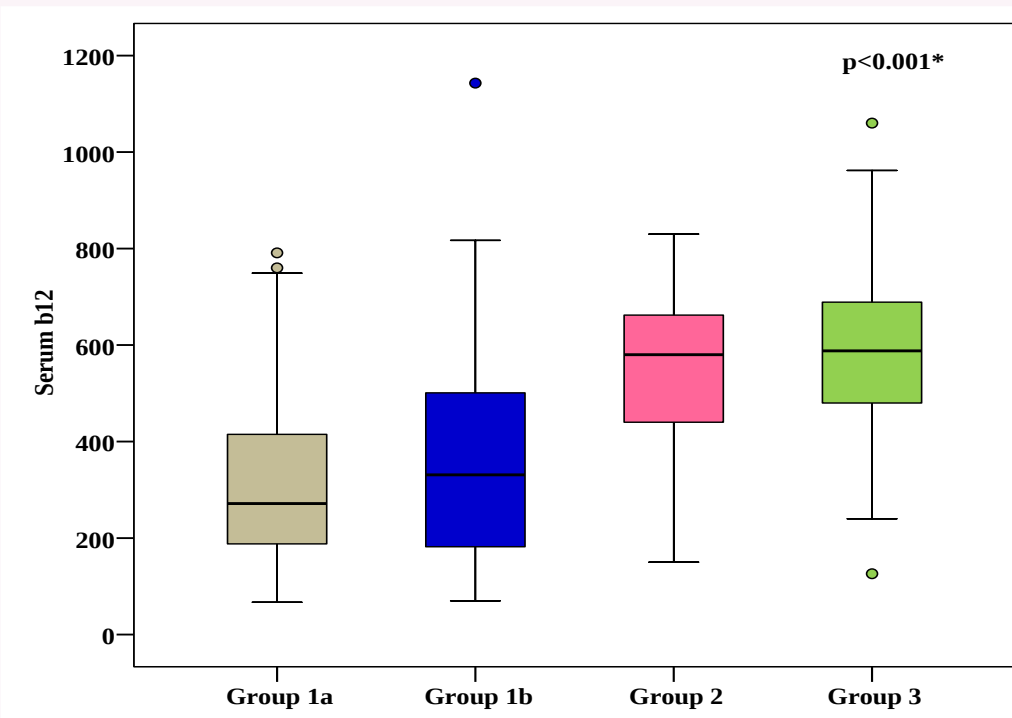


Figure: Comparison between the different studied groups according to serum vitamin B12

Conclusion

From the results of the present study, the following can be concluded: Patients with T2DM who are on metformin have significantly lower serum vitamin b 12 compared to T2DM patients who are not on metformin. Metformin usage index is significantly negatively correlated with serum vitamin b 12. T2DM patients with lower serum vitamin b 12 have significant peripheral neuropathy. The mean serum vitamin b 12 was higher in T2DM patients who are on metformin and vitamin b12 supplements compared to those T2DM on metformin without supplementations.