downward tendency as well, accompanied by non-reliable reduction of the integral indicator of kidney acid activity, such as urine pH. Moreover, an excretion of active hydrogen ions raised, and after standardization by volume of glomerular filtrate remained 22,2% ($P<0,05$) higher than in controls.

Hence, the obtained findings enable the suggestion that the mechanisms of urinary acidification associated with acido- and ammoniogenesis, with direct sodium-hydrogen antiport remain unchanged on 11th day of alloxan-induced diabetes, however acid-regulating renal function demonstrates the tendency to augmentation, probably due to an intensification of glomerular filtration, typical for the initial stages of diabetic kidney disease and leading to the elevation of filtration load of the nephron by acids and ammonia, and certifies the high efficacy of renal transport mechanisms for effective clearance of extracellular fluid from excessive acidic metabolites and ammonia against a background of diabetes mellitus.

Pankiv I.V.

VITAMIN B12 LEVELS IN METFORMIN-TREATED TYPE 2 DIABETES PATIENTS

Department of Clinical Immunology, Allergology and Endocrinology
Higher State Educational Establishement of Ukraine
«Bukovinian State Medical University»

Metformin is the most widely used oral antihyperglycaemic drug, but it may lower B_{12} status, which could have important clinical implications. There are limited data about the effect of metformin use on serum vitamin B12 levels in type 2 diabetes mellitus (DM) patients.

Aim of the research was to study serum Vitamin B12 levels in patients with type 2 diabetes mellitus who were receiving metformin and compared them to those never treated with metformin.

A total of 53 patients with type 2 DM (group 1, n=35, receiving metformin and group 2, n=25, never treated with metformin) from the endocrinology clinic in Chernivtsi were studied. Serum Vitamin B12 levels were measured in all patients. Diabetic neuropathy symptom score (DNS) was used to assess peripheral neuropathy.

The mean age of the study population was 51,9±9,3 years. Table 1 shows the baseline characteristics of the «metformin» and «no metformin» groups. The two groups were comparable except for duration of DM which was significantly greater in the metformin group. Duration of metformin use was 26,2±5,4 months (range 4–180 months). Daily dose of metformin was 839,2±53,1 mg (range 500–2500 mg). The cumulative dose of metformin was 970,8±517,2 g (range 85–10,590 g). The serum Vitamin B12 levels were 239,6±37,4 pg/ml in metformin group and 293,6±42,3 pg/ml in the no metformin group (p=0,37). When adjusted for duration of DM, metformin use was associated with a 57,2±7,3 pg/ml (p=0,03) lower serum Vitamin B12 levels. No significant increase in the prevalence of neuropathy (DNS score) was found in the Vitamin B12 deficient patients (levels <190 pg/ml) as compared to patients with normal Vitamin B12. Serum Vitamin B12 levels for the entire cohort were higher by 11,8±1,7 pg/ml (95% CI 6,3–17,0, p<0,01) for every 1 year increase in the DM duration. On univariate linear regression analysis with Vitamin B12 levels as the dependent variable and duration of metformin use as the predictor variable, duration of metformin use predicted a 0,8±0,4 pg/ml (95% CI 0,004–1,7 pg/ml, p=0,04) lower Vitamin B12 levels for every 1 month increase in the duration of metformin use. On stratifying duration of metformin use into no metformin use, 0–1 years, 1–5 years, and more than 5 years, it was found that a 20,1 pg/ml (p=0,64) and 37,3 pg/ml lower serum Vitamin B12 concentration was observed in individuals with a 0–1 years and 1–5 year duration of metformin use, respectively, compared with the group which had not received metformin.

Thus, metformin use was associated with a lower serum Vitamin B12 levels when adjusted for duration of diabetes mellitus. Increasing duration of diabetes mellitus was associated with higher serum Vitamin B12 levels.