

FEATURES OF VEGETATIVE DISORDERS IN PATIENTS WITH TYPE 2 DIABETES IN THE POSTMENOPAUSAL PERIOD

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A number of foreign and domestic studies indicate that diabetes mellitus is a predisposing factor to the development of lower urinary tract dysfunction [2, 4, 6]. The urogenital form of autonomic neuropathy is a poorly understood neurological complication of diabetes mellitus. Urination disorders in diabetes mellitus are not life-threatening, however, they often lead to maladaptation, irritability, distracting patients from the outside world, increasing introversion, and ultimately worsening the quality of life of patients [1, 3, 5]. Unpleasant sensations reduce resistance to various stress factors, contributing to the progression of existing somatic pathology, in particular severe cases, disability of patients [7].

Despite the high prevalence of urinary disorders in women with diabetes mellitus [5, 6], these disorders are still underestimated by doctors of various specialties, which can be explained by certain difficulties in their diagnosis and untimely drug treatment.

Research goal: To identify the features of vegetative disorders in postmenopausal patients with carbohydrate metabolism disorders and evaluate the effectiveness of trospium chloride in patients with lower urinary tract dysfunction.

The study included 45 postmenopausal women. Group 1 consisted of patients with type 2 diabetes mellitus (DM2), group 2 - a patient with impaired glucose tolerance (HTG), and 10 women with normoglycemia were included in the comparison group (Group 3). In both groups with carbohydrate metabolism disorders (group 1 and 2), subgroups were distinguished: A - with lower urinary tract dysfunction and B - without urination disorders. Twenty-eight patients in subgroups 1A and 2A received trospium chloride 30 mg per day for 4 weeks during the phonecomplex treatment of background diseases with the aim of correcting light emission disorders.

The groups were comparable in age and duration of menopause ($p > 0.05$). The median age of patients and duration of menopause at the time of examination was 65.0 (61.0-69.0) years and 15 (10-18) years in group 1, 63.0

(61.0-65.0) years and 14 (12-16) years - in group 2, 64.5 (63.0-67.0) years and 14 (12-15) years - in group 3, respectively. The duration of type 2 diabetes in group 1 was 6.0 (3.5-8.5) years.

The clinical examination of patients included analysis of anamnestic data of ijalob, reflecting the features of neurological disorders. An endocrinologist must be examined: body weight assessment using the Quetelet index (weight, kg/height, m²), determination of the type of fat distribution (according to the waist-to-hip ratio index according to the recommendations of the World Health Organization (1997), blood pressure measurement. Laboratory examination included: general blood test, general urinalysis, blood chemistry analysis with determination of total protein, blood glucose, transaminases, creatinine, urea, total cholesterol, triglycerides, glyated hemoglobin (HbA_{1c}, %), C-peptide (ng / ml), Nechiporenko urinalysis, determination of microalbuminuria in a single dose. the morning portion.

Research results and their discussion: Elderly women with carbohydrate disorders presented asthenic-neurotic complaints with a higher frequency (98%): increased fatigue,

emotional instability, irritability. Headaches associated with increased blood pressure were also more often registered in women in the DM and HTG groups (87 and 76%).

Analysis of the initial vegetative tone (IVT) revealed the predominance of parasympathetic influences in patients of group 1 (61% of cases). At the same time, women in groups 2 and 3 were more likely to have sympathetic influences (52% and 50%, respectively). It is worth noting that only in the group with DM 2 there was no state of eitonina.

During the analysis of the functional state of vegetative regulatory mechanisms, it was revealed that patients in all groups showed a decrease in the total power of the spectrum (TR), due to a decrease in high-and low-frequency modulations with a predominance of very slow waves in the structure of the spectral power, which characterize the transition of heart rate regulation from the reflex vegetative circuit to a lowermetabolic. Significantly higher values of frequency characteristics, expressed in ms², were observed in the comparison group in the background recording and orthoprobe. The observed negative correlation between age and all spectral parameters highlights the role of involutinal changes in HRV reduction. However, the lower values of spectral characteristics in patients with impaired carbohydrate metabolism in the absence of an age difference between the groups suggests that there are other factors affecting the reduction of heart rate variability. These factors include the level of compensation for carbohydrate disorders. The HbA1c value (%) was significantly higher in group 1 and had a negative correlation with the following parameters: TP (ms²) (R=-0.27, p=0.00), VLF (ms²) (R=-0.30, p=0.00), LF(ms²) (R=-0.25, p=0.01), HF (ms²) (R=0.02; p=0.04), which explains the role of hyperglycemia in reducing all frequency characteristics of the spectrum. A negative correlation was also found between the TG value and spectral parameters:TR (ms²) (R=-0.34; p=0.00), VLF(ms²) (R=-0.22;p=0.00), HF(ms²) (R=-0.25; p=0.02), which emphasizes the role of dyslipidemia in the development of autonomic dysfunction.

Thus, age-related changes in women are a favorable background for the occurrence of autonomic disorders. The presence of glucose-metabolic disorders contributes to the appearance of autonomic neuropathy already at the pre-diabetic stage.

The results of cardiovascular testing demonstrate a decrease in the autonomic support of activity due to both parasympathetic and sympathetic divisions in patients with carbohydrate disorders compared to the comparison group. In group 1, the majority of patients registered borderline results of two HR tests (deep controlled breathing test and Valsalva test) and both BP tests, and in group 2-borderline results of two HR tests and one BP test. Combined damage to the sympathetic and parasympathetic parts of the ANS was detected already at the stage of initial carbohydrate disorders. The atypical variant of cardiac autonomic neuropathy was predominant in both groups.

Thus, we suggest that sympathetic activity depends on hyperinsulinemia and remains higher in patients with compensatory hyperfunction of the pancreas. As beta-cell activity is depleted and the concentration of C-peptide in the blood decreases, the activity of the sympathetic part of the autonomic nervous system also decreases. It is obvious that the predominance of sympathetic influences occurs at the initial stages of carbohydrate metabolism disorders – with hyperfunction β -of pancreatic beta-cells.

Analyzing the data from the DAN-IPSS questionnaire, urination diaries, the most common complaints in patients with DNMP identified using the questionnaires were pollakiuria, nocturia, and urinary incontinence. The majority of patients in subgroup 1A (80%) reported dysuric symptoms within 5 years of the diagnosis of T2DM, and 20% associated DNMP with the onset of

the underlying disease. When assessing the severity of urination disorders, the average degree (13-24 points) was detected in 10 patients in subgroup 1A and in 5 – in subgroup 2A, and severe (from 25-36 points)-in 10 and 6 patients, respectively. When performing ultrasound of the bladder placentox DM2, residual urine was more often recorded, in subgroup 2A, residual urine after emptying the bladder was not detected by ultrasound. In patients in subgroups 1A (17 observations) and 2A (11 observations), when evaluating nomograms, the urination curve was rapid. The presence of residual urine in patients with T2DM corresponds to pronounced changes in the ANS, against which sphincter instability with the manifestation of detrusor-sphincter dyssynergy is possible.

The volume of residual urine in subgroup 1A positively correlated with HbA1c (%) ($R=0.28$; $p=0.041$), TG ($R=0.43$; $p=0.00$), parameters of variational heart rate monitoring: AMo (%) ($R=0.38$; $p=0.03$) and IN ($R=0.39$; $p=0.03$) and negative-with spectral characteristics, indicators of KW (KVALS, changes in heart rate in the sample with deep breathing).

We suggest that sphincter instability may be related to *сболеевыраженнымиизменениямивариабельностиритмасердцаиассоциированасдлительностьюистепеньювыраженностиуглеводныхнарушений.*

Thus, the results of our work indicate that in elderly patients with hyperglycemia, asymptomatic cardiac autonomic neuropathy of the mixed (sympatho-vagal) type is often combined with lower urinary tract dysfunction and is detected already at the stage of impaired glucose tolerance. Thus, functional urination disorders in patients with carbohydrate metabolism disorders can serve as a marker of autonomic neuropathy.

17 patients in subgroup 1A and 11 patients in subgroup 2A treated with trospium chloride showed good tolerability of this drug. The results of control uroflowmetry showed a statistically significant decrease in the maximum and average rate of urine outflow and an increase in the time of urination in both groups ($p<0.05$). When evaluating control urination diaries, the frequency of urination decreased from 12 to 9 (8-10) times in subgroup 1A ($p<0.05$) and from 12 to 8 (8-10) times in subgroup 2A ($p<0.05$). A decrease in urgent urges from 6 to 1 (1-2) times a day was observed in both groups. The minimum volume of urine increased from 70(50-80) to 110 (100-150) ml and from 150 (120-180) to 200(180-210) ml, respectively ($p<0.05$). Repeated DAN-IPSS questionnaires showed a significant reduction in the severity of urinary disorders and an improvement in the quality of life of patients, which indicated the effectiveness of the therapy.

The use of the drug did not affect the parameters of spectral and temporal analysis, which characterizes its high selectivity with respect to muscarinic receptors of the bladder.

Thus, our work established the presence of signs of cardiac autonomic neuropathy in elderly women in the postmenopausal period with various disorders of carbohydrate metabolism, which are registered already at the stage of impaired glucose tolerance.

Dysfunction of the autonomic nervous system is caused by a complex of various factors: age, hyperglycemia, dyslipidemia, hyperinsulinemia. The main variant of autonomic cardiac dysfunction is atypical and is associated with urodynamic disorders in more than three-quarters of patients. The use of trospium chloride corrects disturbed urination and improves the quality of life of women. The symptomatic method of correction of autonomic urination disorders is safe and effective, and may be an important addition to pathogenetic therapy in patients with cardiac and urogenital autonomic neuropathy.

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