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**THE SIGNIFICANCE OF COMPREHENSIVE ULTRASONIC
EXAMINATION IN THE CLINICAL DIAGNOSTICS OF
NEPHROANGIOPATHIES IN LATENT TYPE 2 DIABETES MELLITUS**

Summary. Diabetic nephropathy is one of the most common causes development of terminal chronic renal failure (ESRD). AT over the past decade, in the United States and a number of countries in Europe and Asia, DN has come out on top in terms of need for renal replacement therapy insufficiency.

A feature of kidney damage in type 2 diabetes is the absence of severe clinical symptoms at the beginning, which is the reason for its late diagnosis.

Key words: arterial hypertension, diabetic nephropathy, microalbuminuria, diabetes mellitus, glomerular filtration rate, ultrasound.

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**ЗНАЧЕНИЕ КОМПЛЕКСНОГО УЛЬТРАЗВУКОВОГО
ИССЛЕДОВАНИЯ В КЛИНИЧЕСКОЙ ДИАГНОСТИКЕ**

НЕФРОАНГИОПАТИЙ ПРИ ЛАТЕНТНОМ САХАРНОМ ДИАБЕТЕ 2 ТИПА

Резюме. Диабетическая нефропатия является одной из наиболее частых причин развития терминальной хронической почечной недостаточности (ТХПН). В течение последнего десятилетия в США и ряде стран Европы и Азии ДН вышла на 1-е место по потребности в заместительных видах терапии почечной недостаточности.

Особенностью поражения почек при СД 2 типа является отсутствие выраженной клинической симптоматики в начале, что является причиной его поздней диагностики.

Ключевые слова: артериальная гипертензия, диабетическая нефропатия, микроальбуминурия, сахарный диабет, скорость клубочковой фильтрации, УЗИ.

Relevance. Due to its high prevalence and severe medical and social consequences, diabetes mellitus is one of the current problems of modern medicine. The nature of the global epidemic of diabetes is given by type 2 diabetes, which, according to WHO data for 2010, affects 285 million people in the world (Mkrtumyan A.M., 2010).

The cost of treating diabetes and its complications in the developed countries of the world is 10-15% of the total healthcare budget (Dedov I.I., 2010, Gaede P., Valentine W.J., Palmer A.J. et al., 2008). The most dangerous consequences of the global DM epidemic are its systemic vascular complications, which are the main cause of disability and mortality in patients with this pathology.

Considering the continuous increase in the incidence of diabetes, as well as the increase in life expectancy of these patients, a significant increase is predicted kidney damage in this pathology.

Purpose of the study. Explore the possibilities of complex echography (blood flow color flow, ED, ZD) in the diagnosis of kidney damage in the early stages in type 2 diabetes.

Materials and research methods. To solve the tasks set on the basis of the Republican Clinical Hospital State Healthcare Institution of the Ministry of Health of the Republic of Tajikistan, an analysis of the results of a survey of 182 patients. Of these, 115 were patients with type 2 diabetes and 67 with hypertension.

The main group consisted of 115 patients with type 2 diabetes, which included included 58 (50.4%) patients with normoalbuminuria and 57 (49.6%) patients with microalbuminuria. Of the 58 patients with normoalbuminuria, 19 (32.8%) men and 39 (67.2%) women, aged 38 to 73 years, mean age 53.9 ± 1.3 years.

Of the 57 patients with microalbuminuria, 19 (33.3%) were men and 28 (66.7%) women, aged 36 to 75 years, mean age 54.7 ± 1.4 years. The mean duration of type 2 diabetes was 6.9 ± 0.5 years. Criteria inclusions in the group were the absence of kidney disease, arterial hypertension and renal artery stenosis. Treatment for patients: diet therapy - 28, tablets therapy - 48, insulin therapy - 39.

Type 2 DM was diagnosed in patients based on the analysis of the data obtained during the collection of anamnesis, clinical and laboratory studies. Patients with arterial hypertension, severe atherosclerosis of the terminal aorta, renal artery stenosis, nephroptosis, chronic pyelonephritis, glomerulonephritis, urolithiasis, diabetic nephropathy in stages of proteinuria.

Research results. In order to determine the echographic criteria of the kidneys in the norm, we a study was conducted on the individuals who made up the control group. Everyone they (55 practically healthy people) underwent a complex echographic examination of the kidneys according to the methods described above.

Examination in the "gray" scale mode revealed clear, even contours of the kidneys. Pelvicalyceal system without features, cavity not extended. When determining the linear dimensions of the kidneys, the following parameters were obtained: the average value of the length of the right kidney was 10.7 ± 0.1 cm, width 4.8 ± 0.1 cm, thickness 4.5 ± 0.1 cm, parenchyma 1.6 ± 0.2 cm ($p < 0.05$). The linear dimensions of the left kidney did not differ significantly and amounted to 10.9 ± 0.1 cm, 4.9 ± 0.0 cm, 4.6 ± 0.1 cm, parenchyma 1.6 ± 0.2 cm, respectively ($p < 0.05$).

The mean value of the volume of the right kidney was 122.9 ± 2.7 cm³, that of the left kidney was 128.5 ± 2.5 cm³ ($p < 0.05$). The total volume of kidneys referred to standard body surface area (1.73 m) was 234.8 ± 2.9 cm ($p < 0.05$).

In an ultrasound study with CFD, blood flow and ED were assessed state of intrarenal blood flow.

In the study of intrarenal blood flow at the level of segmental arteries with an assessment of quantitative characteristics, the following average values of hemodynamic parameters were obtained: 51 the blood flow rate in the right kidney was 40.1 ± 1.9 cm/s, the minimum blood flow velocity was 13.0 ± 1.4 cm/s, the average blood flow velocity was 21.3 ± 1.2 cm/s ($p < 0.05$).

Similar hemodynamic parameters of intrarenal blood flow in the left kidney were somewhat lower and amounted to 39.9 ± 1.8 cm/s, 12.7 ± 1.1 cm/s, 20.5 ± 1.2 cm/s ($p < 0, 05$) respectively.

The average value of the resistivity index in the right kidney was 0.63 ± 0.01 , the pulsation index was 1.21 ± 0.05 ($p < 0.05$). The indices of the resistivity index and the pulsation index in the left kidney practically did not differ from those on the right and were equal to 0.64 ± 0.01 , 1.23 ± 0.04 ($p < 0.05$), respectively.

Conclusion: The earliest echographic criteria for kidney damage in patients with type 2 diabetes mellitus are changes in intrarenal hemodynamics - an increase in linear hemodynamic parameters of intrarenal blood flow ($V_{max} - 49.1 \pm 2.0$ cm/s, $V_{mjn} - 14.7 \pm 1.3$ cm /sec., $V_{med} - 24.9 \pm 1.3$ cm/sec.) $p < 0.05$ and

intrarenal vascular resistance (0.71 ± 0.01) $p < 0.05$ in combination with increased glomerular filtration rate (153.3 ± 8.5 ml/min $\times 1.73$ m²) $p < 0.05$.

Comprehensive echography makes it possible to trace the increase in changes in intrarenal hemodynamics in type 2 diabetes mellitus, which significantly increase depending on the stage of diabetic nephropathy ($p < 0.05$).

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