MORPHOMETRIC FEATURES OF MESANGIOPROLIFERATIVE GLOMERULONEPHRITIS WITH NEPHROTIC SYNDROME AND CORRELATION OF MORPHO-LABORATORY PARAMETERS

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RESUME: *The results of biopsies obtained from patients with nephrotic syndrome were stu-died. Necessary material for research was collected from patients, who were on treat-ment and the nephrological department of the 1st polyclinic MHRUz. A compre-hensive clinical and laboratory examination was performed on 104 patients. Of these, 58 had a proteinuric form of chronic glomerulonephritis. The mean age of the patients was 24.9±5.2 years. Depending on the morphological variant of glomerulonephritis, all patients were divided into 5 groups. The data from the correlation analysis of the studied morphometric parameters and the data of routine laboratory studies made it possible to create a mathematical model that can be used to determine the morpho-logical form of chronic glomerulonephritis.*

Keywords: *nephrotic syndrome, a morphological form of glomerulonephritis.*

МОРФОМЕТРИЧЕСКИЕ ОСОБЕННОСТИ МЕЗАНГИОПРОЛИФЕРАТИВНОГО ГЛОМЕРУЛОНЕФРИТА С НЕФРОТИЧЕСКИМ СИНДРОМОМ И КОРРЕЛЯЦИЯ МОРФО-ЛАБОРАТОРНЫХ ПОКАЗАТЕЛЕЙ

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Аннотация: *Изучены результаты биопсий, полученных от больных с нефротическим синдромом. Необходимые материалы для исследований были собраны от больных, находившихся на лечении в нефрологическом отделении 1-й поли-клиники МЗРУз. Всестороннее клинико лабораторное обследование проведено у 104 больных. Из них у 58 установлена протеинурическая форма хронического гломерулонефрита. Средний возраст больных составил 24,9±5,2 года. В зави-симости от морфологического варианта гломерулонефрита все больные были распределены на 5 групп. Данные корреляционного анализа изученных морфо-метрических параметров и данные рутинных лабораторных исследований поз-волили создать математическую модель, с помощью которой можно определить морфологическую форму хронического гломерулонефрита.*

Ключевыеq слова: *нефротический синдром, морфологическая форма гломе-рулонефрита.*

INTRODUCTION

In recent years, significant progress has been made in the study of structural and functional changes in kidney diseases and the pathogenesis of the disease. At the same time, a large number of diseases of the excretory system, the formation of glomerulonephritis (Gn), the main part of which continues with Nephritic syndrome, the development of renal failure as a result of the rapid progression of the disease, make it necessary to treat the disease early [1. Western G.D]. According to the information given in the literature, the survival rate of patients is 80% after 5 years in the first type of proliferative Gn and 70% in the second type. After 10 years, 50% of the first type and 40% of the second type will survive. A slightly positive result is observed in the third type of membranous proliferative Gn [2. Schmidt H., Bohle A]. In membranous Gn, 15 years after the onset of the disease, 50% of patients suffer from chronic kidney failure [4. Mactier R ., et al., 2. Schmit H., Bohle A], 34% of patients have persistent proteinuria or recurrence of nephrotic syndrome, and only 16% of patients have self-removal of proteinuria it is possible, the rest of the patients have proteinuria due to chronic or nephrotic disease. kept repeating [5. Honkanen E. et al., 6 Zucchelli P., Cagnoli L., Pasquali S. et al.].

Among diseases of internal organs, chronic glomerulonephritis (CGn) takes the leading place. It realizes how important it is to preassess the tools for the diagnosis and production of developing CGn in theoretical and applied nephrology.

According to the information given by B.I Shulutko, CGn occupies a special place among many chronic kidney diseases. Despite the fact that the field has reached several sources, it remains difficult to predict the positive or negative corrections of CGs. All this prompted us to go to settings, for the first time related to the level of proteinuria, total oxygen, and other laboratory parameters and morphometric data in different morphological forms of glomerulonephritis with nephrotic syndrome.

Materials and methods: To solve the tasks set before us, we studied biopsy materials from 104 patients with nephrotic syndrome. The necessary materials for the examinations were collected from patients treated in the nephrology department of the 1st clinic of the Ministry of Health of the Republic of Uzbekistan. The diagnosis given to the patients was confirmed on the basis of their complex clinical and morphological examinations. 104 patients underwent comprehensive clinical and laboratory exa-minations (proteinuria (g/l), glomerular filtration (ml/min), reabsorption %, total oxy-gen, creatinine level in blood (mg%), proteinuria (g/s), the amount of unchanged eryth-rocytes in the urine, the amount of leukocytes in the urine, the amount of hyaline cylinders in the urine, the amount of erythrocytes in the blood, the amount of lymphocytes in the blood), in 78 of them the necessary information was determined and the reports were filled. A puncture biopsy of the kidney was

performed using "BIP" (Germany) needles under the control of an ultrasound scanner. 58 patients with proteinuric form of the disease were taken for further investigations. The materials taken for inspection were divided into groups corresponding to the same variants depending on the morphological variants of Gn.

Results and Discussions. 58 patients (74.4%) had a proteinuric form of CGn, 19 patients (24.3%) had a mixed form, and 1 patient (1.3%) had a hematuric form. In the proteinuric form, the incidence among female and male patients was almost the same, males accounted for 56.4%, females 43.6%, and the average age of patients was 24.9+5.2 years. To determine the morphological forms of CGn, the biopsy samples were stained with hematoxylin and eosin, picrofuchsin according to Vangizon, Schiff-iodic acid reaction, and immunofluorescence tests were performed.

23 patients had mesangioproliferative, 14 membranous, 11 mesangiomembranous, 4 mesangiocapillary, 4 fibroplastic, 2 focal segmental glomerular sclerosis.

Mesangioproliferative glomerulonephritis (MPGn) was detected in 23 patients with nephrotic syndrome as mentioned above. 6 of them were men, and 17 were women. The average age of the patients was 25.8+1.4.

Among the patients in this group, swellings were observed in the legs, arms, face, and body parts, and in some patients, the swellings reached the level of anasarca.

The analysis of laboratory indicators showed a significant decrease in the number of erythrocytes in the field (R<0.006; 3.6+0.2*106) and the total amount of oxygen (R<0.06; 48.5+1.9 g/l), the amount of creatinine showed a reliable increase (R<0.04; 1.02+0.3 mg%). Changes in the number of lymphocytes (R<0.5; 29.1+2.2%) remained almost normal, and in the urine, there was an exacerbation of proteinuria (R<0.01; 6.2+0.8 g/l; R<0.02; 5, 1+0.8 g/s), reliable reduction of glomerular filtration (R<0.02; 43.4+2.7ml/min) and reabsorption processes (R<0.05; 92.2+3.6%), as well as urine leukocytes (R<0.01; 9.6+1.9), unchanged erythrocytes (R<0.03; 4.3+0.6) and the number of hyaline cylinders (R<0.01; 6.8+ 1.4) was observed to increase.

An increase in the number of mesangial cells in the balls and an expansion of the mesangial branch was detected when the biopsies taken from the kidney were examined microscopically. The increase in the number of mesangial cells not only led to the thickening of the basal membrane in this area but also its separation into two. Changes in the basal membrane are visible when the cross-sections are stained with the help of the Schiff iodine reaction.

When the renal glomeruli were examined by immunofluorescence, the presence of IgM with specific high-intensity illumination was detected in the basal membrane of glomerular capillaries and the mesangial branch. Hydropic dystrophy was detected in the convoluted tubules of the kidney.

The morphometric examination of the kidney showed that the surface of the balls was equal to 26078.3+728.9 μm2, which was significantly (R<0.01) greater than the value in the control group (22642+1268.7 μm2). Such an increase in the surface of

the balls, the surface of the capillary section of the balls (60+1.2 μm2 in the examined group; 47.2+2.5 μm2 in the control group; R<0.001), as well as the number of total cells in the balls and the number of mesangial cells in the examined group (159.2+4.2 and 71.1+1.8) was reliably increased compared to the control group (107.6+3.8; p<0.0001 and 22.2+0.8; R<0.0001).

Morphometric changes were also observed in renal tubules. The cross-sectional area of renal convoluted tubules (2860.5+77.6 μm2) increased significantly (R<0.001) compared to the control group (2475.0+129.2 μm2). The increase in the cross-sectional surface of the convoluted tubules is associated with a reliable (R<0.002) increase in the number of epithelial cells in the examined group (13.1+0.1) compared to the control group (11.6+0.3), where the surface of the epithelial cells in this group (155.5+ 3.1 μm2), was almost the same as the size of the control group (152.7+5.3 μm2) (R<0.3).

Dystrophic changes in the tubular system apparently caused a compensatory increase in the number of cells, which led to an increase in the cross-sectional area of the tubes.

In MPGn, the number of mesangial cells was correctly correlated with creatinine in the deposit (r=0.65) and proteinuria (r=0.56), that is, the increase in the number of mesangial cells in the balls leads to an increase in the amount of creatinine in the deposit and the amount of oxygen excreted in the urine.

CONCLUSION: In the development of nephrotic syndrome, each morphological form of CGn occupies different positions, including mesangioproliferative glomerulonephritis -39.61%. Each morphological form of CGn has distinctive morphometric signs, in particular, Mesangioproliferative glomerulonephritis - the surface of the glomeruli, the surface of the capillary section of the glomeruli, as well as the number of total cells in the glomeruli, as well as the number of mesangial cells reliably differ from other forms. The above information allows to develop a mathematical model suitable for chronic mesangioproliferative glomerulonephritis with nephrotic syndrome.

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