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CLINICAL AND LABORATORY ASSESSMENT OF IMMUNE DISORDERS IN PATIENTS WITH CHRONIC GLOMERULONEPHRITIS, DIAGNOSTIC SIGNIFICANCE OF ANTI-PLA2R

Kurbanova Zumrad Chutbayevna
Tashkent State Medical University, Professor of the Department of Hematology, Transfusiology and Laboratory Work
Tojiboyeva Dildora Abdujalilovna
Tashkent State Medical University, PhD student at the Department of Hematology, Transfusiology and Laboratory Work

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Abstract:
This study investigated the clinical and laboratory characteristics of immune system disorders and endothelial dysfunction in patients with chronic glomerulonephritis (CG). Also, the level of antibodies against the A2 phospholipase receptor (PLA2R) of renal podocytes - anti-PLA2R - was determined and its diagnostic significance was assessed. According to the results of the study, the level of anti-PLA2R was significantly increased in primary membranous nephropathy, which indicated that this marker is a diagnostic criterion with high sensitivity and specificity. In secondary membranous and IgA nephropathies, the level of anti-PLA2R remained unchanged.

Keywords: chronic glomerulonephritis, membranous nephropathy, IgA nephropathy, anti-PLA2R, kidney biopsy, endothelial dysfunction.

INTRODUCTION

Chronic glomerulonephritis (CG) is a chronic inflammatory process of the renal glomeruli, which gradually leads to renal failure. Globally, 20–30% of patients requiring kidney transplantation and dialysis are associated with CG. The clinical course of the disease is often latent, which leads to late diagnosis. Therefore, an in-depth study of the immune-pathogenetic mechanisms of CG, especially the determination of the diagnostic and prognostic significance of anti-PLA2R antibodies, is an urgent issue.

AIM OF THE STUDY

To study the clinical and laboratory study of immune system disorders and endothelial dysfunction in patients with glomerulonephritis and to determine the diagnostic significance of the level of anti-PLA2R.

MATERIALS AND METHODS

The study was conducted at the Republican Specialized Scientific and Practical Medical Center for Nephrology and Kidney Transplantation from 2022 to 2025.

104 patients with chronic glomerulonephritis aged 20–68 years were involved in the study. Written consent was obtained from all participants.

Gender composition: men – 60 (57.7%), women – 44 (42.3%).

Age distribution: 18–44 years – 58 (55.8%), 45–59 years – 29 (27.9%), 60–68 years – 17 (16.3%).

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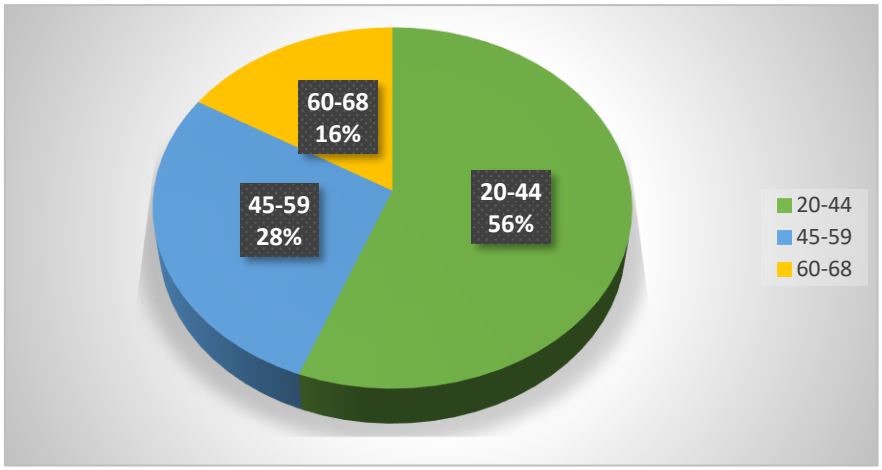

Figure 1. Age of the main group of patients

The main group was divided into two parts:
• Group 1 – 51 patients with non-proliferative, primary membranous nephropathy;
• Group 2 – 53 patients with proliferative form (IgA-nephropathy).

20 healthy individuals with no known kidney disease, with an average age of 40.2 ± 6.6 years, were selected as the control group.

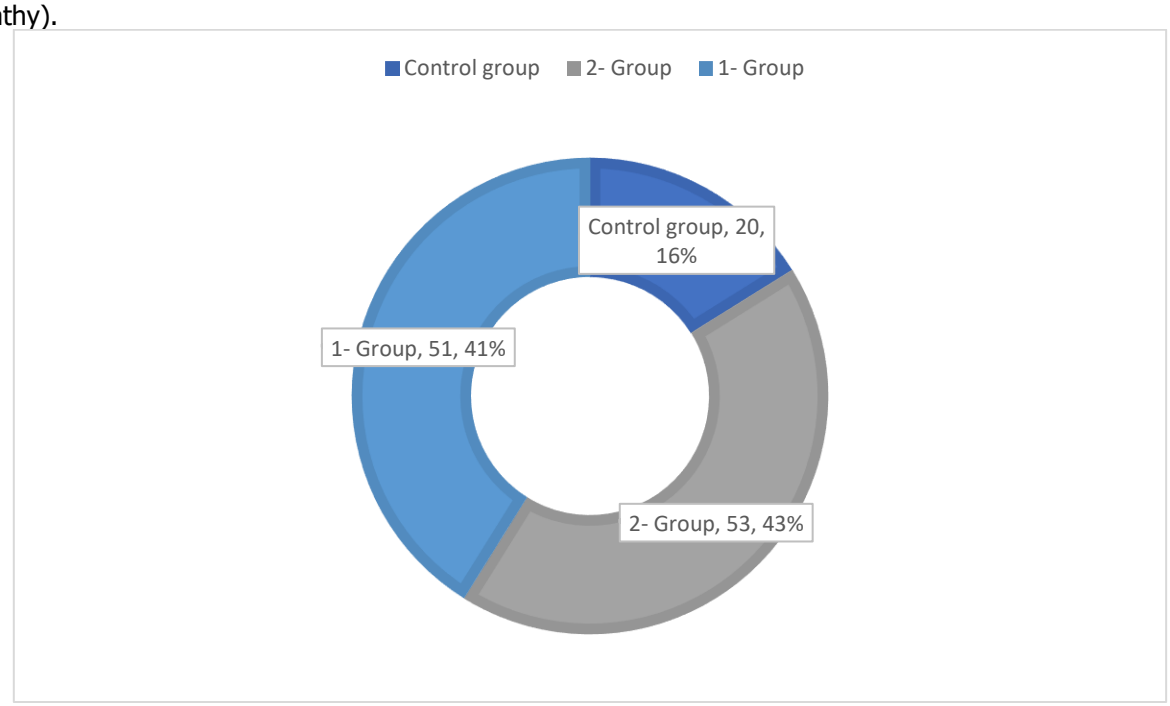

Figure 2. Research materials

Exclusion criteria from the study: oncological diseases, pregnancy, long-term use of nephrotoxic drugs.
Laboratory tests:
• serum creatinine, urea, residual nitrogen;
• daily urine protein (KPOq);
• glomerular filtration rate (GFR) and reabsorption indicators;
• anti-PLA2R level (by ELISA method).
Kidney biopsy was performed on patients for morphological studies.

RESULTS

It was found that the renal excretory function of the patients decreased sharply compared to the control group.

Groups Creatinine (μmol/l) Urea (mmol/l) KPOq (g/l) KFT (ml/min) Reabsorption (%)
Control group (n=20) 75.8 ± 6.9 5.2 ± 0.7 0.03 ± 0.02 105 ± 6.3 98.4 ± 1.3
Group 1 (n=51) 201.0 ± 11.4*** 13.3 ± 1.4*** 2.17 ± 0.16*** 38.8 ± 2.6*** 95.5 ± 2.6

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Group 2 (n=53) 217.8 ± 12.8*** 12.0 ± 0.8*** 1.79 ± 0.14*** 28.1 ± 2.2*** 94.7 ± 2.5
Note: *– to the control group relatively significant difference ($p < 0.001$).

According to the results of kidney biopsy, membranous nephropathy was detected in 51 patients, and IgA nephropathy in 53. SG membranous nephropathy was more common in mixed (45.6%) and nephrotic (77.8%) forms, and IgA nephropathy in mixed (54.4%) and hematuric (73.3%) forms.

Anti-PLA2R levels were high in 40 patients in group 1 (24.9 ng/ml), and negative in 11 (8.1 ng/ml). In patients in group 2, this indicator was 7.0 ng/ml, and in the control group - 6.6 ng/ml.

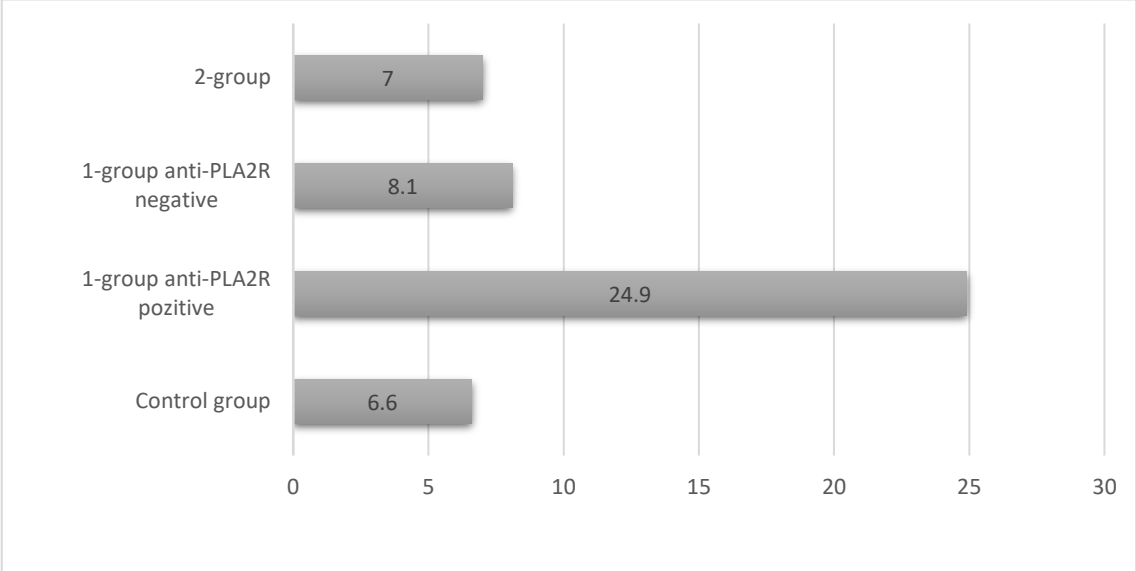

Figure 3. Anti-PLA2R antibodies against the transmembrane receptor phospholipase A2 of renal podocytes.

Among the patients with negative results for anti-PLA2R, 8 patients had systemic connective tissue diseases (rheumatoid arthritis, systemic lupus erythematosus), 2 patients had autoimmune thyroiditis, and 1 patient had bronchial asthma.

DISCUSSION

The results obtained show a decrease in renal filtration function and an increase in proteinuria in patients with SG. These changes indicate that the glomerular apparatus is damaged by the immune inflammatory process.

An increase in the level of anti-PLA2R is characteristic of primary membranous nephropathy, and this marker is important in the differential diagnosis of the disease. At the same time, in cases of secondary membranous or IgA nephropathy, anti-PLA2R remained unchanged. This indicates the selective diagnostic properties of this marker.

These results are consistent with the data presented in foreign literature, which indicate that anti-PLA2R has high sensitivity (≈80%) and specificity (≈95%) [Beck et al., 2009; Ronco & Debiec, 2020].

CONCLUSION

1. There was no gender difference among patients with chronic glomerulonephritis, but the frequency of occurrence was higher among individuals of reproductive age (18–44 years).
2. Patients had significantly impaired renal excretory function (decreased KFT, increased creatinine and urea).
3. Increased anti-PLA2R levels in primary membranous nephropathy confirm the high diagnostic value of this marker.
4. The unchanged level of anti-PLA2R in secondary membranous and IgA nephropathy allows its use as a differential diagnostic criterion.

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