

## THE DEVELOPMENT AND COURSE OF CHRONIC PYELONEPHRITIS AGAINST THE BACKGROUND OF DYSMETABOLIC NEPHROPATHY IN CHILDREN

Baratova Ra'no Shomuratovna

Samarkand State Medical University, Republic of Uzbekistan, Samarkand

### Abstract:

A number of studies have proven the role of combined immunological insufficiency in the pathogenesis of secondary chronic pyelonephritis in children, and therefore various variants of immunocorrective therapy have been developed. In most cases, it was carried out. monoimmunocorrection in various diseases, including chronic pyelonephritis, i.e. stimulation of one of the links of immunity, which can be acceptable only if the patient has an isolated lesion of one of the links of the immune system. The aim of our study was to study the effectiveness of step-by-step sequential targeted immunocorrection in secondary chronic pyelonephritis against the background of purine dysmetabolism. Materials and methods. 76 children aged 3 to 15 years inclusive were examined, diagnosed with secondary chronic pyelonephritis on the background of hyperuricemia and hyperuricosuria with signs of activity of the renal microbial inflammatory process. Results and discussion. The initial immunological parameters of group 2 patients were characterized by the fact that the relative content of T-lymphocytes was significantly reduced compared to the control ( $49.92 \pm 1.52\%$  :  $p < 0.01$  see Tab. 1). Conclusions. The results of the conducted studies indicate that secondary chronic pyelonephritis against the background of hyperuricemia and uraturia proceeds with pronounced shifts in the body's immune system, and they are combined.

**Keywords:** children, pyelonephritis, dysmetabolic nephropathy.

### Introduction

A number of studies have proven the role of combined immunological insufficiency in the pathogenesis of secondary chronic pyelonephritis in children, and therefore various variants of immunocorrective therapy have been developed. In most cases, it was carried out monoimmunocorrection in various diseases, including chronic pyelonephritis, i.e. stimulation of one of the links of immunity, which can be acceptable only if the patient has an isolated lesion of one of the links of the immune system. Therefore, the development of clear principles of immunocorrection in combined immunodeficiency conditions has now become relevant. In the light of the above, a special position is occupied by chronic pyelonephritis, which developed against the background of uraturia, since children with impaired purine metabolism constitute a contingent in the children's population, initially compromised. This is due to the fact that a violation of nucleoside metabolism causes dysfunction of the immunological system, impaired differentiation and proliferation of lymphocytes.

**The aim of our study** was to study the effectiveness of step-by-step sequential targeted immunocorrection in secondary chronic pyelonephritis against the background of purine dysmetabolism.



### Materials and Methods

76 children aged 3 to 15 years inclusive were examined, diagnosed with secondary chronic pyelonephritis on the background of hyperuricemia and hyperuricosuria with signs of activity of the renal microbial inflammatory process. All patients, along with general clinical studies accepted in nephrological practice, studied the indicators of cellular and humoral immunity, functional activity of neutrophil granulocytes. The determination of T-lymphocytes and their subpopulations, B-lymphocytes was carried out on a panel using monoclonal antibodies manufactured by Sorbent using the immunofluorescence method according to Filatov A.V. and co-authors 1990. The level of serum immunoglobulins of class A, M, G was determined by Mancini radial immunodiffusion using monospecific antisera (Research Institute of Epidemiology and Microbiology named after. The phagocytic activity of neutrophilic granulocytes was evaluated using a method based on the registration of phagocytosis objects, which were formalized sheep erythrocytes. The results were expressed as a percentage of phagocytosis, phagocytic number and phagocytic index. The immunological parameters of 25 healthy children aged 3-15 years served as a control.

All patients underwent basic pyelonephritis therapy, including dietary and drug correction of purine metabolism disorders and antibiotic therapy, taking into account the sensitivity of the microflora. The treatment was carried out before the sanitation of the urinary sediment and the elimination of bacteriuria.

In 17 patients (22,4 % of group 1), in whom a tendency to decrease in T-cell lymphocytes was revealed in the indicators, but the differences were not significant ( $p > 0.05$ ), only basic therapy was performed without the inclusion of tactivin.

Based on the initial immunological shifts in the T-link of immunity, 59 patients (77,6%, group 2) were identified, whose indicators were lower (T lymphocytes  $49.9 \pm 1.52\%$ ) compared with those of healthy ( $67.26 \pm 2.2\%$ ). Simultaneously with basic therapy, a biologically active thymus drug, tactivin, was prescribed to these patients to stimulate the T-link. The drug was prescribed at a dose of 3 mg / kg per day, subcutaneously, once in a continuous course for 10 days and followed by a transition to a maintenance intermittent course with an interval of 7 days. The duration of the stage was 2 months.

The second stage of immunocorrection was performed in patients who, after stage 1, had restored cellular immunity, but there were no positive changes in the B-link and in the spectrum of immunoglobulins. There were 52 such patients. at the second stage, myelopid was used, a drug mainly active against the B -link of immunity. Myelopid was administered at a dose of 3 mg / 1.5 m<sup>2</sup> body surface per day, intramuscularly, once with a course of 7 injections. The frequency of repeated courses depended on the dynamics of the results of immunological parameters. The repeated course was carried out in 17 patients.

### Results and Discussion

The initial immunological parameters of group 2 patients were characterized by the fact that the relative content of T-lymphocytes was significantly reduced compared to the control ( $49.92 \pm 1.52\%$ ;  $p < 0.01$  see Tab. 1).

There was a slight downward trend in T-helper cells ( $32.82 \pm 1.45\%$ ). The percentage of T - suppressors was significantly weighted ( $25.40 \pm 2, \%$ ,  $p < 0.05$ ).

The ratio of regulatory cells CD4/SD8 was reduced by 2 times compared with the control group



(1.26 and 2.60, respectively), the coefficient of suppression (SDZ/SD8) was significantly reduced (1.97).

Thus, in There were significant shifts in the content of T - lymphocytes and their subpopulations, as well as in their ratios. The quantitative content of B lymphocytes tended to decrease (20.19=1.80), but the difference was unreliable ( $p > 0.05$ ).

The analysis of the immunoglobulin spectrum revealed a significant decrease in immunoglobulin G ( $6.12 \pm 0.15$  g/l.  $p < 0.001$ ), the content of immunoglobulins A and M were reduced compared with the control group ( $1.06 \pm 0.04$  g/l and  $1.22 \pm 0.06$  g/l,  $p < 0.05$ ).

All indicators of phagocytic activity of neutrophil granulocytes in patients they were lowered ( tab. 1)

**Table 1. Immunological parameters of patients with chronic pyelonephritis on the background of uraturia before and after stage-by-stage immunocorrection**

Indicators	Control n-25	Initial indicators		Indicators after immunocorrection.		
		1 – group n-17	2-group n-59	Stage 1 of treatment of p-59	Stage 2 of treatment of p- 52	Stage 3 of treatment p-36
SD 3 %	66,25±2,24	64,34±2,04	48,93 ±1,52	63.71±1,80	64,76±2,10	68,38±2,4 6
SD 4%	39,92±0,60	36,62±1,12	33,02 ± 1,45	36,8±0,90	38,75±1,20	2,19±2,62
SD 8%	16,25±0,41	19,42±0,34	24,40 ±2,10	18.82±0,85	19,98±0,98	6,95±0,25
SD 19%	25,21 ±2,24	22,74±0,65	20,19 ±1,80	23,87±1,20	26,25±1,70	24,92±2,3 1
Ratio SD4/SD8	2,62	1,94	1,28	1,98	2,30	2,61
SD3/SD8	4,43	3,45	1,89	3,44	3,68	4,23
Ig G, g/l	9,82±0,14	8,81 ±0,16	6,19 ± 0,15	6,48 ±0,12	9,75 ±0,21	11,36±0,2 4
Ig A, g/l	1,38 ±0,06	1,28 ±0,04	1,10 ±0,04	1,19 ± 0,10	1,34 ±0,08	1,36±0,07
Ig M, g/l	1,43 ±0,04	1,36 ±0,07	1,24 ±0,04	1,18 ±0,04	1,31 ±0,06	1,32 ±0,08
% of phagocytosis	59,94±2,30	52,94±1,82	46,08 ±2,02	47,92 ± 2,3	51,12±1,14	58,20±2,1 2
Phagocytic number	1,14 ± 0,18	0,89±0,13	0,54 ±0,12	0,62 ±0,14	0,65 ±0,14	1,08 ±0,1
Phagocytic index	1,14 ± 0,18	0,89 ±0,11	0,54 ±0,12	0,55±0,14	0,65 ±0,14	1,09 ±0,1

In group 1 patients, there were no significant differences in the content of T-lymphocytes and their subpopulations, the ratios of CD4/SD8 and SDZ/SD8 were slightly reduced (1,94 and 3,45, respectively). There was a tendency to decrease IgG and IgA, but the difference with the control group was unreliable ( $p > 0.05$ ).

The decrease in the phagocytic activity of neutrophil granulocytes in these patients was less pronounced compared to the indicators of the 2nd group. Taking into account the above data, this group underwent only basic pyelonephritis therapy without immunocorrection.

In patients of the 2nd group after the 1st stage of treatment (basic therapy + tactivin) some positive changes in the T-link of immunity were revealed, which were expressed in a significant increase in T-lymphocytes ( $63,71 \pm 1.80\%$ ,  $p < 0.05$ ), a decrease in the number of T-suppressors ( $18.82 \pm 0,85\%$ ,  $p < 0.05$ ), as well as an increase in the regulatory indices of SD4/SD8 and SDZ/SD8 (1.99 and 3.46 respectively).

Of 59 patients with tactivin monotherapy, 17 patients (22.4%) managed to receive complete immunological rehabilitation. Since 52 of them (68.4%) had an imbalance in the humoral immune system, we believed that this contingent of patients still needed targeted immunocorrective therapy



at the next stage. After the second stage of the myelopid course in 13 (17.1%) patients, the indicators of immunoglobulins and phagocytic activity of neutrophilic granulocytes reached normal values. These patients did not undergo stage III immunocorrection.

The remaining 36 (47.4%) patients had their cellular and humoral levels restored, but changes in the phagocytic activity of neutrophil granulocytes remained reduced. In this regard, this contingent underwent stage III using sodium nucleinate, which allowed normalization of the functional activity of neutrophilic granulocytes.

To achieve positive changes, 10 patients underwent a repeated course of sodium nucleate. After the third stage of therapy, the indicators of all parts of the immune system were restored. With this approach to immunological rehabilitation, we did not observe the occurrence of respiratory diseases or recurrence of the renal process for 1 year.

### Conclusions

The results of the conducted studies indicate that secondary chronic pyelonephritis against the background of hyperuricemia and uraturia proceeds with pronounced shifts in the body's immune system, and they are combined. Step-by-step sequential targeted immunocorrection provides the most complete immunorehabilitation, the persistence of the therapeutic effect and ensures the prevention of relapse. Therefore, this approach is effective for the prevention of the formation of chronic renal pathology of microbial-inflammatory origin.

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