Volume 1, Issue 8, November 2023 ISSN (E): 2938-3765

IMMUNOPATHOLOGICAL CHANGES IN NEPHROTIC SYNDROME IN CHILDREN WITH ATOPIC DERMATITIS

У. Н. Каримова
Ташкентская медицинская академия

Abstract
The main manifestation of the nephrotic form of glomerulonephritis is nephrotic syndrome (UA), which is characterized by proteinuria (more than 2.5 g/day or 50 mg/kg body weight), oliguria, edema, hypoproteinemia, hypoalbuminemia, hyperlipidemia, hypercoagulation and develops as the main manifestation of acute and chronic glomerulonephritis [11,13,21].

Introduction

Glomerulonephritis (GN) is a genetically determined immune-mediated inflammation with predominant glomerular lesions and involvement of all renal structures in the pathological process, clinically manifested by renal and extrarenal symptoms [9,14]. Among the parenchymal kidney diseases, GN occupies a dominant place, in which chronic glomerulonephritis (CGN) accounts for more than 35% and is one of the common causes of chronic renal failure (CKD) [10,20].
Atopic dermatitis (AD) is a chronically recurrent inflammatory skin disease caused predominantly by IgE-mediated allergic reactions and genetically associated with atopy [3,16]. According to epidemiological studies, its prevalence reaches 20% in children in the first 2 years of life, ranges from 5.5 to 30.8% in children 6–7 years old, and from 6.7 to 20.7% in children 13–14 years old. In children suffering from AD, almost all organs and systems are involved in the pathological process. In this regard, serious attention is paid to BP in children suffering from renal pathology [2,3].

The aim of the study was to study immunopathological changes in nephrotic syndrome in children with atopic dermatitis.

Materials and Methods

We followed 40 children aged 7 to 11 years with nephrotic syndrome (NS). The patients were divided into two groups: group 1 - HC + BP (20 children); Group 2-NS (20 children). The control group consisted of 25 healthy children of the same age. Clinical diagnosis was made on the basis of anamnesis, clinical, laboratory and functional research methods, immunological parameters, as well as blood pressure markers and the SCORAD index [2]. The state of cellular and humoral immunity, antigen-binding lymphocytes (ASL) of the kidneys was studied according to the method of Garib F.Y. and co-authors [7,8]. Phagocytic neutrophil activity (FAN) by nitrosinium tetrazolium test using latex particles [5]. Immunoglobulin (Ig)E concentrations were studied by ELISA [6], circulating immune complexes (CICs) were determined by precipitation [4], interleukin-2 (IL-2) by Ortaldo J., et al. [17].

Web of Medicine: Journal of Medicine, Practice and Nursing
webofjournals.com/index.php/5

The material for the study was venous blood taken in the morning on an empty stomach. The numerical data were processed by the method of variational statistics with the calculation of the reliability of numerical differences according to Student.

Results and Discussion

According to the results of the studies, it was revealed that 55.0% of the observed patients with UA were boys and 45% were girls by sex. In the case of HC + BP, 72.5% were boys and 27.5% were girls, which confirm the literature data that UA and AD are 2 times more common in males. The duration of the disease is from the onset of UA in UA-8 years, on average 4.1 ±1.8 years; in case of HC + BP – 10 years, 4.6 ±2.0 on average. According to the mandatory diagnostic criteria, blood pressure was as follows: hereditary predisposition to atopy - 88.0%, pathological course of pregnancy and childbirth in the mother - 76.0%, onset of the disease in early childhood - 71.1%, skin rashes on the flexor surfaces of the limbs - 64.7%, Denier-Morgan line - 16.0%, presence of concomitant diseases of the digestive system (gastroduodenitis) - 54.0%, nervous system (NCD) - 67.0%, which are consistent with the literature data [12,15]. Assessment of the severity of BP in patients according to the SCORAD index showed that in children with HC + BP a large percentage were moderate and severe forms, in the complicated course of UA in children a large percentage was also HC + BP.

Clinical manifestations of UA and HC + BP were characterized, respectively: gradual onset of the disease (70.0%; 51.0%), "chalky" pallor (62.2%; 46.4%), lethargy (70.0%; 79.0%), decreased appetite (88.0%; 92.0%), edema (more common up to ascites) (65.9%; 76.9%), increased A/D (36.2%; 58.7%), hydrothorax (12.0%; 18.5%), tachycardia (79.3%; 89.5%), nausea (26.0%; 38.5%), hepatomegaly (14.5%; 27.5%), positive symptoms of tapping in the projection of the kidneys (58.0%; 76.5%), oliguria (100.0%; 100.0%), anuria (4.5%; 13.0%), headache (47.9%; 76.8%); proteinuria (100.0%; 100.0%), hypoproteinemia (88.9%; 95.0%), dysproteinemia (86.4%; 94.5%), hypercoagulability (74.0%; 82.0%), and hypercholesterolemia (37.0%; 49.0%), which were more pronounced in children diagnosed with HC+BP. The main disease in children with UA and HC+BP was anemia (59.5%; 68.5%), chronic tonsillitis (67.5%; 83.0%), helminthiasis (30.0%; 48.0%), gastroduodenitis (22.5%; 35.0%), bronchitis (10.0%; 15.0%), JVP (7.5%; 17.5%), thyroid gland (17.5%; 22.5%).

According to the results of the study of partial functions of the kidneys in sick children of both groups, when compared with the control group, there was a statistically significant increase in daily proteinuria (more than 2.5-3.0 g/day), erythrocyturia, leukocyturia, cylindruria ($P<0.001$-0.01), a decrease in daily urine output, relative density of urine ($P< 0.001$), hyperlipidemia ($P<0.001$-0.01) , increased blood fibrinolytic activity, hypercoagulation ($P<0.01$), increased serum urea and creatinine ($P<0.001$), hypoproteinemia, hypoalbuminemia and hypergammaglobulinemia ($P<0.01$).

The results of immunological studies showed that, in comparison with the control group, children with UA (group 1) and HC + BP (group 2) during the exacerbation period (before treatment) had a statistically significant decrease in the number of T-lymphocytes (T-lymphocytes), T-suppressors (T-suppressors (T-T8), T-helper cells (T-helper (T4) and FAN ($P<0.001$-0.01), a significant increase in the number of B-lymphocytes (T-19) and renal ASL ($P<0.001$), an increase in the content of IgE in the blood serum ($P<0.001$), as well as a significant increase in the production of IL-2 ($P<0.001$) and CEC concentration ($P<0.001$). Immunopathological changes were more pronounced in children of group 2 compared to group 1 (Table 1).

Web of Medicine: Journal of Medicine, Practice and Nursing
webofjournals.com/index.php/5

Web of Medicine: Journal of Medicine, Practice and Nursing
webofjournals.com/index.php/5

Immunopathological shifts in UA in children with AD are explained by the fact that the nature of UA is immune-mediated inflammation involving the activation of Thl or Th2 cells and corresponding cytokines, including IL-2. IL-2 stimulates the synthesis of other cytokines (IL-4. IL-6. IFN-γ) and affects the Thl/Th2 balance autocrinely and paracrinely on the subpopulation of Th2 cells. The cytokine imbalance between Th1 and Th2 determines the direction of impaired immune response [1,19]. The ability of T-cell clones to maintain plasma cell production of IgE is directly proportional to the production of IL-4, and the content of this cytokine in the blood of children with allergic diseases (BP) correlates with clinical manifestations. including the period of illness, the duration of the disease, and the level of IgE in the blood. The increased ability to produce IL-4 under stimulation of IL-2 seems to be one of the defects that contribute to the increase and prolongation of IgE production in patients with atopic diseases. The initiating role in the development of the immunopathological process in UA probably belongs to the activation of the complement system, hyperproduction, and impaired elimination of CICs, which, accumulating on the basement membrane of glomerular vessels, cause the development of a local inflammatory reaction. At the same time, the activation of the humoral and cellular link of immunity with impaired production of cytokines, including IL-2, plays an important role in the formation of both local inflammation and immunopathological shifts in the body as a whole [18]. The revealed immune disorders in the initial period of UA may indicate an imbalance in the mechanisms of control of the inflammatory response, the lack of an adequate response of the body's anti-inflammatory defense system, therefore, it is the pathogenetic basis for the formation of the chronic course of UA, the progression of immunoinflammatory damage, including in the renal tissue, and ultimately lead to a worsening of the prognosis of the disease.

After the traditional therapy in dynamics (after 6 months), the patients showed an improvement in clinical, laboratory and immunological parameters, expressed in an increase in the relative content of T3DM, T4DM, T8DM, FAN, IgA, ($P<0.001$-0.01), a decrease in renal ASL, IgM, IgE and CIC concentration in the blood ($P<0.01$-0.01), as well as a decrease in the production of IL-2 ($P<0.05$), compared to the data before treatment.

During one year of follow-up in children of group 1 (HC + BP), incomplete normalization of peripheral blood and urine parameters (hemoglobin, leukocytes, ESR, proteinuria, erythrocyturia, leukocyturia, daily diuresis and shortening of the period of clinical remission compared to children of group 2) was observed. During this period, in group 1 (HC + BP), exacerbation of the disease was observed in 8 (40.0%) out of 20 patients. In children of group 2 (UA), Exacerbation of the disease occurred in 5 (25.0%) of 20 patients. The results obtained suggest that UA in children with AD is more severe and difficult to respond to traditional treatment and requires the inclusion of additional adequate therapies.

Table Dynamics of immunopathological shifts of the nervous system in children with AD (M±m).

Indicators	Sick children, n=40			
	Control group, n=25	Pre-treatment, n=40	After Treatment	
			Group 1, HC + BP, n=20	2nd group, HC, n=20
SD3, %	56.21±0.98	32.16±1.21*	35.11±1.12#	46.32±0.36#
SD4 %	34.50±1.40	15.00±1.41*	18.05±1.44	25.13±1.15#
SD8, %	18.64±0.49	12.21±0.85*	12.21±1.08	14.22±1.14#
SD19, %	11.16±0.73	28.03±0.46*	23.02±0.64	18.07±0.69#
Blood ASL, % Renal ASL	-	8.63±0.36	5.25±0.45*	2.17±0.22#
IgE, IU/ml	109.67±60.11	588.68±85.37*	396.73±62.44*	162.28±55.18#
CEC, wholesale unit	0.002±0.004	0.01±0.006*	0.084±0.001	0.043±0.006#
FAN,%	50.50±1.11	34.25±1.45*	38.09±0.34	46.42±0.47#
IL-2, (IS)	2.8±0.07	3.8±0.05*	3.4±0.04	2.9±0.13#

Note: *-Significance of differences compared to the healthy group; # - the significance of the differences between groups 1 and 2. ASL was compared with the difference before treatment (P<0.001-0.01).

Findings

1. Immunopathological changes in the nervous system in children with AD are characterized by a deficiency of the cellular and humoral links of immunity in the form of a decrease in T3DM, T4DM, T8DM, FAN, an increase in the number of T19DM, renal ASL, an increase in serum IgE, CIC concentrations, and hyperproduction of IL-2, which persist in the period of remission.
2. Persistence of immunopathological changes in the period of disease remission, such as an increase in renal ASL and IgE, serum CIC concentrations, and hyperproduction of IL-2, can serve as a criterion for early immunodiagnosis of UA in children with AD.
3. UA in children with AD is more severe and more difficult to respond to traditional treatment, which requires the inclusion of additional adequate therapies.

References

1. Avtonomova O.I. Cytokine-mediated mechanisms of pathogenesis of clinical variants of glomerulonephrit. Cheboksary. 2016.183s.
2. Atopic dermatitis in children: diagnosis, treatment and prevention: Program of the Union of Pediatricians of Russia. Moscow, 2000. 75 p. (in Russian).
3. Balabolkin I.I.Modern aspects of pathogenesis and therapy of atopic dermatitis in children. 2015.Vol. 94.No4.p.177-183.
4. Belokrinitskiy D.B. Metody klinicheskoy immunologii [Methods of clinical immunology]. In: Laboratory research methods in the clinic. Ed. by Menshikov V.V.-M.: Medicine, 1987. P.277-310.
5. Bumagina T.K. Determination of phagocytic activity of neutrophils with the help of latex // Immunology.-1981.-No2.-P.44-45.
6. Vlagov G.S. Method of enzyme immunoassay analysis by the use of a set of reagents, produced by ZAO "Vector-best".-Novosibirsk, 1991.

Web of Medicine: Journal of Medicine, Practice and Nursing
webofjournals.com/index.php/5

7. Garib F.Y. et al. Method for determining lymphocytes // Rasmiy akhborotnoma.-1995.-No1.-P.90.
8. Garib F.Y. et al. Clinical value of ASL determination in patients with typhoid fever and other diseases. Method. Rivers. Tashkent. 1983.
9. Ignatova M.S. Diagnostika n lechenie nephropathii u detey [Diagnostics and treatment of nephropathies in children]. A guide for doctors by M.S. Ignatov. N.A. Korovina 7- M., 2007. - 332 p. (in Russian).
10. Kartamysheva N.N., Chumakova O.V., Kucherenko A.G., Sergeeva T.V. Progression of chronic glomerulonephritis: clinical and morphological relationships. 395-398.
11. Kayukov I.G., Smirnov A.V., Dobronravov V.A. Radiopaque nephropathy. Nephrology. 2007; 11(3): 93-101.
12. Rakhmanova L.K., Suleymanov A.S., Karimzhanov I.A., Kholtoeva F.F. Efficacy of polyoxidonium in the treatment of atopic dermatitis in frequently ill children, Vestnik TMA.2014; 2: 99-102.
13. Rakhmanova L.K., Karimova U.N. Khronicheskiy glomerulonephrit u detey [Chronic glomerulonephrit in children]. Tashkent. 2017. 50 p. (in Russian).
14. Shulutko B.I. Nephropathy as a vascular pathology // Nephrology.-2003.- v.7, No.4.- P, 21-28.
15. Tur I.I., Savenkova N.D., Nazarov P.G. Comparative study of IgE-antibodies, IFN-y and IL-4 in children with nephrotic syndrome with minimal changes and atopic dermatitis. — 2007.-No4.-C. 69-74.
16.Fuiano N, Incorvaia C. Dissecting the causes of atopic dermatitis in children: less foods, more mites. Allergology International. 2012; 61: 231–243.
17.Ortaldo J., et al. Effects of natural and recombinand il-2 on regulation of JEN production and Nk activity //J.immunol.-1984. –Vol.133.N2.-P.779-784.
18.Ritz E. Hypertension and kidney disease. Clin Nephrol 2010; 74 [Suppl 1]: S39-43.
19.Uwaezuokc S.N. Steroid-sensitive nephrotic sy ndrome in children: triggers of relapse and evolving hypotheses on pathogenesis /S.N.Uwaczuokc // Ital. J. Pediatr. - 2015.-Vol. 41.-P.19.
20.Warady B.A, Chadcha V. Chronic kidney disease in children the global perspective. Pediatric nephrology. 2010; 22:. 1999-2009.
21.Weening J.J. Advances in the pathology of glomerular diseases /J.J. Weening. P. Ronco.G. Rcmuzzi//Contrib Nephrol.-2013.-Vol. 181.-P. 12-21.

Web of Medicine: Journal of Medicine, Practice and Nursing
webofjournals.com/index.php/5