PREDICTION OF OUTCOMES OF NEPHROTIC GLOMERULONEPHRITIS SYNDROME IN YOUNG CHILDREN

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Annotation

Glomerulonephritis still plays a significant role in the development of chronic renal failure in children. Detection of chronic kidney pathology at the initial stage is important for increasing the effectiveness of preventive and therapeutic measures aimed at slowing down the progression of the disease. Patients with acute GN (74) with nephrotic syndrome aged from 2 to 5 years were examined, of which 30 were boys and 44 were girls. The patients were divided into 2 groups. The first group included 35 patients who had no relapses of the disease for two or more years, the second group of patients (39) in whom complete remission was not achieved and a chronic form of the disease (CGN) developed. The development of the forecast algorithm was carried out using the method of sequential Wald analysis. The share of glomerulonephritis (GN) remains significant in the development of chronic renal failure at all ages.

Key Words: Glomerulonephritis, nephrotic syndrome, patients, course, prognosis.

INTRODUCTION

Glomerulonephritis is one of the main causes of chronic renal failure (CRF). The prevalence of the disease is growing in many countries of the world, and therefore it is extremely necessary to study the clinical course and prognosis of renal diseases [1,2,7]. In modern nephrology, age-related features of glomerular diseases are considered in two directions: differences between children and adults are studied, as well as features in children and adults depending on their age at the onset of the disease [6,12]. According to epidemiological studies, the structure of glomerular diseases may change. The development of nephrotic syndrome is associated with an increase in the permeability of the glomerular filtration barrier to macromolecules [14-20].

It is known that glomerular diseases can lead to decreased renal function. Renal dysfunction may remain latent for a long time. Detection of chronic renal failure (CRF) in the initial stage is important to increase the effectiveness of preventive and therapeutic measures aimed at slowing the progression of the disease [3,8,11].

Consequently, predicting the outcomes of glomerulonephritis in early childhood continues to be an urgent medical and social problem [5,10,13]. In the development of chronic renal failure at all ages, the share of glomerulonephritis (GN) is still significant [4,9].

Purpose of the study. Determination of the diagnostic significance of clinical and laboratory parameters in predicting glomerulonephritis with nephrotic syndrome in young children.

MATERIAL AND RESEARCH METHODS

Patients with acute GN (74) with nephrotic syndrome aged from 2 to 5 years were studied, including 30 boys and 44 girls. The patients were divided into 2 groups. The first group included 35 patients who had no relapses of the disease for two or more years, the second group of patients (39) in whom complete remission was not achieved and a chronic form of the disease (CGN) developed.

The development of the forecast algorithm was carried out using the sequential Wald analysis method (3). To conclude the prognosis, "10" points were used as a threshold. The conclusion about the high probability of the disease progressing to chronic glomerulonephritis (CGN) was determined if the patient had more than 10 points. The development of the sequential Wald analysis algorithm was carried out by determining the percentage frequency of symptoms in each group. Evidence of statistical reliability of differences in the frequency of symptoms is determined by the formula: $t = P1 \, P2 \, / \, M^2{}_1 - M^2{}_2$. Proof of the independence of the signs for identifying prognostic symptoms was the determination of the correlation coefficient for qualitative signs, which is calculated by the formula:

$$Ch = ao - sun \, / \, (a+c)x(c+d) \, x \, (a+c) \, x \, (c+d) \, ,$$

where the letters indicate the signs. Correlation coefficient for quantitative characteristics, where "x´" and "y´" are the average correlated characteristics, Tx Ty standard deviation: $H = (x-x´) \, x \, (y-y´) \, / \, p \, (Tx-Tu)$ Determination of relative probability and the calculation of the prognostic coefficient (PC) was carried out according to the formula: $PC = 10 \, lg \, P1 \, / \, P2$.

Indicators of an unfavorable prognosis with a positive sign, because in the numerator is the frequency of symptoms characteristic of the group with established CGN, and in the denominator are symptoms characteristic of the group of AGN with long-term clinical and laboratory remission. Taking into account the hypothesis of normal distribution, the information measure was calculated using the Kulbach formula (2). According to the degree of information content, the following features were selected, listed in Table No. 1, where PC is the predictive coefficient, J(xi) is information content.

RESEARCH RESULTS AND DISCUSSION

A comparative assessment of hereditary burden revealed that a prognostically unfavorable sign of chronicity was the presence of kidney disease in relatives in the pedigree; the prognostic coefficient was (PC) 9.9 and the significantly informative value was +1.65. From the anamnestic data, there were frequent sore throats (PC = 15.3) with the highest information content among all other signs (6.12). Food and drug allergies, parasitic infestations, PC = 5.2 and 6 with information significance of 1.35 and 1.02, respectively. Thus, if the sum of points exceeds the threshold unit "10", the patient has an unfavorable prognosis and belongs to a high-risk group requiring appropriate therapy.

Of the laboratory studies, the most unfavorable prognostic sign was partial impairment of renal function: hypo- and hyperkalemia, proteinuria more than 3 g/l per day. According to the coagulogram, there was plasma tolerance to heparin (PC-7.6). According to the analysis of excretory urography, unfavorable factors of chronicity were an increase in the size of the kidneys (PC = 17), information content 1.76, an increase in the nephrographic effect (PC = 12) with information content 1.24.

In the genesis of damage to renal structures in acute glomerulonephritis (AGN), the high informative content of malondialdehyde has been established when it increases from 6.8-8.4 nmol/mg/lipids in the cell membrane. Despite the insignificant difference in the indicators of phosphatidylcholine, phosphatidylethanolamine, lysophosphatidylcholine in the membranes of erythrocytes in AGN and CGN compared with the indicators in the control group, their information content is high - 96, 88, 21, respectively.

Study of thyroid function in patients with AGN with long-term remission, the level of thyroxine-bound globulin (TBG) -0.52±0.086 nmol/l, triiodothyronine 1.32±0.15 nmol/l, thyroxine 99.96±7.13 nmol/l significant no differences were found in patients with acute hypertension and CGN. However, if we take into account that the sum of the predictive coefficients is reliable at a value of 19.5, then a significant difference is revealed between patients of both groups.

The next stage of the study was an analysis of information content, which reflects the degree to which the diagnosis approaches the correct diagnostic threshold. An informative measure of more than 3 was considered highly informative, but not less than 1, because 3-4 such signs are sufficient to achieve the threshold of +10, i.e. ensuring no more than 10% errors. Such signs, for example, were a decrease in alpha globulin, an increase in gamma globulin, hyperlipidemia, and an increase in cholesterol. Signs such as hypercoagulation, a decrease in endogenous creatinine, against the background of a hereditary burden of kidney pathology, an increase in malondialdehyde and lysophosphatidylcholine, a decrease in phosphatidylethanolamine and phosphatidylcholine were prognostically unfavorable indicators. These indicators characterize the high activity of lipid peroxidation, leading to destabilization of cytomembranes and the formation of a prognostically unfavorable course of nephrotic syndrome in patients with glomerulonephritis.

Table

Prognostic coefficients and information content in patients with glomerulonephritis

No.	These parameters	Predictive coefficient	Information content
1	Family history of kidney pathology	9,9	1,65
2	Frequent sore throats	15,3	6,12
3.	Food and drug allergies	5,2	1,35

4	Parasitic infestation	6,0	1,02
5	Stigmas of dysembryogenesis: epicanthus, wide bridge of the nose	6,4	2,22
6	Flat feet	5,8	1,36
7.	Hyperpigmentation	4,4	1,2
8.	Hypertrichosis	6,9	1,87
9.	Malocclusion	6,0	1,8
10	Swelling for more than 14 days	6,0	2,2
11	Narrowing of the arteries of the eye	1,25	9,7
12.	Hepatomegaly	10,7	4,06
13	Tachycardia	6,0	2,05
14	T wave interval depression	6,0	2,05
15	Proteinuria more than 3 g/l	6,0	2,3
16	Partial renal impairment	7,5	1,97
17	Hypokalemia less than 3.7 mmol/l	19,5	2,01
18.	Kidney enlargement	17,0	1,76
19	Increased nephrographic effect	12	1,24
20	Increasing plasma tolerance to heparin	7,5	1,97
21	Stable hypergammaglobulinemia	2,81	2,37
22	Treatment with chlorbutin	4,1	0,75

CONCLUSIONS

1. The peculiarity of the course of glomerulonephritis in young children is that it develops against the background of a hereditary predisposition.

2. Chronicity of the pathological process is due to instability of cytomembranes against the background of increased activity of lipid peroxidation.

3. In connection with established facts, timely diagnosis of chronicization factors, prevention of the formation of cytomembrane instability and immunological control are necessary.

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