



FEATURES OF THE COURSE OF RENAL COMPLICATIONS DUE TO VIRAL INFECTIONS IN CHILDREN

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ABSTRACT

Coronavirus disease 2019 (COVID -19) has been declared a pandemic due to its global spread.

***The goal** is to determine the characteristics of clinical and laboratory disorders and evaluate the effectiveness of a complex method of treating children with acute pyelonephritis that developed against the background of Covid -19.*

***Material and methods research.** 65 patients were observed, including 30 children with AP without a history of Covid -19 and 35 patients with AP due to Covid -19, aged from 4 to 18 years.*

***Results and discussion.** of the study. Since patients with AP had varying degrees of process activity, 12 (40%) children without a history of Covid -19 and 35 (100%) patients with a history of Covid -19 had a III degree of activity of the inflammatory process. and in patients with AP who did not have a history of Covid -19, stage II activity was noted.*

***Conclusions.** In patients who had Covid -19, there was a high percentage of tubulointerstitial kidney damage (acute pyelonephritis (49%)) of viral etiology (77%). The cost-effectiveness of the combination therapy method was 31%.*

Coronavirus disease 2019 (COVID -19) has been declared a pandemic due to its global spread. Children make up 1% of patients and are less likely to be seriously ill than adults; although preschool children and infants may experience severe clinical manifestations [8].

Damage to the urinary tract in children with Covid -19 disease progresses and is one of the most pressing medical problems today. Kidney pathology has a high risk of developing in children at different stages of Covid -19 compared to the general population (9).

It should be emphasized that the development of kidney pathology against the background of Covid -19 aggravates the course of nephrological disorders, leads to an even more pronounced deterioration of intrarenal hemodynamics and contributes to the development of nephrosclerosis (1, 6).



A number of studies have shown that in many cases, the diagnosis of kidney pathology in childhood remains late, which is the cause of kidney disease. Due to ineffective and untimely medical care, the disease continues into adulthood (2, 3, 7).

Thus, it is impossible to prevent kidney pathology in adults without detecting it in childhood (4, 5). The problem of the relationship between clinical and laboratory parameters of the kidneys in children with Covid -19 remains relevant today.

Objective: to determine the characteristics of clinical and laboratory abnormalities and evaluate the effectiveness of complex treatment of children with acute pyelonephritis that developed against the background of Covid -19.

Material and research methods. The observation included 65 patients, 30 children with AP without a history of Covid -19 and 35 patients with AP due to Covid -19, aged from 4 to 18 years (depending on the treatment methods, patients were divided into 2 groups: 1st group) . - 20 patients with AP with a history of Covid -19 who were treated with conventional treatment methods; Group 2 - 15 patients with AP with a history of Covid -19 who received complex therapy;

General anamnesis, examination, blood and urine tests, instrumental - excretory urography, kidney ultrasound, nephroscintigraphy, blood pressure measurement, biochemical - blood and urine creatinine, PCR, bacteriological - urine culture for microflora and sensitivity to antibiotics, statistical.

When analyzing the examined patients with AP, a high incidence rate was noted among children of primary school age (7-11 years), which amounted to 47.6% (31) of patients. The diagnosis of AP was established based on the classification of Korovina (2003). Based on the analysis of the results of clinical, laboratory and instrumental research methods, the predominance of the secondary form of pyelonephritis against the background of DN was established (n = 42 (64.6%)). No reasons contributing to its development were identified in only 5 (7.7%) patients with acute disease.

All patients (100%) were diagnosed with an acute course of the pathological process. The number of patients with AP under the age of 6 years was 22 (33.8%) out of 65 children: 13 (20%) boys and 9 (13.8%) girls. This group was dominated by girls (36 out of 65) (55%). History of Covid -19 since admission ranged from 3 weeks to 2 months.

According to the results and discussion of the study, varying degrees of activity of the inflammatory process were detected in 12 (40%) children without a history of Covid -19 and in 35 (100%) patients with Covid -19, while in patients with AP without a history of Covid -19. Marked Covid-19 activity stage II .

Febrile fever; pain syndrome (pain in the abdomen, in the side, on palpation of the kidneys, positive Pasternatsky's sign) prevailed in all observed children (65); in eleven patients these syndromes were combined with dysuria.

Signs of intoxication were pale skin, marbling, periorbital shadows, decreased appetite and cephalgia in 16 and 26 patients. In 11 and 22 patients, mild pastosis of the eyelids and legs was observed, which was combined with a short-term decrease in diuresis (2-3 days). In 10 (33%) and 28 (80%) patients of group 2, blood pressure increased, while in 20 (67%) and 7 (20%) patients, respectively, blood pressure remained unchanged.



Blood tests in all children revealed changes in nonspecific markers of inflammatory activity: leukocytosis with a rod-shaped shift (17.52 ± 1.33 -109/l and 21.51 ± 1.45 -109/l) and accelerated sedimentation rate (25.0 and 45.2 mm/hour, respectively).

Dysproteinemia with hyperglobulinemia was less common in 7 and 17 children (18-25%). The maximum concentration of C-reactive protein was 19 mg/l and 26 mg/l, the minimum - 10 mg/l and 15 mg/l, respectively (normal - 6 mg/l).

When examining urinary syndrome, leukocyturia of neutrophilic origin was determined (20 and 28 or more cells in the subsection, respectively; neutrophils more than 50%), microhematuria (up to 10 and 16 red blood cells in the subsection). Leukocyturia was most pronounced in the total sample: minimum 3750.0 and 6480.0 cells per 1 ml, maximum 50400.0 and 8970.0.

Proteinuria did not exceed 0.18 g/l and 0.76 in a single serving and 567.0 mg/24 hours and did not exceed 954 mg/24 hours. Slight erythrocyuria from 750 and 1100 to 1540 and 2000 cells per 1 ml (1223.86 ± 121.51). In all examined children, bacteriuria exceeded 100,000 microbial bodies in 1 ml of urine.

Children with kidney pathology (acute AP and TIN) during the Covid -19 pandemic received one course of complex treatment with Ingavirin against the background of traditional therapy. The comparison group (first group) consisted of 20 patients with AP due to Covid -19 who received traditional treatment. The second group consisted of 15 patients with AP due to Covid -19 who received complex treatment. One of the components of basic therapy was etiotropic treatment. After completion of antibiotic therapy, therapy was continued with uroantiseptics. Pathogenetic treatment of the disease consisted of the appointment of membrane stabilizers, antioxidants, and nephroprotectors. Patients receiving immunomodulatory treatment were excluded from the clinical study. 35 patients with AP due to Covid-19 received one course of complex therapy. The course of Ingavirin was used regardless of the course of AP from the moment of admission to the hospital.

The pharmacokinetics of Ingavirin is to act on the body at the level of infected cells, without damaging the structure and function of healthy cells. By blocking further circulation of viruses and causing their elimination, Ingavirin stimulates the body's immune system.

This reduces the duration of the disease and the risk of complications. Elimination of the active process was achieved by the 7th day of treatment in 11 (73%) children versus 7 (35%) in the comparison group ($p < 0.05$). In 4 patients who received complex treatment and in 13 patients in group 1, there was moderate pain on palpation in the costovertebral angle and signs of intoxication (including low-grade fever), which disappeared on the 9th and 14th days from the onset treatment accordingly. Features of OP activity indicators in the blood of patients are presented in Table 1.

Table 1

Characteristics of AP activity in patients depending on the treatment methods used



Indicator	Before treatment n =35	After traditional treatment n = 20	After complex therapy n =15	R
ESR (mm /h)	48.0±4.5	10.5±2.5 p1≤0.001	6.0±1.75 p1≤0.001	p2≤0.01
Leukocytes (• 10%)	17.52±2.52	10.15±1.81 p1≤0.01	6.27±0.12 p1≤0.001	p2≤0.01

Note: p1 - corresponds to before and after treatment of children with AP; p2- correspondence between complex and traditional treatment.

Regardless of treatment, significant normalization of acute phase parameters was observed in both groups . Dysproteinemia was not observed in any group. After complex treatment, ESR and leukocyte counts decreased significantly, indicating its anti-inflammatory ability.

After complex therapy for AP, the cellular composition of urine sediment was normalized in 10 (66%) patients and in 7 (35%) of the control group. In the remaining patients (5 and 13, respectively), leukocyturia was no more than 10-12 cells according to the Nechiporenko test, in the 1st group - 2000.0 cells / ml, and in the 1st group - 4078.0 cells / ml. Thus, after traditional therapy, less significant positive dynamics (p = 0.06) in leukocyturia were observed .

Previous microhematuria after combination therapy was negative in 12 (80%) patients, and in the control group - in 8 (40%). In the remaining patients of both groups, the number of erythrocytes ranged from 6 to 8 cells per cell. The Nechiporenko test revealed a normal number of red blood cells during therapy in both groups, regardless of treatment (p1<0.001).

In single servings after combination therapy, proteinuria was negative in 13 (86%) patients and did not exceed 0.01 g/l in 2 (10%), while in the comparison group these values were identical in 11 (73%) and 9 (45%) of patients, respectively.

Analysis of urinary syndrome showed that in the group after traditional treatment, abnormal leukocyturia remained , while erythrocyturia was within 2200 cells /ml and had no statistical dynamics (p1≥0.1).

Thus, in children with AP against the background of Covid -19 who received traditional treatment, less significant dynamics of the main clinical signs were observed, the elimination of which occurred on average 12-13 days from the start of treatment, whereas against the background of complex treatment in children 2- group, reliable normalization of all studied parameters occurred already on days 6-7 from the start of treatment.

After using combination therapy at the same time, a significant improvement in the indicators of general and local inflammatory symptoms of the urinary tract was registered, regardless of the course of AP.

Conclusions. 1. In patients with Covid -19, a high percentage of tubulointerstitial kidney damage (acute pyelonephritis (49%)) of viral etiology (77%) was noted. In 100% of patients with AP treated with Covid -19, and in 40% of children with AP without Covid -19, a third degree of activity of the inflammatory process was observed in the anamnesis.



After applying the proposed method of combination therapy (traditional therapy + Ingavirin), complete clinical and laboratory remission was achieved in 86.6% of patients with tubulointerstitial kidney damage (60% in the comparison group). The cost-effectiveness of the combination therapy method was 31%.

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