COMBINED METHODS OF EXTRACORPOREAL DETOXIFICATION FOR RENAL INSUFFICIENCY IN CHILDREN

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Annotation: Research the effectiveness of detoxification methods carried out in 215 patients with acute renal failure (63) and chronic renal failure (152). In the analysis of the results revealed that, depending on the severity of patients possible options to connect to a combined dialysis methods hemosorption, plasmapheresis. This technique has reduced the level of intoxication, improve metabolism, changes in electrolyte metabolism level. The positive results obtained contribute to improving the general condition of patients, more efficient life expectancy in the most severe category of patients.

Key words: Extracorporeal detoxification, hemodialysis, hemosorbtion, plasmapheresis, children, acute renal failure, chronic renal failure.

The complex use of methods of extracorporeal detoxification in childhood with renal failure is one of the priority and expedient, allowing to contribute to the correction of metabolic changes.

With renal failure, the system of regulatory mechanisms of the body is accompanied by the activation of a whole cascade of changes in metabolic processes, which lead to impaired hemodynamics, microcirculation, disruption of detoxification properties, and electrolyte metabolism disorder [1, 2, 3]. The formation of organ disorders, an increase in intoxication, the pathological effect of changes in metabolism lead to a serious state of the detoxification system that requires immediate solutions.

The current state of theextracorporeal detoxificationmethods to a large extent allows the implementation of intoxication syndrome, contributing to the early elimination of toxic agents from the body [5, 6, 7]. In addition to the widely used method of hemodialysis, the positive results of the simultaneous use of other methods are known. However, to date, the issue of the effective use of related extracorporeal detoxification methods depending on the form and stage of renal failure has not been resolved [3, 5, 9]. The method of individualization of indications for the complex use of these methods in children remains problematic [3, 6, 8], which largely determines the nature of the course and outcome of the disease.

The aim of the research was to study the effect of using the hemodialysis method in combination with hemosorptionand exchange plasmapheresis on the effective reduction of endogenous intoxication in children with renal failure.

Materials and methods of the research: The studies were carried out in 215 children (2-14 years old) with renal failure, which developed as a result of prerenal (hemorrhagic vasculitis, sepsis, ureteral obstruction, complications of respiratory infections) and renal (acute glomerulonephritis, pyelonephritis, congenital kidney pathologies, etc.) factors. Of the total number of patients, 63 (29.3%) cases included children with acute renal failure and 152 (70.6%) - with chronic renal failure. Depending on the developed methods of detoxification, patients, comparable in terms of the main anthropometric parameters, were divided: into a control group (33) - which underwent only the hemodialysis method and the main group (182) - using the methods of gravitational surgery hemosorption, hemodialysis, plasmapheresis. Introduction these extracorporeal detoxification methods were caused by the severity of intoxication syndrome, developing multiple organ failure. As a result, the patients of the main group were subdivided into 3 subgroups, depending on the severity of the general condition and theextracorporeal detoxificationmethod used: 1 - subgroup (55) - with the use of hemodialysis andhemosorptionmethods; 2 subgroup (62) - using hemodialysis and plasmapheresis; 3 subgroup (65) - using hemodialysis, hemosorption and plasmapheresis.

The level of urea and creatinine in blood and urine was studied by the urease method using reagents from La-Chema (Czech Republic); the level of potassium and sodium was determined on a Microlit apparatus (Hungary) using reagents from La-Chema (Czech Republic); the level of creatine in blood and urine (Reberg's test) was used to calculate changes in the level of glomerular filtration and tubular reabsorption ; ultrasound examination (ultrasound) of the kidneys was carried out on an "Acuson-128 XP / 10" apparatus (USA) with a 3.5 MHz transducer; The results obtained were processed in the Medstat program.

Results and discussion of the research: The general clinical picture in all patients on admission was noted by the severity of intoxication syndrome, manifestations of respiratory, cardiovascular insufficiency, confusion in 84.2% of cases, anemic syndrome in 72%, hypoproteinemia in 78%, 93% - anuria. In order to correct hemodynamic and metabolic changes, corrective, symptomatic complex therapy was carried out, including diet therapy, pulse therapy, antibiotics, vitamins, and immunotherapy.

In 63 (29.3%) cases, extracorporeal detoxificationmethods were performed for children once, depending on the severity of the condition, the severity of the intoxication syndrome and the level of organ changes.

Due to the low effectiveness of attempts to reduce the uremic syndrome in 152 (70.6%) cases, complex therapy was carried out for a long time in patients with terminal stage chronic renal failure on chronodialysis.

Indications for extracorporeal detoxification methods depended on the urgency of the condition in acute renal failure, the severity of organ changes and manifestations of uremia in children with chronic renal failure. In addition, the severity of changes in biochemical parameters, the shift of which corresponded to the level of severity of the underlying pathology and accompanying complications, had an undoubted role in the choice of extracorporeal detoxification methods.

The main reason for the development of acute renal failure in children was the generalization of infection in bronchopulmonary diseases with the development of acute pyelonephritis (22.2%), acute glomerulonephritis (63.49%). Late treatment, the hidden clinical picture, the absence of obvious signs of kidney damage, iatrogenic situations, caused the development of acute renal failure. In many cases, chronic renal failure was the result of long-term chronic pyelonephritis (19.93%), chronic glomerulonephritis (53.94%).

Considering the changes in indicators reflecting the level of intoxication syndrome before theextracorporeal detoxification (table 1), it can be noted that they are the confirmation of the severity of the patient's condition in the groups. Upon admission, patients of subgroup 1 of the main group with acute renal failure showed an increase in urea level by 5.6%, in subgroup 2 - by 82.8%, in subgroup 3 - by 93.3%, relative to the analog in the control group. In turn, a similar trend was determined in the study of the level of creatinine in the blood, when in subgroup 1 of the main group its increase was noted by 3.63%, in subgroup 2 - by 9.34%, in subgroup 3 - by 13.8%, from the results in the control group.

Thus, it can be noted that the indicators of the main toxic metabolites in the control and main groups were initially increased, and the range of values predetermined the general condition of the patients, the level of intoxication. Elucidating the changes associated with the regulation of water and electrolyte metabolism, it can be noted that in patients with acute renal failure, before extracorporeal detoxification, the sodium level in subgroup 1 of the main group was reduced by 8.3%, in subgroup 2 - by 3.6%, in 3 subgroup - by 10.2%, relative to the same indicator in the control group. At the same time, the level of potassium was determined by an increase of 44.6% in subgroup 1, by 86.6% in the second subgroup, by 131.1% in subgroup 3, relative to the same indicator in the control group.

Thus, it was found that electrolyte metabolism in patients with acute renal failure upon treatment was significantly impaired and to a greater extent due to an increase in potassium, which predetermined the condition of the patients.

Undoubtedly, the change in metabolism could not but affect the functional state of the kidneys in patients with acute renal failure, which was reflected in a decrease in the glomerular filtration index by 6.4% in subgroup 1, by 22.3% in subgroup 2, and by 38.6% in 3 subgroup, relative to this indicator in the control group. Inseparably linked

with this indicator, the tubular reabsorption result in patients of subgroup 1 of the main group was characterized by an increased value by 1.87%, in subgroup 2 - 17.9%, in subgroup 3 - by 28.8%, from the same indicator in the control group. The results obtained indicate a significant deterioration in renal function in children with acute renal failure, more striking in the main group.

Of particular importance in chronic renal failure is the long-term intoxication of the body, as a result of the circulation of uremic toxins in the blood, which leaves a certain imprint on metabolic changes. The results of the obtained data (table 1) of biochemical changes revealed that upon admission in patients of subgroup 1 with chronic renal failure, the urea level was reduced by only 4.09%, while in subgroup 2, an increase was noted by 23.5%, and in 3 subgroup - by 30.7%, depending on similar data in the control group. At this time, the concentration of creatinine in the blood was quite significant. So in subgroup 1 of the main group, the creatinine indicator increased by 3.6%, in subgroup 2 - by 9.3%, in subgroup 3 - by 13.8% relative to similar results in the control group.

Electrolyte metabolism in patients with chronic renal failure also underwent rather significant changes, characterized by a rise in sodium levels by 3.6% in subgroup 2 and by 10.2% in subgroup 3, although in subgroup 1 this indicator was slightly (8.3%) reduced in 1 subgroup. Most importantly, blood potassium levels in all patients were significantly elevated prior to extracorporeal detoxification, despite repeated chronodialysis sessions (2 times a week) and rationally programmed treatment. So, if in subgroup 1 of the main group in these patients the level of potassium was reduced by 14.1%, then in subgroup 2 by 12.8%, and in subgroup 3 - by 23.07%, higher than the same indicator in the control group. This condition was due to a significant deterioration in detoxification and electrolytic properties, which led to homeostatic changes.

This was confirmed by the deterioration of the filtration and reabsorption properties of the kidneys. Thus, the CP level was quite significantly reduced in both groups, but more pronounced in the patients of the main group. If in subgroup 1 the level of glomerular filtration was reduced by 6.4%, then in subgroup 2 - by 22.3%, while in subgroup 3 - by 38.6%, from the results in the control group. The results of tubular reabsorption in patients of the main group with chronic renal failure beforeextracorporeal detoxificationwere revealed somewhat higher. If in subgroup 1, the tubular reabsorption level was increased by 1.8%, then in subgroup 2 - by 17.9%, while in subgroup 3 - by 28.8%, relative to the analogue in the control group.

In turn, the tubular reabsorption value in the post-absorption period increased, in the control group by 103.7%, in subgroup 1 - by 131, 23%, in subgroup 2 - by 88.22%, in subgroup 3 - by 58.08% of initial values. The effectiveness of sorption methods was reflected in an increase in tubular reabsorption in subgroup 1 by 15.61%, in subgroup

2 - by 8.92%, while in subgroup 3 the value coincided with the same result in the control group.

Conclusion: The influence of sorption methods of detoxification in patients with acute renal failure and chronic renal failure has a significant advantage over monohemodialysis sessions.

1. The corrective effect of complex therapy affects the restoration of organ functions, reduction of intoxication syndrome, improvement of the clinical condition of patients. Undoubtedly,extracorporeal detoxificationmethods have a certain orientation and their use is possible in children with uncorrected conditions only through hemodialysis sessions.

2. The developed techniques have shown significant positive changes in the level of metabolic metabolism, reduction of intoxication due to the progressive removal of residual metabolic products, potassium, and other metabolites. Taking into account the effect on the body of each extracorporeal detoxification technique, realizing their capabilities, the effectiveness of the techniques in the group of the most severe patients with acute renal failure and chronic renal failure was noted.

3. Combined extracorporeal detoxification methods are an integral part of the complex therapy of patients with acute renal failure and chronic renal failure and can be recommended for the treatment of this category of patients.

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