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ACUTE RENAL FAILURE: ETIOLOGY AND PROBLEMS OF ITS PREVENTION

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Summary: Etiological factors of the development of ARF have been studied in 120 patients. According to these factors the patients were divided into five groups. The analysis of mortality in all groups of patients has been conducted and the main causes of death in patients with ARF have been pointed out. It was found that about half of the patients with ARF do not receive timely nephrologist's consultation at the hemodialysis department. It was revealed, that mortality in patients with toxic and post-traumatic ARF was higher than that in patients with postoperative and obstetric-gynecological ARF. The main risk groups of patients with ARF have been identified and the main principles of ARF prevention have been developed.

Key words: acute renal failure (ARF), etiology, prevention, mortality.

Introduction. Acute renal failure (ARF) is a polyetiological secondary disease with sudden renal dysfunctions, which causes further emergence of azotemia and uremia. The urgency of ARF problem is determined by its significant growth and not always timely diagnosis and high mortality [1, 2, 8]. ARF is characterized by rapid development and hard

course of the disease. Despite the rapid progress of renal replacement therapy, mortality at ARF, even in the world's leading clinics, remains at a 50% level and over the last several decades there is no tendency for its decrease [5, 7].

The number of cases with ARF is 200 per 1 million people. Moreover, 50 per cent of these patients need hemodialysis [4, 6]. Beginning with the 1990s, ARF is increasingly becoming not only as a monogamous pathology, but as a part of the syndrome of multiple organ failure. The same tendency will be observed in the 21st century.

The objective of the article is to identify the main etiological factors of ARF and develop the main principles of this disease prevention.

Material and methods. There were 120 patients with renal form of ARF under observation, at which mortality is the highest. Studies on patients with prerenal and post-renal ARF haven't been carried out. Common intensive therapy, including the use of extracorporeal blood purification methods, have been applied to treat the patients. The effectiveness of medical treatment and the time of its prescription before and after the patient's admission to a specialized detoxication department have been studied. General clinical and biochemical laboratory tests were carried out daily after the patient's admission to hospital.

Results and discussion. All the patients were divided into five groups according to the etiological factor by E.M. Tareeva's (1983) qualification of ARF: 1) post-operative ARF – 47 patients (39.2 %); 2) toxic ARF – 36 patients (30.0%); 3) post-traumatic ARF – 11 patients (9.2%); 4) obstetric gynecological ARF – 8 patients (6.6%); 5) other causes – 18 patients (15%). It should be mentioned, that the part of women among the all operated patients was 55.3%.

Most patients were of working age. Thus, the distribution of patients admitted to hospital was as follows: 29 patients at the age under 30 years, 30 patients – under 40, 23 patients – under 50, 16 patients – under 60, 18 patients – under 70, 5 patients – over 70 years. The patients were admitted to hospital or moved from other medical departments to be given a specialized medical care mainly after 1-7 days from the start of the disease. Thus, 13 patients (10.8%) were admitted to hospital within 24 hours from the start of the disease; from 1 to 2 days – 53 patients (44.2%); from 3 to 5 days – 38 patients (31.6%); from 6 to 7 days – 9 patients (7.6%); later than 7 day period of time – 7 patients (5.8%).

Mortality in patients with postoperative ARF was 17% (of 47 patients – 8 died), with toxic ARF – 38.9% (of 36 patients – 14 died), with post-traumatic ARF – 45.4% (of 11 patients – 5 died), with obstetric gynecological ARF – 12.5% (of 8 patients – 1 died), the other causes of ARF made up 22.2% (of 18 patients – 4 patients died). The main causes of the patients' death with ARF were as follows: 1) infectious complications – 15 patients, 2) hyperhydration – 6 patients, 3) hypercaliemia – 5 patients, 4) gastroenteric bleeding – 2 patients. It was found, that mortality in patients with toxic and post-traumatic ARF was higher than that in patients with postoperative and obstetric-gynecological ARF.

An early diagnosis of kidneys' dysfunction is of great importance [3]. After the development of ARF in a shock stage, it is necessary that causal factors should be eliminated as quick as possible. These factors include: shock, hypovolemia, ischemic and toxic renal injury.

Prevention of ARF was based on risk groups of patients selection. It was found, that the risk of ARF was highly increasing in patients with dehydration in children and in elderly people as well as in case of alcoholism, drug addiction, toxicomania, in patients with

multiple injuries and massive burns, during operations on heart and large vessels and with many cases of chronic metabolic (such as gout, generalized atherosclerosis, diabetes) and renal diseases.

According to our tests results, the patients with ARF needed nephrologist's consultation from the specialized department of hemodialysis in 31.7% of cases. But only 15.5% of the patients got the consultation they needed. Nephrologist consultation is required in almost all cases of ARF since it might contribute to better prognosis of the disease. If the cause of ARF is unknown and especially in case of possible occurrence of the kidneys' disease, the urgent consultation of nephrologist is necessary because these cases might need the urgent dialysis therapy. However, nephrologist's consultation is not required during the treatment of shock state (the 1st stage of ARF), because these patients should be treated in the intensive therapy department.

An important factor in ARF prevention is to treat dehydration, especially in children and in elderly people.

Timely restoration of extracellular fluid volume is important for the patients with burns, traumas, lymphopenia and infectious diseases. In addition, increasing blood volume and urine output intensification by means of diuretics, may be useful for the patients with pigmenturia, myeloma, nephrotoxins poisoning and after allergic reactions. An acute decrease in blood pressure and in blood volume, the use of rentgencontrast and nephrotoxic drugs as well as the drugs which activate the renin-aldosterone-angiotenzin system and reduce renal blood flow should be avoided in patients of risk groups. The application of antibiotics, non-steroidal anti-inflammatory drugs, heparin, saluretics should be done for these groups of patients very carefully and strictly according to the

indications for the use of these drugs. At the same time, antibiotic prescription is an

important part of ARF prevention in case of infection by nephrotoxic agents.

The risk of ARF development might be reduced by decreasing traumas during surgery, strict observation of asepsis rules, timely control in case of infection (non-nephrotoxic antibiotics), using the prophylactic injection of low-dosed heparin as well as caffeine-bensonat of sodium.

In uncomplicated course of ARF, absolute recovery of kidneys' functions after ARF was observed in 65 patients (70.6%), partial recovery – in 9 patients (10.9%), transformation of this disease into chronic renal failure – in 2 patients (2.2%). Observation of kidneys' function after patients discharging from hospital in 17 patients (18.5%) couldn't be carried out for various reasons.

- The rich experience in treating patients made it possible to reveal the following basic principles of ARF prevention:
- a qualitative monitoring of hydration level, central venous pressure, diuresis, acid-base balance, electrolyte change in patients in a critical state of health;
- an optimization of cardiac output and renal blood flow;
- avoiding using nephrotoxic drugs in patients with impaired renal function, but in case of obligatory application of these drugs, their doses should be adjusted depending on the state of renal function;

- an early active detoxication by stimulating patient's endogenous detoxication mechanisms: adequate hydration, diuresis stimulation, oncotic pressure adjustment, adequate dose of dopamine or its combination with dobutamine, etc;
- careful use of sulfanilamide and rengecontrast drugs in patients in a shock state, avoiding using uncontrolled introduction of diuretics;
- non-steroidal anti-inflammatory drugs and polyvinylpyrrolidone solutions should be used according to strict indication;
- timely surgical intervention in case of urinary tracks blockade by stones;
- an early use of corticosteroids pulse – dose and urine alkalization (under pH control) at hemoglobin – and myoglobinuria;
- calcium antagonists (verapamil, etc) glycine, theophylline and antioxidants (glutathione, vitamin E) should be used as cytoprotectors which reduce the risk of ARF.

Conclusions.

Early diagnosis of ARF and timely prescription of medical nephroprotective therapy improve its course and help to optimize its prognosis.

Observation of the main principles of prevention makes it possible to avoid the development of ARF in patients.

REFERENCES:

1. Вдовин В.А., Ганеев Т.С., Ханананова А.Н. Опыт лечения больных острой почечной недостаточностью низкопоточными фильтрационными методами в многопрофильных стационарах // Вестник современной клинической медицины. – 2013. – №5. – Т.6. – С. 60–63.
2. Диагностика и лечение неотложных состояний у детей / Волосовец А.П., Нагорная Н.В., Кривоустов С.П. и др. – 2-е изд., доп. – Донецк : Издатель Заславский А.Ю., 2010. – С. 96–101.
3. Кузнецов А.А. Хирургический сепсис: проблема нововведений, определенных конференцией (Чикаго, 1991), и их применение в клинической практике // Хірургія України. – 2006. – №1. – С. 91–95.
4. Хорошилов С.Е. Предупреждение и лечение острой почечной недостаточности при критических состояниях : Автореф. дисс. ... докт. мед. наук. – Москва, 2008. – 47 с.
5. Hoste E.L., Damen J., Vanholder R.C. et al. Assessment of renal function in recently admitted critically ill patients with normal serum creatinine // Nephrol. Dial. Transplant. – 2005. – № 20. – P. 747–753.
6. Lameire N, Van Biesen W, Vanholder R. Acute renal failure // Lancet, 2005. –Vol. 365. – P. 417–423.
7. Shigehiko U. Acute renal failure in critically ill patients. A multinational, multicenter study // JAMA. – 2005. – Vol. 100. – P. 468–475.
8. Waikar S.S., Liu K.D., Chertow G.M. Diagnosis, epidemiology and outcomes of acute kidney injury // Clin. J. Am. Soc. Nephrol. – 2008. – Vol. 3. – P. 844–848.