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VECTOR FOR ACUTE KIDNEY INJURY IN COVID 19

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✓ ***Resume***

Unfortunately, in some patients with acute kidney injury, we do not observe a complete recovery during their stay in the hospital. And in such patients, unfortunately, there may be a situation in which kidney function will not recover to its original values. That is, it is an acute injury, which then gradually transforms into chronic renal failure, with which they will live all their lives and which will require observation by nephrologists.

Keywords: COVID-19, respiratory distress syndrome, kidneys.

COVID-19 DA O'TKIR BUYRAK ZARARLANISHIGA VEKTOR

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✓ ***Rezyume***

Afsuski, o'tkir buyrak shikastlanishi bilan og'rigan ba'zi bemorlarning shifoxonada bo'lish vaqtida to'liq tiklanishini ko'rmayapmiz. Va bunday bemorlarda, afsuski, buyrak funksiyasi asl holatiga qaytmaydigan vaziyat yuzaga kelishi mumkin. Ya'ni, bu o'tkir travma bo'lib, u keyinchalik asta-sekin surunkali buyrak etishmovchiligiga aylanadi, ular bilan butun umri davomida yashaydi va nefrologlarning kuzatuvini talab qiladi.

Kalit so'zlar: COVID-19, respirator distress sindrom, buyraklar.

ВЕКТОР НА ОСТРОЕ ПОВРЕЖДЕНИЕ ПОЧЕК ПРИ COVID-19

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✓ ***Резюме***

К сожалению, у некоторых пациентов с острым повреждением почек мы не наблюдаем полного выздоровления во время их пребывания в стационаре. И у таких пациентов, к сожалению, может возникнуть ситуация, при которой функция почек не восстановится до исходных значений. То есть это острая травма, которая затем постепенно переходит в хроническую почечную недостаточность, с которой они будут жить всю жизнь и которая потребует наблюдения нефрологов.

Ключевые слова: COVID-19, респираторный дистресс синдром, почки.

Relevance

Unfortunately, there is no unambiguous data on it in t he world. According to published data, acute kidney injury can develop in 25-30% of hospitalized patients. At the same time, we do not know the long-term consequences of coronavirus infection. We have a rough idea of what happens in the acute phases, but we don't always understand how long these consequences will persist. As the outbreak of the 2019 coronavirus disease (COVID-19) caused by the severe acute respiratory syndrome 2 coronavirus (SARS-CoV-2) continues to spread worldwide, the full range of its consequences becomes apparent - from a mild respiratory disease that does not require treatment to severe acute respiratory distress syndrome (ARDS), multiple organ failure and death. With COVID-19, the kidneys are often affected; abnormal proteinuria is noted in more than 40% of patients upon admission to the hospital. In approximately 20% of patients admitted to the intensive care unit (ICU) with COVID-19, the median time interval from the

onset of the disease to the moment when they needed HRT was 15 days. Timely detection of kidney damage in COVID-19 and the use of preventive and therapeutic measures to limit the subsequent development of acute kidney injury or progression to more severe stages are crucial for reducing morbidity and mortality [1].

The introduction of the principles of supportive therapy within the framework of Clinical Practical Recommendations for acute renal injury (for example, avoid the use of nephrotoxic drugs, conduct regular monitoring of serum creatinine and diuresis, consider monitoring hemodynamic parameters) in critically ill patients with kidney damage is likely to reduce the incidence and severity of acute renal failure in COVID-19, but requires further validation. Relief of volumetric trauma and barotrauma through the use of protective artificial lung ventilation (ventilator) reduces the risk of acute respiratory failure or its deterioration by limiting the hemodynamic effect induced by ventilation and the load on the kidneys caused by a cytokine storm. New biomarkers of tubule damage should be included in future randomized clinical trials to study their significance in the prognosis and treatment of acute kidney injury [4].

All treatment options should be tested in rigorous trials, and ideally in randomized trials in the context of COVID-19. In the absence of specific treatment methods, all options should be considered taking into account the individual needs of each patient. Extracorporeal treatment methods included in the figure for consideration can serve as an addition to drug maintenance therapy. The targets of anticoagulant therapy are only indicative and should take into account the characteristics of each patient and his clinical condition. The general principle is that in the extracorporeal circuit, maximum anticoagulant action should be achieved with minimal systemic effects; if there are indications for systemic anticoagulation, and then the possibility of complex administration should be considered.

Hyper coagulation syndrome is often observed in critically ill patients with COVID-19. Thus, anticoagulant protocols for the extracorporeal circuit should be tailored to the individual needs of patients. Regional citrate anticoagulation is more effective than other anticoagulation methods in terms of prolonging the service life of the extracorporeal circuit and reducing the risk of bleeding. Based on our experience, a decrease in the concentration of ionized calcium after passing through the filter to about 0.25-0.35 m mol/l (the usual concentration is 0.30-0.45 m mol/l) in patients with COVID-19, it is a viable option to extend the patency of the filter; this goal is usually achieved with an initial dose of citrate of 3-5 m mol/l of filtered blood [2].

In the absence of established COVID-19 treatment methods, it is path physiologically possible to justify the use of membranes with good cutting off of large and medium-sized molecules in PVVG to increase cytokine excretion. In addition, in the early stages of a cytokine storm, the use of hem perfusion using sobbing columns can prevent cytokine-induced kidney damage. These treatments can be indicated in special cases when immune deregulation is obvious, inflammatory parameters or cytokine levels are elevated, and other methods of maintenance therapy are ineffective or insufficient. Although encouraging results have been obtained with the use of these methods, currently the evidence base for them is limited, so they should be used only in clinical trials to determine their safety and effectiveness. Extracorporeal life support methods do not jeopardize such experimental antibody-based therapy used in COVID-19 as the use of tocilizumab, intravenous administration of immunoglobulins and the use of convalescent plasma. Neither the hemodialysis filter nor the sorbing columns for hemadsorption remove antibodies, since the size of antibodies (for example, the size of IgG is 150 kDa) is much larger than the maximum size of molecules that can be removed by RRT or hemadsorption (about 60 kDa). Protective ventilation of the lungs with a respiratory volume of 6 ml/kg of estimated body weight can lead to hypercapnia, respiratory acidosis, increased need for vasopressors and acute respiratory failure. In such patients, extracorporeal carbon dioxide removal (ECCO2R) technique can help prevent deterioration of the clinical picture [3].

In the absence of specific treatments for SARS-CoV-2, supportive therapy and consistent use of extracorporeal replacement therapy for critically ill patients with signs of kidney damage provide temporary life support measures and increase the likelihood of a favorable outcome. The decision on the consistent use of extracorporeal replacement therapy methods should take into account the technical potential and special skills of all categories of personnel that are necessary to ensure the safety and effectiveness of this type of treatment. Careful selection of patients is necessary for the consistent use of extracorporeal replacement therapy methods, since age and concomitant

diseases apparently affect the outcome of the disease in seriously ill patients with COVID-19 [5].

In order to better understand the mechanisms of the occurrence of AKI due to COVID-19, further research is needed to obtain an adequate evidence base in favor of the use of certain clinical approaches discussed here and to develop new approaches to monitoring and treatment. The promotion of an international culture of collaborative and interdisciplinary research will be crucial for the systematic testing of therapies in clinical trials and the rapid identification of patients with COVID-19 who are at risk of acute kidney injury and in whom the use of existing and new therapeutic approaches can have a positive effect [1].

In patients with COVID-19, the kidneys are often affected; upon admission to the hospital, they may have proteinuria, and in the late stages of the disease, critically severe patients often develop acute kidney failure, which is considered as a marker of multiple organ failure and the severity of the disease.

Dehydration at admission can serve as a trigger for acute respiratory failure, since patients with COVID-19 usually arrive with fever and rarely undergo aggressive infusion therapy at the prehospital stage; protective ventilation reduces the risk of a new or worsening of existing acute respiratory failure, limiting the hemodynamic effects caused by ventilation and the load on the kidneys associated with a cytokine storm [3].

In the absence of specific treatment for COVID-19, therapy is mainly supportive; we recommend the introduction of principles for supportive therapy within the framework of Clinical Practical Recommendations for Acute Renal Injury, the use of extended RRT taking into account the characteristics of patients with COVID-19, as well as the possible use of methods for removing cytokines from the body, ideally in a clinical trial, in patients with early signs of hyper inflammatory reaction and cytokine release syndrome [2].

Research is needed to determine the significance of new tubule injury biomarkers in the prognosis and treatment of acute renal failure in patients with coronavirus disease 2019 (COVID-19); research should also focus on their potential to develop guidelines for optimal infusion therapy strategies (maintaining water balance), ventilation strategies and recruitment maneuver in patients with COVID-19 [4].

Clinical trials should investigate the use of HRT and the subsequent use of extracorporeal replacement therapy techniques at an early stage as a means of providing adequate support for organ function and preventing the progression of COVID-19. Studies are needed to clarify the role of hem adsorption and other extracorporeal techniques for removing cytokines from the body in cytokine storm scenarios in patients with COVID-19 [5].

Studies should establish the proportion of patients with bacterial sepsis and the role of the subsequent use of extracorporeal life support techniques (removal of endotoxin, cytokines, immune modulation, and extracorporeal replacement therapy) in their treatment.

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