POST-COVID-19 REHABILITATION OF ELDERLY AND ELDERLY PATIENTS WITH CHRONIC KIDNEY DISEASE

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Abstract:Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) can infect the kidney and the presence of chronic kidney disease (CKD) constitutes a higher risk of negative prognosis. SARS-CoV-2 main sequelae in CKD patients are an incomplete recovery of kidney function, muscle weakness and atrophy, breathiness, tiredness, pulmonary fibrosis, and initiation of kidney replacement therapy. The overall aim of this review is to provide a theoretical basis for early improvements of physical function health to all CKD stages by rehabilitation therapies.

Keywords: Exercise, Rehabilitation, Kidney replacement therapy, SARS-CoV-2, Preventive medicine.

Chronic kidney failure in the world population with not only medical, but also social and economic aspects remains relevant among. Development of medicine in our country, medicine in the world adaptation to the requirements of standards, healthcare system a series aimed at improvement and social protection of the population defined tasks "Medical care provided to the population in our country increase the efficiency, quality and popularity of aid, as well as formation of medical standardization system, diagnosis and introduction of high-tech methods of treatment, patronage by creating effective models of service and dispensary, support of a healthy lifestyle and disease prevention tasks such as doing...»2 are defined. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) can infect the kidney; however, it is not yet clear if virus replication occurs resulting in functional damage. Given the expression of the angiotensin-converting enzyme 2, the kidney is vulnerable to SARS-CoV-2. If kidney dysfunction is caused only by direct damage of the virus or is secondary also to other systemic processes triggered by SARS-CoV-2 it has not been well described. In a cohort of 701 SARS-CoV-2 chronic kidney disease (CKD) patients, the presence of proteinuria and hematuria were associated with an increased risk of in-hospital death up to 11- and 12-fold, respectively . Also, a systematic review and meta-analysis showed that CKD patients were more likely to be transferred to intensive care and undergo mechanical

ventilation . Therefore, the presence of CKD on admission constitutes a higher risk of a negative prognosis .

Frankly, the topic of the coronavirus has exhausted everyone. Some people are fed up with the information about him, while others still haven't come to their senses from the painful complications and separations... When you go out on the street, when you go to the market, it's like you've fallen on the trail of life, but God forbid, if you go to the healing places, you'll witness the seriousness of the situation... Patients with chronic kidney disease are at high risk of contracting COVID-19. So why? Because they suffer from major diseases, such as diabetes, hypertension, obesity, and atherosclerosis. Therefore, if patients belonging to this group are infected with the coronavirus, serious complications may occur, and there may even be a risk of death. Especially among these patients, those who receive permanent artificial kidney replacement therapy, those who have undergone kidney transplantation, have a very difficult time with the coronavirus. We know that under physiological conditions, the immune system protects by controlling various inflammatory processes in the body through innate and acquired immunity. Due to the fact that permanent uremic toxins in the blood of patients with chronic kidney failure are not completely removed even by hemodialysis, specific deep pathological changes occur in their immune system due to uremic intoxication, and a state of immunodeficiency is observed due to a decrease in immune activity. This, in turn, creates good conditions for the rapid development of secondary opportunistic infections. In addition, patients suffer from concomitant diseases. It is precisely because of ischemic heart disease, hypertension and other diseases that our patients tend to have severe cases of COVID-19.Currently, most of those infected with the coronavirus had no kidney complaints, but this disease is systemic, i.e., mainly by injuring small-caliber blood vessels (vasculitis and thrombotic microangiopathy), complications of acute kidney failure are occurring, i.e., they have an acute impairment of kidney function. As a result, patients face the problem of increased need for artificial kidney devices, regardless of their profile and location. To put it simply, now that we have cured COVID, the kidney is suddenly failing and the need for dialysis is emerging. Our patients, who are chronically undergoing dialysis, cannot be separated from this treatment. They receive dialysis for life. Here's how complicated and problematic the situation is…

As you probably know, there is a chronic systemic disease called lupus. It mainly damages connective tissue and blood vessels, it is a rheumatological disease. In this pain, there is a systemic, that is, an autoimmune process. "Auto" means that the

immune system works against its own tissue. What will be the result? That tissue and organ function is derailed. In any autoimmune disease, an immune mechanism - an antigen-antibody mechanism occurs. Although the basis of lupus is rheumatology, look at how many organs are affected: skin, kidney, heart, liver, veins, in short, all of them go into systemic failure one after the other.The same goes for COVID-19. Due to the strength of the virus, the process develops very quickly, and in some people, damage to the lungs, others to the liver, heart, and kidneys, the formation of blood clots, that is, hemorrhagic syndromes are observed. Cases of acute kidney failure may occur due to such an autoimmune process. But, as you mentioned above, this disease is still new for us, that is, an enigma. The first conclusions of the scientific research are now being announced. Patients with chronic kidney disease who are being monitored should try to avoid contracting the coronavirus as much as possible. It is known that COVID-19 is transmitted from person to person through airborne droplets. Therefore, people who are prone to severe complications of the virus, including the elderly, those receiving dialysis, those who have undergone kidney transplants and those with other chronic diseases, must definitely use all preventive measures: strictly apply the recommendations of experts continuously given by the mass media in practice, i.e. it is necessary to self-isolate, maintain social distance, and strictly follow the rules of personal hygiene. Regardless of whether kidney function is altered on admission or developed during hospitalization, many people experience kidney function loss after hospital discharge . A significant number requires long-term follow-up due to incomplete recovery of kidney function, continuous interstitial inflammation, loss of renal vascular cell regenerative potential, and hypertension . The high cost of kidney replacement therapies and the lack of uniform availability of hemodialysis clinics manifest into a challenging scenario. Improving the outcome of these patients is fundamental and emerging; these sequelae cannot become a COVID-19 legacy. For this reason, exercise rehabilitation therapies may play an important role in improving physical function health and attenuating the expected sequels in CKD patients infected by SARS-CoV-2. Kidney damage during SARS-CoV-2 infection is a risk factor for CKD development. The COVID-19 survivors, especially those dialysis-dependent or with pre-existing CKD, need to be closely monitored, as they represent a high-risk group. Studies suggest that pulmonary fibrosis will become one of the main sequelae in patients with SARS-CoV-2 infection, which may be exacerbated in CKD. Lung damage associated with SARS-CoV-2 can lead to the impairment of alveolar air exchange and a decrease of pulmonary ventilation function. As a result, many patients reported respiratory symptoms such as dyspnea and chest tightness,

and almost half within 1 month after SARS-CoV-2 infection have developed pulmonary fibrosis, persisting up to 6 months. During hospitalization, the development of cardiac complications such as acute myocardial injury, arrhythmias, and cardiogenic shock may also be seen, increasing mortality risk in AKI and CKD survivors. It is known that CKD is associated with the concomitant development of cardiopulmonary diseases, resulting in poor cardiorespiratory fitness and all its deleterious consequences . Lifestyle changes, medication adequacy, health education, and a rehabilitation program with therapeutic exercises can alleviate kidney damage and improve patient outcomes in the long term. The aim of rehabilitation in the context of cardiopulmonary complications of SARS-CoV-2 is to trigger the systemic antioxidant response to modulate the inflammatory state generated by the virus and to intervene in the endothelial dysfunction caused by it. This can be achieved through exercise rehabilitation, among which the most used types are: aerobic, respiratory, resistance, and interval training. Physical function rehabilitation performed with resistance training, balance exercises, and neuromuscular electrical stimulation could potentially counterbalance muscle and strength losses due to muscle disuse caused by bed-rest and long hospitalization periods. We, therefore, recommend rehabilitation professionals start early interventions in the acute inpatient setting, such as passive mobilization, bed mobility, sit-to-stand, and isometric exercises, and for safety reasons, control all clinical parameters. When it comes to hospital discharge, CKD patients infected by SARS-CoV-2 should be continued into physical rehabilitation. Home-based, in-home telehealth, intradialytic, or patient-directed exercises determined to patient needs should be delivered.

Chronic kidney disease is relatively common in later times along with primary kidney pathologies,diabetes, hyperlipidemia, obesity, metabolic syndromes, hypertension disease, secondary to systemic diseases .It was mentioned in detail above that it can also be explained with nephropathies. It is important whether it is primary or secondary nephropathy whether it is all based on the violation of blood circulation in the nephron, microthrombosis, renal parenchyma ischemia and their consequences nephroangiosclerosis of the balls lies. Therefore, in the treatment of SBK blood rheology improving, antiaggregant and anticoagulant drug the role of tools is incomparable. In addition, antiaggregant and anticoagulants are four in the treatment of glomerular diseases are the main components 1 and 2 of component therapy. That's why for the effect on the hemostasis system and blood rheology in the treatment of SBK below. It is about a group of drugs.

Conclusions: Chronic kidney disease patients affected with SARS-CoV-2 should be monitored by rehabilitation professionals as the cardiopulmonary, musculoskeletal, and cognitive systems might be deteriorated due to the infection. During the infection phase, if the patient is physically able to rehab (i.e., not reporting fever or dyspnea, oxygen saturation ≥ 95%, rhythmic heart rate), it should be started respecting all safety procedures to avoid the therapist's infection, but home-based or telehealth sessions should be prioritized. Long-term consequences of SARS-CoV-2 on physical function health are unknown and preventive rehabilitation may attenuate them. Therefore, future experimental studies must be designed to elucidate the rehabilitation benefits of SARS-CoV-2-related sequelae in CKD patients from all stages.

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