

MODERN METHODS OF TREATMENT OF CHRONIC RENAL FAILURE

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Abstract

Chronic renal failure (CKD) is a progressive condition characterized by a prolonged decline in kidney function and requiring constant medical monitoring. Modern treatments for CKD include drug therapy, dialysis, and kidney transplantation. This article discusses current approaches to the treatment of CKD, based on the analysis of data from scientific sources, such as Google Scholar, Scopus and other peer-reviewed databases. The main methods of therapy, their effectiveness and the results of clinical trials are described. It has been revealed that an integrated approach to treatment, including new medications, improved dialysis methods and modern transplantation technologies, can significantly improve the quality of life of patients and slow down the progression of the disease. The work highlights the importance of continuous monitoring and individualization of treatment to achieve the best outcomes.

Keywords. Chronic renal failure, drug therapy, dialysis, kidney transplantation, ACE inhibitors, angiotensin II receptor blockers, sodium-glucose cotransporters type 2, hemodialysis, peritoneal dialysis, immunosuppressive therapy, quality of life, disease progression.



Introduction

Chronic kidney failure (CKD) is a serious medical condition characterized by progressive and irreversible deterioration in kidney function. It can occur as a result of various diseases such as diabetes, hypertension, glomerulonephritis and polycystic kidney disease. CKD is a global health problem affecting millions of people around the world.

The progression of CKD leads to the disruption of all basic functions of the kidneys, including blood filtration, regulation of water-salt balance and maintenance of acid-base balance. As a result, an accumulation of toxic substances develops in the body, which leads to many serious complications and deterioration of the patient's general condition.

Current treatments for CKD include conservative approaches such as drug therapy, as well as replacement methods such as dialysis and kidney transplantation. Drug treatment is aimed at slowing down the progression of the disease and preventing complications. Dialysis is a life-saving therapy that is used in cases of a significant decrease in kidney function. Kidney transplantation, in turn, remains the most effective method of restoring kidney function in the late stages of CKD.

Despite advances in the treatment of CKD, disease progression and associated complications remain a significant challenge. The continuous development of medical technology and the exploration of new treatment approaches play a key role in improving patient outcomes. In this article, we will analyze modern methods of treating CKD, their effectiveness and the results of the latest research, based on data from peer-reviewed scientific sources.

Materials and Methods

A variety of scientific sources were used to conduct this study, including articles, reports, and reviews published on leading scientific platforms such as Google Scholar, Scopus, PubMed, and Web of Science. The study was multidisciplinary in nature and included the analysis of materials related to both conservative and invasive treatment of chronic renal failure (CKD).

The main materials for the analysis were selected according to the criteria of relevance, quality and degree of evidence of the data presented. First of all, studies conducted over the past 10 years were taken into account to assess the current state of treatment methods for CKD. Articles describing the results of



clinical trials and meta-analyses, as well as materials highlighting innovative approaches and new treatments, were used.

The study methods included the analysis of data on drug therapy, renal replacement therapy, including hemodialysis, peritoneal dialysis, as well as kidney transplantation. Particular attention was paid to the review of the use of angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers, and sodium-glucose cotransporters type 2 (SGLT-2), which are widely used in the treatment of CKD at different stages. In addition, a comparative analysis of the effectiveness of different types of dialysis was carried out, including modern methods aimed at improving the quality of life of patients, such as the use of portable dialysis machines and new formulations of solutions. For the kidney transplantation study, new methods of immunosuppressive therapy were evaluated to reduce the risk of organ rejection after transplantation. The results of international clinical trials were studied, as well as the analysis of long-term outcomes in transplant patients.

The methodology also included a comparative analysis of traditional and modern methods of treating CKD, in order to identify the most effective approaches. Particular attention was paid to the individualization of therapy, the need for a multidisciplinary approach and consideration of concomitant diseases, such as diabetes mellitus and cardiovascular pathologies, which often accompany CKD and can complicate the course of the disease.

Thus, the materials and methods used made it possible to conduct a comprehensive analysis of modern approaches to the treatment of chronic renal failure, which made it possible to summarize the data and identify the most promising areas for further development in this field of medicine.

Results

The results of the study, based on the analysis of scientific data from peer-reviewed sources, confirm the high effectiveness of an integrated approach to the treatment of chronic renal failure (CKD). During the analysis, several key areas were identified that show the greatest results in slowing the progression of the disease, improving the quality of life of patients and reducing mortality.

One of the most promising treatments for CKD is drug therapy, which is based on the use of angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers. The use of new generation drugs, such as sodium-glucose cotransporters type 2 (SGLT-2), has also shown significant improvement in the



condition of patients suffering from both CKD and concomitant diabetes mellitus. These drugs help to reduce blood glucose levels and have a protective effect on the kidneys, which is an important factor in the treatment of this disease.

The second area that has shown significant results is renal replacement therapy. Hemodialysis and peritoneal dialysis remain the main treatments for patients with end-stage CKD. Modern hemodialysis techniques, including the use of high-performance filters and individualized dialysis fluid formulations, have improved the control of toxin levels in the body and increased patient survival. The use of portable dialysis devices also opens up new perspectives for patients, allowing treatment to be carried out more flexibly and comfortably.

Kidney transplantation, as before, is the most preferred method for patients with end-stage CKD. Advances in immunosuppressive therapy aimed at preventing rejection of the transplanted kidney have significantly reduced the risk of complications after surgery. The use of new combination drug regimens showed an improvement in long-term outcomes in transplant patients, which made it possible to increase life expectancy and reduce the number of repeat operations. In addition, the analysis showed the importance of timely diagnosis and an individualized approach to the treatment of patients with CKD. Numerous studies have confirmed that early detection of the disease and the use of complex therapy in the early stages help slow down its progression. This highlights the need for continuous monitoring and the application of a multidisciplinary approach, including nephrologists, cardiologists and endocrinologists, to manage both the underlying disease and the comorbidities.

The results also suggest that patients who receive comprehensive treatments that include medication, regular dialysis and transplants have higher survival rates and quality of life compared to those who receive only one of these treatments. This highlights the importance of a comprehensive approach that includes both pharmacological treatment and invasive techniques, if necessary.

Thus, the results of this study confirm that modern methods of treating chronic renal failure, based on individualized therapy and the use of innovative solutions, can significantly improve the prognosis for patients and improve their quality of life.



Conclusions

The conclusions made on the basis of the study show that chronic renal failure (CKD) is a complex and multifactorial disease that requires a comprehensive and individualized approach to treatment. The progression of CKD can be effectively slowed down, and the quality of life of patients can be significantly improved with timely diagnosis, the right choice of drug therapy and the use of modern methods of renal replacement therapy, such as dialysis and kidney transplantation.

One of the key factors influencing the success of treatment is the use of modern medications, such as angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers, and sodium-glucose cotransporter type 2 (SGLT-2) inhibitors. These drugs have been shown to be highly effective in reducing the risk of complications, slowing the progression of kidney failure, and improving the overall condition of patients. Modern pharmacological approaches also play a key role in the prevention and management of comorbidities, such as hypertension and diabetes, which can accelerate the development of CKD.

Renal replacement therapy remains the main treatment in the advanced stages of the disease. The results of numerous clinical studies indicate that modern methods of hemodialysis and peritoneal dialysis can significantly improve the control of toxins in the body, which has a positive effect on patient survival. The emergence of new technologies, such as portable dialysis devices, opens up new opportunities for patients, increasing their autonomy and quality of life.

Kidney transplantation continues to be the most effective treatment for end-stage CKD. Thanks to significant advances in immunosuppressive therapy, the risk of transplant rejection has been significantly reduced, which has significantly increased the life expectancy of patients after surgery. However, transplantation requires careful and long-term monitoring, which makes it necessary to further improve both surgical and therapeutic approaches.

The findings also highlight the importance of a comprehensive approach to the treatment of CKD, including a multidisciplinary team of specialists. This is especially important for patients with comorbidities, as the management of complex cases requires the involvement of not only nephrologists, but also cardiologists, endocrinologists, and other specialists. Individualization of treatment allows you to optimize it for each individual patient, which significantly improves outcomes and reduces the risk of complications.



Thus, modern treatments for chronic renal failure are showing significant progress, however, further research and development remains necessary to improve existing methods and find new therapeutic approaches. Constant updating of knowledge and the introduction of innovative technologies will not only prolong the life of patients, but also significantly improve its quality, making treatment more accessible and effective at all stages of the disease.

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