Treatment of Renal Failure

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ABSTRACT

Chronic kidney disease (CKD) is a global health burden with a high economic cost to health systems and is an independent risk factor for cardiovascular disease (CVD). All stages of CKD are associated with increased risks of cardiovascular morbidity, premature mortality, and/or decreased quality of life. CKD is usually asymptomatic until later stages and accurate prevalence data are lacking.

INTRODUCTION

The kidney is a vital organ in the human body that removes waste products from circulation, such as nitrogenous waste and exogenous molecules, such as drugs, in addition to regulation levels of electrolytes, participating in the synthesis of erythropoietin hormone and Metabolism of proteins that are low molecular weight, such as insulin. **(Kidney failure 2017)**

Renal failure is the most important disease that causes loss in the efficiency of the kidney is a renal failure or may called end-stage kidney disease where the capacity for the kidney becomes 15% less than the normal levels. This disease can be classified into two types: first (acute kidney failure) which may resolve and it rapidly develop. Second (chronic kidney failure): it slowly develops and may become a permanent condition.

Chronic kidney disease (CKD) is the 16th leading cause of years of life lost worldwide. Appropriate screening, diagnosis, and management by primary care clinicians are necessary to prevent adverse CKD-associated outcomes, including cardiovascular disease, end-stage kidney disease, and death. **(Chen TK et al 2019)**

Chronic kidney disease (CKD) affects between 8% and 16% of the population worldwide and is often under-recognized by patients and clinicians. **(Coresh J et al 2007)**

Defined by a glomerular filtration rate (GFR) of less than 60 mL/min/1.73 m^2, albuminuria of at least 30 mg per 24 hours, or markers of kidney damage (eg, hematuria or structural abnormalities such as polycystic or dysplastic kidneys) persisting for more than 3 months,CKD is more prevalent in low- and middle-income than in high-income countries. **(KDIGO 2012)**

Globally, CKD is most commonly attributed to diabetes and/or hypertension, but other causes such as glomerulonephritis, infection, and environmental exposures (such as air pollution, herbal remedies, and pesticides) are common in Asia, sub-Saharan Africa, and many developing countries.[4] Genetic

risk factors may also contribute to CKD risk. For example, sickle cell trait and the presence of 2 *APOL1* risk alleles, both common in people of African ancestry but not European ancestry, may double the risk of CKD. **(Jha V et al 2013)**

Diabetes and hypertension are the leading causes of CKD in all high-income countries and many low- and middle-income countries (1). The global epidemic of diabetes and hypertension could lead to a worldwide increase in prevalence and in the number of persons with CKD and its complications without effective interventions **(Danaei G et al 2011).**

Although the prevalence of CKD has been reported in individual countries, global estimates of CKD prevalence and absolute burden are not available. Accurate estimates of the worldwide prevalence of this condition are essential as a source of primary information and for rational planning of health services. Quantifying the global burden of CKD will allow public-health policy-makers around the world to assign sufficient priority and resources to its prevention and treatment. We aimed to estimate the global prevalence and absolute burden of CKD in 2010 by pooling data from population-based studies worldwide. **(Danaei G et al 2011)**

Widespread implementation of the definition and classification of chronic kidney disease, as proposed by Kidney Disease Outcomes Quality Initiative (KDOQI) in 2002 and subsequently endorsed by KDIGO in 2004, has promoted increased attention to chronic kidney disease in clinical practice, research and public health **(National Kidney Foundation 2002).**

It has also generated substantial debate about the appropriateness of recommending the same GFR thresholds for people of all ages, the optimal level of albuminuria for diagnosing kidney damage, and about the value of the 5-stage classification system based on eGFR without consideration of albuminuria **(Gansevoort RT, de Jong PE, 2009).**

TREATMENT

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As per the outcome of established renal /kidney failure, prevention is critical. In certain cases, the risk of developing renal failure could be predicted such as decreased perfusion secondary to abdominal surgery, coronary bypass surgery, acute blood loss in trauma, and uric acid nephropathy, where preventative strategies could prove effective.

When patients with risk factors for developing renal failure are scheduled for surgery, the doctor should be aware that the likelihood of the patient developing renal failure is high and should consider preventative measures, including discontinuation of medications that might enhance the likelihood of renal damage (e.g., NSAIDs, angiotensin-converting enzyme inhibitors).

1. **Dialysis**

Dialysis is a medical treatment that filters and purifies the blood using a machine, when the

kidneys are no longer able to perform this function.Regular dialysis can help manage symptoms, slow disease progression, and improve overall health. However, dialysis is not a cure for kidney disease, and individuals may still experience complications such as anemia, bone disease, and cardiovascular disease.Dialysis is a life-sustaining treatment for individuals with end-stage renal disease (ESRD). The process involves filtering the blood to remove waste products, excess fluids, and electrolytes. **(Tattersall et al., 2020).**

There are two types of dialysis:

- **Hemodysis:** Hemodialysis is a treatment for renal failure that uses a machine to filter the blood outside the body. The process involves accessing the bloodstream through a vascular access, such as an arteriovenous fistula or graft, or a central venous catheter. The blood is then pumped into the dialysis machine, where it is filtered through a semipermeable membrane to remove waste products, excess fluids, and electrolytes **(KDOQI, 2013).**

  Hemodialysis is typically performed three times a week, for 3-4 hours per session. Regular hemodialysis can help manage symptoms, slow disease progression, and improve overall health for individuals with end-stage renal disease (ESRD). Adherence to hemodialysis treatment and proper management of vascular access can improve outcomes and reduce complications.

- **Peritoneal Dialysis:**Peritoneal dialysis (PD) is a treatment for renal failure that uses the peritoneum, a membrane lining the abdominal cavity, as a filter to remove waste products from the blood. A catheter is inserted into the abdominal cavity, and a dialysis solution, also known as dialysate, is infused through the catheter. The dialysate absorbs waste products and excess fluids from the blood, which are then drained from the body **(Li et al., 2015).**

There are several types of PD, including continuous ambulatory peritoneal dialysis (CAPD) and automated peritoneal dialysis (APD). PD offers flexibility and autonomy, allowing patients to perform exchanges at home. However, PD requires careful management of the catheter and dialysate to prevent infections and other complications.

2. **Kidney Transplant:**Kidney transplantation is a surgical procedure that involves replacing a diseased or damaged kidney with a healthy one from a donor. It is a treatment option for individuals with end-stage renal disease (ESRD), who have lost nearly all kidney function. The transplanted kidney takes over the function of the failed kidneys, filtering waste products and excess fluids from the blood.

   The transplant process involves several steps, including evaluation, surgery, and post-operative care. The recipient's immune system is suppressed to prevent rejection of the

transplanted kidney. Immunosuppressive medications are taken for the rest of the recipient's life to maintain the health of the transplanted kidney.

Kidney transplantation can significantly improve the quality of life for individuals with ESRD, allowing them to return to their normal activities and improving their overall health. According to a study published in the New England Journal of Medicine, kidney transplantation is associated with improved survival and quality of life compared to dialysis **(Wolfe et al., 2018).**

CONCLUSION

Renal failure treatment options vary depending on the underlying cause and severity of the disease. Hemodialysis and peritoneal dialysis are common treatments for end-stage renal disease, helping to filter waste products and excess fluids from the blood. Kidney transplantation is also a viable option for some patients. Additionally, lifestyle modifications, such as dietary changes and medication adherence, can help manage symptoms and slow disease progression. Early detection and treatment are crucial to improving outcomes.

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