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Chronic Kidney Disease: A Comprehensive Review of Follow-Up Care in Primary Health Settings

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ABSTRACT

Chronic kidney disease (CKD) encompasses a variety of kidney function and structural abnormalities, posing a significant global health challenge. Early detection and management are critical, with guidelines from 2002 outlining CKD classification based on severity, which is determined by factors such as glomerular filtration rate (GFR), clinical diagnosis, and albuminuria. Routine laboratory tests play a key role in detecting CKD at early stages. Effective treatments are available to slow disease progression, prevent complications, reduce cardiovascular risks, and improve the quality of life and survival rates for CKD patients. This review examines data from multiple sources, including Cochrane, Medline, PubMed, Embase, and NCBI, and focuses on the etiology, incidence, and management strategies of CKD. The increasing prevalence of CKD is largely attributed to the growing incidence of chronic conditions such as hypertension and diabetes, as well as the aging population. CKD often goes unnoticed in its early stages, being asymptomatic until it reaches advanced stages, where it may lead to end-stage renal failure or death.

Keywords: Chronic kidney disease, Kidney disorders, Glomerular filtration rate, Primary care

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Introduction

Chronic kidney disease (CKD) encompasses a range of disorders that impact kidney structure and function. The manifestation of CKD varies depending on its severity, progression rate, underlying causes, and pathology. Since the establishment of guidelines defining CKD a decade ago [1], the understanding of this condition has evolved significantly. What was once considered a rare and potentially fatal disease now represents a widespread health issue, with varying levels of severity, necessitating a comprehensive public health approach for its detection, prevention, and management [2]. CKD now affects about 10% of the global population [3], though not all cases progress to end-stage kidney disease (ESKD), which can typically be managed within primary care settings [4]. Today, CKD ranks as the 16th leading cause of years of life lost worldwide. Numerous organizations, including Kidney Disease: Improving Global Outcomes, the UK National Institute for Health and Clinical Excellence, and the Canadian Society of Nephrology, have developed recommendations for CKD management to help prevent

cardiovascular disease and ESKD [5]. Despite these guidelines, the quality of CKD care remains inconsistent across different regions [6]. Primary care physicians play a crucial role in the early detection, diagnosis, and management of CKD, aiming to prevent severe outcomes such as cardiovascular disease, ESKD, and premature death. CKD is clinically defined as an abnormality in kidney function or structure persisting for more than three months [7].

This review aims to explore the role of primary care in managing CKD and how healthcare providers approach the condition in everyday clinical practice.

Materials and Methods

Articles were selected from the PubMed database, and key terms were searched using Mesh: ((“Chronic Kidney Disease” [Mesh]) AND (“Primary Care” [Mesh]) OR (Management [Mesh])). The inclusion criteria focused on articles discussing the management and assessment of CKD within primary care settings. Articles that did not center on these topics were excluded. Additional relevant publications cited in the selected studies were also utilized.

Results and Discussion

Chronic kidney disease (CKD) is often detected incidentally or during routine screenings, particularly through urine tests. While some patients may experience symptoms like flank pain, decreased urine output, gross hematuria, albuminuria (foamy urine), and nocturia, these are less common early in the disease. As CKD advances, patients might report more systemic symptoms such as a metallic taste, fatigue, loss of appetite, vomiting, nausea, weight loss, pruritus, mood changes, difficulty breathing, and peripheral edema. It is important for healthcare providers to remain vigilant for symptoms that could suggest systemic causes, such as hemoptysis, lymphadenopathy, hearing loss, rashes, or neuropathy, and to consider the possibility of urinary obstruction when assessing a patient with CKD [8-10].

Risk factors for CKD should be carefully assessed, including family history of kidney disease, comorbid conditions like diabetes, hypertension, autoimmune diseases, prior kidney stones, and urinary tract infections. Additionally, exposure to nephrotoxins, such as herbal remedies, certain medications (e.g., gentamicin, NSAIDs), chemotherapy agents, and phosphate-based bowel preparations, should also be considered as potential contributors to kidney damage [8, 9, 11].

CKD is defined as the presence of an abnormality in kidney function or structure lasting for more than three months. This may be evidenced by a glomerular filtration rate (GFR) below 60 mL/min/1.73 m^2, albuminuria (urinary albumin ≥ 30 mg per 24 hours or a urine albumin-to-creatinine ratio greater than or equal to 30 mg/g), and other signs of kidney damage such as abnormal imaging findings, renal tubular disorders, or a history of kidney transplantation. To distinguish CKD from acute kidney conditions such as acute kidney disease or acute kidney injury, it is important to assess the duration of kidney dysfunction and repeat evaluations when necessary. If there is any uncertainty about the duration of kidney dysfunction, additional assessments should be conducted to confirm the diagnosis [9-11].

Once CKD is diagnosed, it is important to determine its stage, which is based on the GFR levels and the presence of albuminuria. The stages of CKD range from G1 (GFR ≥ 90 mL/min/1.73 m^2) to G5 (GFR < 15 mL/min/1.73 m^2). The GFR can be evaluated using methods such as iohexol or iothalamate plasma clearance tests. CKD can also be categorized based on the presence of systemic diseases, including genetic disorders, autoimmune conditions, diabetes, chronic infections, and malignancies, as well as by kidney anatomy (e.g., cystic, congenital, vascular, glomerular). Identifying the specific cause of CKD is often challenging but important, as it influences both the prognosis and treatment plan. For example, polycystic kidney disease tends to progress more rapidly to end-stage kidney disease (ESKD) and may require specific treatments like tolvaptan to slow the decline in GFR. If the cause of CKD remains undetermined, referral to a nephrologist is often necessary for further evaluation [8-11].

Given that CKD is often asymptomatic in its early stages, screening is crucial for early detection. The National Kidney Foundation offers a kidney profile test to assess urine albumin-to-creatinine ratio (ACR) and estimate GFR based on serum creatinine levels. Screening is particularly recommended for individuals over the age of 60, as well as for those with pre-existing hypertension, diabetes, or other risk factors such as kidney stones,

autoimmune diseases, reduced kidney mass, obesity, and prior episodes of acute kidney injury. However, while guidelines recommend screening for those at risk, no randomized clinical trials have definitively shown that screening asymptomatic individuals for CKD improves patient outcomes. Despite this, many clinical guidelines continue to advocate for screening, especially in at-risk populations [9-11].

In conclusion, early detection and proper management are essential in managing CKD. Regular screenings in individuals at risk can facilitate early intervention, potentially slowing disease progression and improving long-term outcomes. However, further research is needed to better understand the effectiveness of screening and the most effective methods of managing CKD in primary care settings [8, 10, 11].

Risk factors

Chronic kidney disease (CKD) is influenced by a variety of risk factors that can be categorized into clinical, sociodemographic, and genetic types. Clinical factors associated with CKD include obesity, diabetes, frequent urinary tract infections, kidney stones, hypertension, and a history of systemic infections such as HIV or hepatitis. Additionally, autoimmune disorders, malignancy, and low kidney mass from conditions like nephrectomy or low birth weight contribute to the risk. The use of nephrotoxic medications, such as NSAIDs, lithium, and certain herbal treatments, as well as smoking, also elevates risk. Sociodemographic factors such as being older than 60, having low income, low educational attainment, or being from a non-white ethnicity have been linked to a higher likelihood of developing CKD. In terms of genetic predisposition, conditions such as polycystic kidney disease, sickle cell trait, and Alport syndrome are significant contributors [12].

Management in primary care

Cardiovascular risk reduction

Cardiovascular issues present a higher threat to CKD patients than to the general population, with CKD exacerbating the prognosis for those with preexisting heart conditions. Managing cardiovascular risk in CKD patients is crucial, and it is common practice to prescribe statins to individuals over 50, regardless of cholesterol levels, to help reduce cardiovascular events [13, 14].

Managing hypertension

Hypertension is one of the primary risk factors contributing to CKD progression. For patients with both CKD and hypertension, reducing blood pressure is essential in mitigating cardiovascular and kidney-related complications. Guidelines recommend specific treatments such as ACE inhibitors (ACE-I) or angiotensin II receptor blockers (ARBs), especially in diabetic patients, as these medications can help reduce albuminuria, a marker of kidney damage. A blood pressure goal of under 130/80 mm Hg is advised for most CKD patients to minimize further kidney deterioration [15, 16].

Diabetes management

Controlling blood sugar levels is crucial for CKD patients with diabetes, as it can slow the progression of kidney disease. Most health guidelines recommend keeping HbA1c levels below 7.0%. In these patients, it is preferable to use medications that are metabolized by the liver and partially excreted through the kidneys. Medications like SGLT2 inhibitors, which have proven benefits in reducing cardiovascular risks and preserving kidney function, are particularly recommended for those with high albuminuria [12, 17].

Avoiding nephrotoxins

Medications that cause kidney damage are a common cause of acute renal injury, with elderly patients being particularly susceptible. It is essential to educate CKD patients about the potential risks of nephrotoxic drugs. For instance, NSAIDs should generally be avoided, especially for patients already undergoing treatment with ACE-I or ARBs, as these can exacerbate kidney damage [12, 18].

Drug dosage adjustments

Patients with CKD often need adjustments to their medication dosages due to impaired renal function. Over-prescribing drugs that are ineffective or unsafe can lead to adverse effects. It is critical to monitor drug dosages

for medications like antibiotics, anticoagulants, insulin, and oral hypoglycemic agents, as these often require reductions in dosages to prevent toxicity and side effects [12, 17, 18].

Conclusion

Chronic kidney disease (CKD) is a growing health concern, with an increasing number of people affected globally. Its prevalence is closely linked to other chronic health conditions, particularly hypertension and diabetes, which are becoming more common as life expectancy increases. One of the challenges with CKD is that it often progresses without noticeable symptoms, meaning it is frequently diagnosed only at more advanced stages. If left unchecked, CKD can progress to end-stage renal failure and, in severe cases, may lead to death.

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