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Hypertension and chronic kidney disease; a mutual relationship

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ABSTRACT

Hypertension (HTN) and chronic kidney disease (CKD) have a mutual relationship. HTN is both a risk factor for and a complication of CKD due to various mechanisms. High blood pressure causes damage to blood vessels, including those in the kidneys, contributing to reduced kidney function over time. Meanwhile, decreasing kidney function leads to salt and water retention, increased activity of the renin-angiotensin-aldosterone system, and other effects that worsen HTN. Tight blood pressure control through lifestyle modification and medication is essential for slowing CKD progression and lowering the risk of associated cardiovascular complications. Understanding the intersecting pathophysiology between HTN and CKD is critical for optimal management. This paper summarizes current evidence on this relationship and its implications for treatment considerations. Further research is warranted on interventions that can effectively disrupt the vicious cycle connecting HTN and progressive CKD.

Implication for health policy/practice/research/medical education:

Hypertension is a significant global concern and one of the leading causes of death worldwide. Chronic kidney disease, which has been increasing in prevalence rates, is known to be in mutual relationship with hypertension.

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To Editor,

Hypertension (HTN) is a significant global concern and one of the leading causes of death across the world. The World Health Organization (WHO) predicts that the number of adults with HTN will rise from 1.28 billion to 1.56 billion by 2025. High systolic pressure over 140 mmHg is the primary risk factor that can be adjusted by disability-adjusted life years (DALYs) in women and the second in men. Due to its importance, HTN was declared on May 11, 2005, to increase public awareness and prevent and control this disease, which is one of the factors leading to cardiovascular diseases and premature death (1,2). This study investigates the relationship between HTN as a significant risk factor in chronic kidney disease (CKD).

Chronic kidney disease is a condition that affects 9.1% of the global population, and its prevalence is on the rise (3). CKD is defined as either decreased renal function (estimated glomerular filtration rate [eGFR] < 60 mL/min/1.73 m²) or renal damage, often characterized by the presence of proteinuria, for more than three months (4).

High blood pressure is a significant risk factor for kidney disease, and it has a mutual relationship with CKD. On the one hand, HTN can lead to a decrease in kidney function; on the other hand, high stages of CKD can worsen HTN (5). Studies have shown that the prevalence of HTN in patients with CKD is about 67 to 92%, making it the most common disease associated with an increased prevalence and severity of kidney function progression (6,7).

High blood pressure can damage the body, especially on the small blood vessels in different organs, including the kidneys. When the HTN persists, it can damage and weaken these vessels, effectively reducing their ability to filter waste and excess fluid from the blood. This damage can cause a dangerous cycle in which the kidneys struggle to remove waste and fluid, increasing blood pressure. Over time, this cycle can cause damage to the kidneys, eventually leading to kidney failure (8).

Several mechanisms contribute to HTN development in CKD. Each of these mechanisms can influence its management. One such mechanism is the increase in

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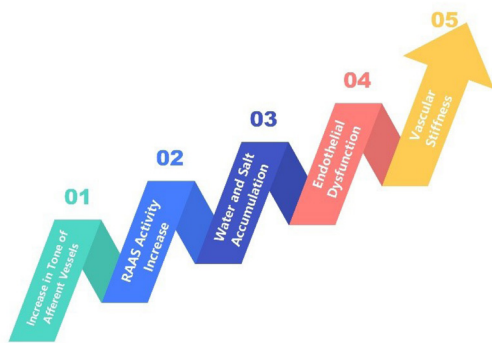


Figure 1. Hypertension promote the progression of CKD.

sympathetic tone caused by signals sent from the kidney's afferent vessels, whose function has decreased, leading to high blood pressure (9). Additionally, a decrease in the eGFR increases the renin-angiotensin-aldosterone system's (RAAS) activity, causing salt and water accumulation and increased blood pressure sensitivity to salt (10). CKD is characterized by endothelial dysfunction and vascular stiffness, also associated with HTN. Furthermore, HTN's development can be promoted by increased oxidative metabolism and relative renal hypoxia (11).

Patients with HTN must manage it through lifestyle changes and medication. These changes will help reduce the risk of organ damage and related complications. Regular monitoring and management of blood pressure can also lower the risk of kidney damage and other related health problems (Figure 1).

Authors' contribution

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Conflicts of interest

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