



# Onco-hypertension; a collaboration among oncologists, nephrologists and cardiologists

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## Abstract

It is essential to manage hypertension in cancer patients because uncontrolled high blood pressure can increase the risk of cardiovascular complications and negatively impact overall health. We searched PubMed, Web of Science, EBSCO, Scopus, Google Scholar, Directory of Open Access Journals (DOAJ), and Embase, using keywords including; hypertension, onco-hypertension, and Neoplasms; and found that several factors can contribute to the development of onco-hypertension, including certain types of cancer, chemotherapy drugs, targeted therapies, and hormonal treatments. Favorable cooperation of multi-specialists in this disease treatment can lead to better and more optimal treatment management for these patients.

**Keywords:** Hypertension, Neoplasms, Onco-hypertension

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## Introduction

Onco-hypertension named also as cancer-associated hypertension, refers to the development of hypertension in cases with cancer. It is a relatively common condition that can occur as a result of several factors associated with cancer and its treatments (1). Onco-hypertension is observed in a significant number of cancer patients. The exact prevalence varies depending on the type of cancer, stage of the disease, and the specific treatments received. Several factors contribute to the development of onco-hypertension, including (a) Tumor-related factors: Some tumors produce substances that can affect blood vessels and lead to increased blood pressure. For example, certain tumors release hormones or other factors that can constrict blood vessels or promote fluid retention, contributing to hypertension; (b) Side effects of cancer treatments; certain cancer treatments, such as chemotherapy agents, targeted therapies, or immunotherapies, can affect blood pressure regulation. For example, some medications may cause fluid retention or damage blood vessels, leading to increased blood pressure; (c) Coexisting conditions; individuals with cancer may have pre-existing conditions like obesity, kidney disease, or cardiovascular diseases, which can contribute to hypertension (2-5).

## Pathophysiology of cancer-associated hypertension

The exact pathophysiology of hypertension caused by

cancer is not fully understood and can vary depending on the specific type of cancer and individual factors. Moreover, the mechanisms underlying hypertension in cancer patients can be complex and multifactorial. Some possible explanations (3,6).

### Tumor-related factors

Certain tumors can release substances that affect blood vessel function and contribute to hypertension. For example, tumors may produce increased levels of renin, a hormone involved in blood pressure regulation, or vascular endothelial growth factor, which can lead to abnormal blood vessel growth and constriction (7,8).

### Renal dysfunction

Cancer can directly affect the kidneys, leading to renal dysfunction. The kidneys play a crucial role in regulating blood pressure by controlling fluid balance and the renin-angiotensin-aldosterone system. Impaired kidney function can disrupt these mechanisms and contribute to hypertension (9,10).

### Hormonal abnormalities

Some cancers, such as pheochromocytoma or adrenal cortical carcinoma, can result in excessive production of hormones like catecholamines or cortisol, which can increase blood pressure (11,12).

### ■ Implication for health policy/practice/research/medical education

In the literature review, we found that cancer-associated hypertension refers to the development of hypertension in cases with cancer. It is a relatively common condition that may occur due to several factors associated with cancer and its treatments. The onco-hypertension management often requires a multidisciplinary approach involving oncologists, nephrologists, cardiologists, and other healthcare professionals.

### Cancer treatments

Certain cancer treatments, such as chemotherapy drugs or hormonal therapies, may have side effects that contribute to hypertension. For example, some chemotherapy agents can cause fluid retention or vascular damage, leading to increased blood pressure (13,14).

### Stress and inflammation

Cancer itself and the associated stress response can lead to increased sympathetic nervous system activity and inflammation, both of which can contribute to elevated blood pressure (15,16).

### Clinical implications of onco-hypertension

Cancer-associated hypertension can have implications for both cancer management and the overall health of the patient. It may affect treatment decisions, including the choice of medications and dosages. Additionally, uncontrolled hypertension can increase the risk of cardiovascular complications and negatively impact the patient's quality of life (6,14).

### Diagnosis and management

Onco-hypertension is diagnosed through blood pressure measurements and evaluation of the patient's medical history. Treatment strategies for onco-hypertension generally involve a combination of lifestyle modifications and antihypertensive medications, tailored to the individual patient's needs. Blood pressure control is essential to minimize the risk of cardiovascular complications and optimize cancer treatment outcomes (17-19).

### Multidisciplinary approach

The management of onco-hypertension often requires a multidisciplinary approach involving oncologists, cardiologists, and other healthcare professionals. Collaborative efforts ensure the coordination of cancer treatment and blood pressure management, considering potential drug interactions and individual patient factors (20).

The clinical implications of onco-hypertension are significant. Uncontrolled hypertension can have detrimental effects on cardiovascular health and may increase the risk of cardiovascular events, such as heart attacks or strokes, in cancer patients. Hypertension

can also impact the delivery and tolerability of cancer treatments. For instance, poorly controlled blood pressure may affect the dosage and administration of certain chemotherapeutic agents or limit the use of certain targeted therapies (6,21).

The diagnosis of onco-hypertension involves regular blood pressure measurements and evaluation of the patient's medical history, including the type of cancer, cancer stage, and treatments received. Blood pressure targets may vary depending on individual patient characteristics, comorbidities, and treatment regimens (2).

### Management of onco-hypertension

The choice of medications will depend on individual factors and the specific needs of the patient. Here are some medications commonly used to treat hypertension in cancer patients (6,21-23):

- Diuretics: Hydrochlorothiazide, chlorthalidone, furosemide, spironolactone
- Angiotensin-converting enzyme inhibitors: Lisinopril, enalapril, ramipril, captopril
- Angiotensin II receptor blockers: Losartan, valsartan, irbesartan, olmesartan
- Calcium channel blockers: Amlodipine, nifedipine, diltiazem, verapamil
- Beta-blockers: Atenolol, metoprolol, propranolol, carvedilol

In some cases, cancer treatments themselves may be contributing to hypertension. In such situations, modifying the cancer treatment plan or exploring alternative treatments with a lower likelihood of causing hypertension may be considered (25,26).

### Conclusion

Onco-hypertension treatment is a multispecialty approach, the management of which requires interdisciplinary cooperation, including cardiology, nephrology, and oncologists. Favorable cooperation of multi-specialists in this disease treatment can lead to better and more optimal treatment management for these patients.

### Authors' contribution

Conceptualization: SD.  
Validation: SD.  
Investigation: SD.  
Resources: SD.  
Data curation: SD.  
Writing—original draft: SD.  
Writing—review and editing: SD.  
Visualization: SD.  
Supervision: SD.  
Funding acquisition: SD.

### Conflicts of interest

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### Ethical issues

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