

# PHARMA HERALD BULLETIN

PHARMACY PROFESSIONALS

## Hypertension (High Blood Pressure)

A handy guide from COLLEGE OF PHARMACY on understanding  
the Hypertension.



*Sixth Edition 26th May 2024*



## **Pharma Herald Bulletin**

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# Preface

The aim of this bulletin is to delineate the essential information about Hypertension and treatment and manage the blood pressure. In the sixth volume of this bulletin, we are aware that India is facing hypertension. It is a time of demand to do efforts act against the hypertension across India. The technical education community in the country is well-capable of serving the humanity by utilizing the knowledge and resources.

We have a great responsibility of not only making the people aware of precautionary measures but also to provide a solution or helping hand to strengthen the people.

I hope this manageable Bulletin would serve to provide unique information for prevention and treatment of hypertension. My sincere thanks are due to my colleagues for their valuable comments and suggestions.

**Dr. A. K. Gupta**

**Dedicated**

**to**

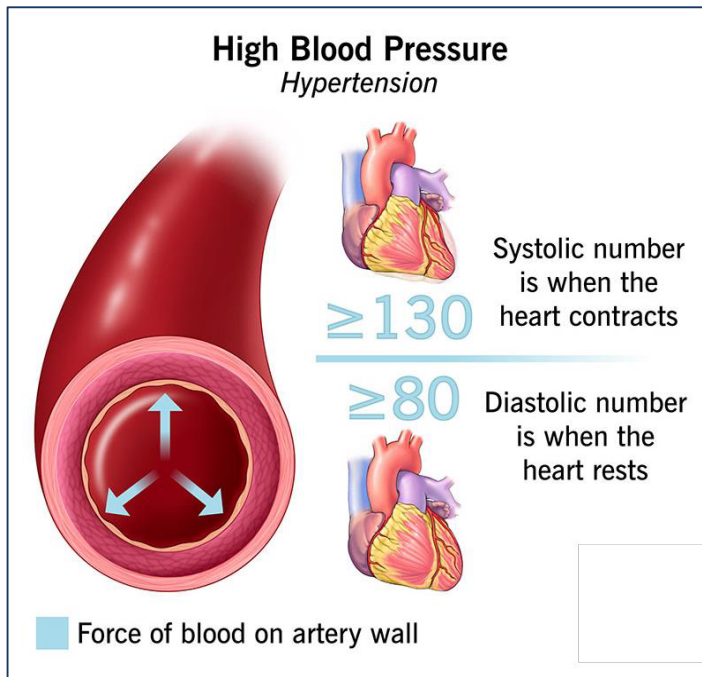
***Human beings***

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# 1. INTRODUCTION

Hypertension, also known as high blood pressure, is a medical condition in which the blood pressure in the arteries is persistently elevated. Blood pressure is the force exerted by circulating blood against the walls of the body's arteries, the major blood vessels in the body. Hypertension is a significant health concern because it is a major risk factor for cardiovascular diseases, including heart attack, stroke, and heart failure, as well as chronic kidney disease.



## 2. TYPE

Hypertension can be categorized into two types:

### 1. Primary (Essential) Hypertension:

This type has no identifiable cause and tends to develop gradually over many years. It is the most common type, accounting for about 90-95% of cases.

**2. Secondary Hypertension:** This type is caused by an underlying condition, such as kidney disease, adrenal gland tumors, thyroid problems, certain congenital heart defects, medications, alcohol abuse and obstructive sleep apnea. It tends to appear suddenly and cause higher blood pressure than primary hypertension.

## 3. RISK FACTOR

Several risk factors contribute to the development of hypertension:

- **Age:** The risk increases with age.
- **Family History:** Hypertension tends to run in families.
- **Obesity:** More body weight means more blood is needed to supply oxygen and nutrients to tissues, increasing the pressure on artery walls.
- **Physical Inactivity:** Lack of physical activity can lead to weight gain and increase the risk.
- **Tobacco Use:** Smoking or chewing tobacco immediately raises blood pressure temporarily and can damage artery linings.
- **High Salt Intake:** Excessive sodium in the diet can retain fluid in the body, raising blood pressure.
- **Low Potassium Intake:** Potassium helps balance sodium levels in cells. A deficiency can lead to elevated blood pressure.

- **Excessive Alcohol Consumption:** Over time, heavy drinking can damage the heart.
- **Stress:** High levels of stress can lead to a temporary increase in blood pressure.

## 4. SYMPTOMS

Hypertension is often called the "silent killer" because it usually has no symptoms until significant damage has been done to the heart and arteries. When symptoms do occur, they can include:

- Headaches
- Shortness of breath
- Nosebleeds
- Flushing
- Dizziness
- Chest pain
- Visual changes
- Blood in the urine

These symptoms typically occur when blood pressure has reached a dangerously high level.

## 5. DIAGNOSIS

Hypertension is diagnosed through blood pressure measurements. A typical blood pressure reading is given in millimeters of mercury (mmHg) and includes two numbers:

- **Systolic pressure (top number):** The pressure in your arteries when your heart beats.
- **Diastolic pressure (bottom number):** The pressure in your

arteries when your heart rests between beats.

CLASSIFICATION	SYSTOLIC	DIASTOLIC
Normal	< 120 mm Hg	< 80 mm Hg
Elevated	120–129 mm Hg	< 80 mm Hg
High	≥ 130 mm Hg	≥ 80 mm Hg

A normal blood pressure reading is below 120/80 mmHg. Hypertension is diagnosed when readings consistently exceed 130/80 mmHg.



## Treatment and Management

Treatment of hypertension involves a combination of lifestyle changes and medication.

## 6. PHARMACOLOGICAL MANAGEMENT

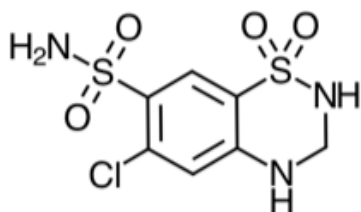
Medications often prescribed for hypertension include:

**1. Diuretics:** It helps the kidneys remove excess salt and water from the body, decreasing blood volume and thus reducing blood pressure.

- **Examples:** Hydrochlorothiazide, Furosemide, Spironolactone

**Mechanism:**

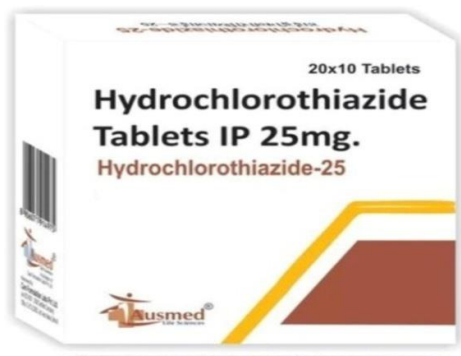
- **Thiazide diuretics (e.g., Hydrochlorothiazide):**



Hydrochlorothiazide

It is a thiazide diuretic commonly used to treat hypertension and edema. It works by inhibiting sodium reabsorption in the distal convoluted tubule of the kidney, leading to increased excretion of sodium and water.

**Mechanism:** Inhibit sodium reabsorption in the distal convoluted tubules of the kidneys.



**Clinical Uses**

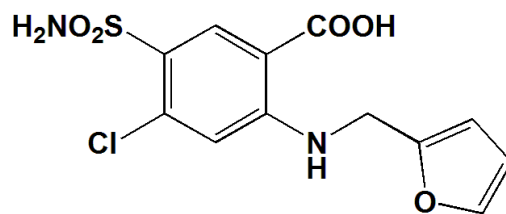
1. Hypertension
2. Edema
3. Nephrolithiasis

4. Diabetes Insipidus

**Side Effects**

1. Electrolyte Imbalance.
2. Hyperglycemia
3. Hyperuricemia
4. Dehydration
5. Hypotension
6. Photosensitivity

- **Loop diuretics (e.g., Furosemide, Torsemide):**



Furosemide

They work by inhibiting the sodium-potassium-chloride cotransporter in the thick ascending limb of the loop of Henle in the kidney. This inhibition results in decreased reabsorption of sodium, chloride, and water, leading to increased urine output (diuresis).



**Clinical Uses**

1. Edema
2. Hypertension
3. Acute Renal Failure
4. Hypercalcemia

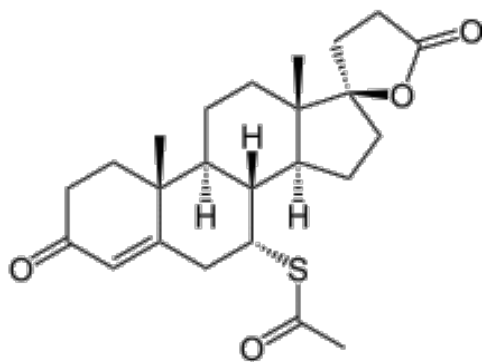
**Side Effects**

1. Electrolyte Imbalance
2. Dehydration
3. Ototoxicity



4. Hypotension
5. Hyperuricemia

- **Potassium-sparing diuretics (e.g., Spironolactone):** Spironolactone is a potassium-sparing diuretic and an aldosterone antagonist. It is commonly used to treat conditions such as heart failure, hypertension, edema, and certain hormonal disorders.



Spironolactone

**Mechanism:** Block the action of aldosterone, reducing sodium reabsorption and potassium excretion in the distal tubules and collecting ducts.



### Clinical Uses

1. Heart Failure
2. Hypertension
3. Edema
4. Primary Hyperaldosteronism
5. Hirsutism and Acne
6. Polycystic Ovary Syndrome (PCOS)

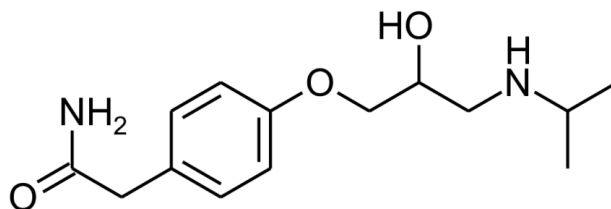
### Dosage

- **Heart Failure:** 12.5 to 25 mg once daily, can be increased to 50 mg based on response.
- **Hypertension:** 25 to 100 mg daily in one or two divided doses.
- **Edema:** 25 to 200 mg daily in one or two divided doses.
- **Primary Hyperaldosteronism:** Initial dose of 100 to 400 mg daily.
- **Hirsutism/Acne:** 50 to 200 mg daily

### 2. Beta-Blockers

Beta-blockers reduce blood pressure by blocking the effects of adrenaline (epinephrine) on the beta receptors, slowing the heart rate and decreasing the force of contraction.

- **Examples:** Metoprolol, Atenolol, Propranolol



atenolol

**Mechanism:** Block beta-adrenergic receptors, primarily in the heart, which reduces heart rate, cardiac output, and the release of renin from the kidneys.



## Clinical Uses

1. Hypertension
2. Angina Pectoris
3. Myocardial Infarction (Heart Attack)
4. Arrhythmias
5. Migraine Prophylaxis

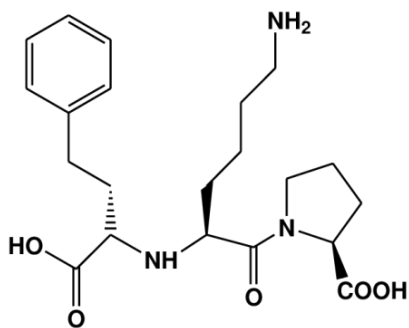
## Side Effects

1. Bradycardia
2. Hypotension
3. Fatigue
4. Cold Extremities
5. Dizziness and Lightheadedness
6. Bronchoconstriction
7. Masking of Hypoglycemia

### 3. Angiotensin-Converting Enzyme (ACE) Inhibitors

ACE inhibitors prevent the conversion of angiotensin I to angiotensin II, a potent vasoconstrictor, thereby reducing blood vessel constriction and lowering blood pressure.

- **Examples:** Lisinopril, Enalapril, Ramipril



Lisinopril

**Mechanism:** Inhibit the enzyme ACE, decreasing levels of angiotensin II and reducing aldosterone secretion, leading to vasodilation and decreased blood volume.



## Clinical Uses

1. Hypertension
2. Heart Failure
3. Acute Myocardial Infarction (Heart Attack)
4. Diabetic Nephropathy
5. Chronic Kidney Disease
6. Left Ventricular Dysfunction

## Side Effects

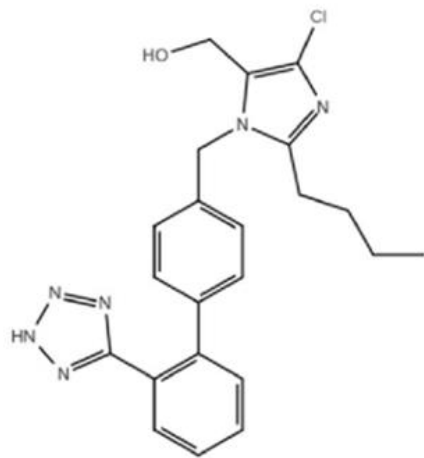
1. Hypotension
2. Hyperkalemia
3. Cough
4. Renal Dysfunction
5. Angioedema
6. Hypersensitivity Reactions
7. Dizziness and Fatigue

### 4. Angiotensin II Receptor Blockers (ARBs)

ARBs block the action of angiotensin II at its receptor site, preventing vasoconstriction and aldosterone secretion, thereby lowering blood pressure.

#### Examples:

- Losartan,
- Valsartan,
- Irbesartan



Losartan

**Mechanism:** Block angiotensin II receptors (AT1 subtype), resulting in vasodilation, reduced aldosterone release and decreased sodium and water retention.



### Clinical Uses

1. Hypertension
2. Heart Failure
3. Diabetic Nephropathy
4. Chronic Kidney Disease
5. Left Ventricular Hypertrophy

### Side Effects

1. Hypotension
2. Hyperkalemia
3. Renal Dysfunction
4. Dizziness and Fatigue
5. Hyperuricemia
6. Angioedema
7. Hypersensitivity Reactions

## 5. Calcium Channel Blockers (CCBs)

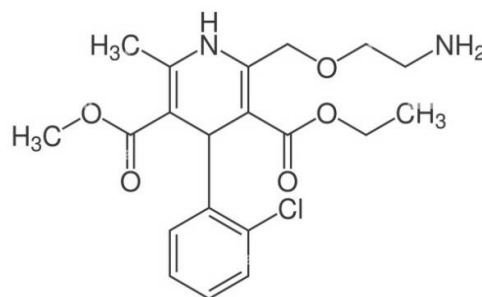
CCBs inhibit calcium ions from entering the cells of the heart and blood vessel walls, leading to vasodilation and reduced heart rate.

- **Examples:** Amlodipine, Diltiazem, Verapamil

### Mechanism:

- **Dihydropyridines (e.g., Amlodipine):** Primarily act on vascular smooth muscle to cause vasodilation.

#### *Amlodipine*



- **Non-dihydropyridines (e.g., Verapamil, Diltiazem):** Act on both the heart and blood vessels, reducing heart rate and contractility as well as causing vasodilation.



## Clinical Uses

1. Hypertension
2. Chronic Stable Angina
3. Variant (Prinzmetal's) Angina
4. Coronary Artery Disease
5. Raynaud's Phenomenon

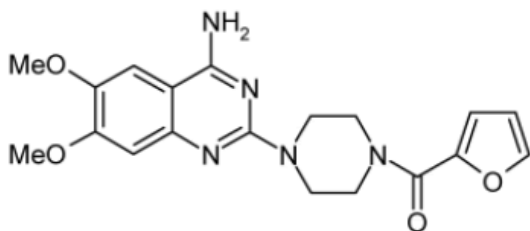
## Side Effects

1. Peripheral Edema
2. Headache
3. Flushing
4. Dizziness and Fatigue
5. Palpitations
6. Gastrointestinal Disturbances

## 6. Alpha-Blockers

Alpha-blockers reduce blood pressure by blocking alpha-adrenergic receptors, leading to vasodilation of blood vessels.

- **Examples:** Prazosin, Doxazosin, Terazosin



### Prazosin

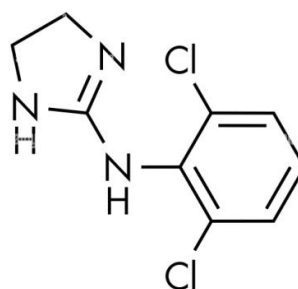
**Mechanism:** Block alpha-1 adrenergic receptors on vascular smooth muscle, causing vasodilation and reduced peripheral resistance.



## 7. Centrally Acting Agents

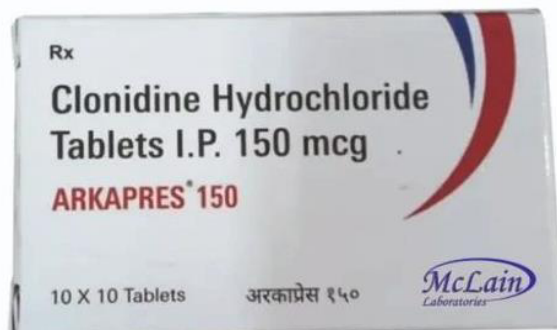
These medications act on the central nervous system to lower blood pressure by reducing sympathetic outflow.

- **Examples:** Clonidine, Methyldopa



### clonidine

**Mechanism:** Stimulate alpha-2 adrenergic receptors in the brain, reducing sympathetic outflow and decreasing heart rate, cardiac output, and peripheral resistance.

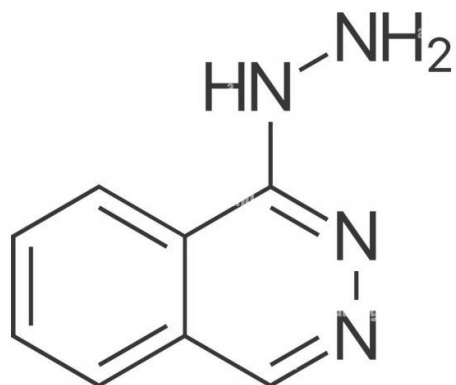


## 8. Direct Vasodilators

Direct vasodilators act directly on the smooth muscle of blood vessels, causing them to dilate and thereby reducing blood pressure.

- **Examples:** Hydralazine, Minoxidil

## Hydralazine



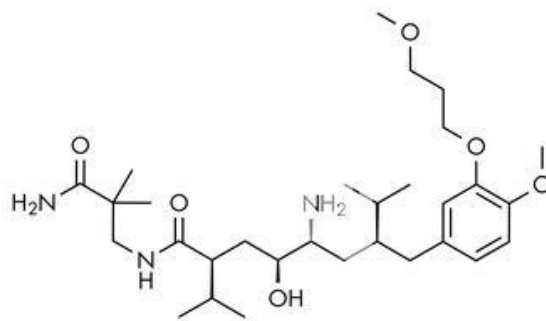
**Mechanism:** Directly relax the vascular smooth muscle, leading to vasodilation and decreased peripheral resistance.



### 9. Renin Inhibitors

Renin inhibitors block the activity of renin, an enzyme involved in the production of angiotensin I, leading to lower levels of angiotensin II and reduced blood pressure.

- **Example: Aliskiren**



aliskiren

**Mechanism:** Inhibit renin, decreasing the formation of angiotensin I and subsequently angiotensin II, resulting in vasodilation and decreased blood volume.



## 7. NON PHARMACOLOGICAL MANAGEMENT

Lifestyle changes include:

- **Dietary changes:** Following a healthy diet such as the DASH diet (Dietary Approaches to Stop Hypertension), which emphasizes fruits, vegetables, whole grains, and low-fat dairy products.
- **Regular physical activity:** Engaging in at least 150 minutes of moderate-intensity exercise each week.
- **Weight management:** Achieving and maintaining a healthy weight.
- **Limiting alcohol:** Keeping alcohol intake to moderate levels.

- **Reducing salt intake:** Limiting sodium to less than 2,300 mg per day, and ideally to 1,500 mg per day for adults with hypertension.
- **Stress management:** Practicing relaxation techniques such as yoga, meditation, and deep breathing exercises.

## 8. COMPLICATIONS

If left untreated, hypertension can lead to serious health problems, including:

- **Heart attack or stroke:** High blood pressure can cause hardening and thickening of the arteries (atherosclerosis), which can lead to a heart attack, stroke, or other complications.
- **Aneurysm:** Increased blood pressure can cause blood vessels to weaken and bulge, forming an aneurysm. A ruptured aneurysm can be life-threatening.
- **Heart failure:** To pump blood against higher pressure in your vessels, the heart muscle thickens. Eventually, the thickened muscle may have a hard time pumping enough blood to meet your body's needs.
- **Kidney damage:** Hypertension can damage the arteries around the kidneys and interfere with their ability to filter blood effectively.
- **Eye damage:** High blood pressure can cause thickened, narrowed, or torn

blood vessels in the eyes, which can lead to vision loss.

- **Metabolic syndrome:** This syndrome is a cluster of disorders of your body's metabolism — including increased waist circumference, high triglycerides, low HDL cholesterol (the "good" cholesterol), high blood pressure, and high insulin levels. These conditions make you more likely to develop diabetes, heart disease, and stroke.

## 9. PREVENTIONS

Preventing hypertension involves many of the same lifestyle changes recommended for managing it:

- Maintaining a healthy weight
- Eating a balanced diet with plenty of fruits and vegetables
- Reducing salt intake
- Exercising regularly
- Limiting alcohol intake
- Avoiding tobacco use
  - Managing stress effectively

Regular check-ups with a healthcare provider can help monitor blood pressure and catch any issues early, allowing for timely intervention and management.

**Arjunarishta** is an Ayurvedic herbal medicine that helps control blood cholesterol and blood pressure levels. It is also known to prevent coronary heart disease, making it a great choice for those looking to maintain their cardiovascular health.



Below are 10 herbs that may help lower blood pressure.

## 1. Cinnamon

Cinnamon is an aromatic spice that comes from the inner bark of trees from the *Cinnamomum* genus.

People have used it for centuries in traditional medicine to treat heart conditions, including high blood pressure.

## 2. Garlic

Garlic is rich in many compounds, such as allicin, that may benefit your heart.

Garlic contains compounds, such as allicin, that have been shown to help relax blood vessels and aid blood flow. Collectively, these factors may help reduce blood pressure.

## 3. Basil

**Basil** (*Ocimum basilicum*) is a flavorful herb that comes in various forms. It's popular in alternative medicine because it's rich in various powerful compounds.

Animal studies suggest basil may help reduce blood pressure.

## 4. Parsley

Parsley (*Petroselinum crispum*) is a popular herb in American, European, and Middle Eastern cuisine. Parsley contains a variety of compounds, such as vitamin C and dietary carotenoids, that may reduce blood pressure.

Animal studies have shown that parsley reduced both systolic and diastolic blood pressure by acting like a calcium channel blocker, a type of medication that helps relax and dilate blood vessels.

## 5. Celery seeds

Celery seeds (*Apium graveolens*) are a versatile spice that's packed with various nutrients, such as:

- iron
- magnesium
- manganese
- calcium
- fiber

Some research suggests celery seeds may help lower blood pressure.

# HOMEOPATHIC MEDICINE FOR HYPERTENSION



Bakson Bee Pee Aid drops: control blood pressure by regulating blood circulation and preventing venous stasis



Rauwolfia serpentina is one of the most often used homoeopathic drugs for hypertension. It belongs to the family Apocynaceae.



ADEL-8(co-HYPERT) drops helps reduce and control high blood pressure particularly in cases where no easily recognizable cause can be diagnosed. This remedy also helps relieve hypertension related to elasticity problems, psychosomatic processes and organ (renal) insufficiency and can help prevent conditions that may lead to an infarct.



Haslab Drox 16 High Tone Drops are indicated for controlling and maintaining high blood pressure. The drops also help during hyperaemia of brain, surging of blood to head and heart, headaches, dark spots, flushing of face and high systolic pressure. Key Ingredients: Glonoin 3x.



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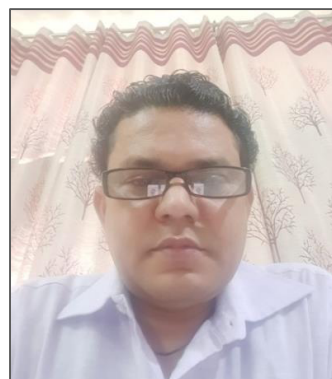
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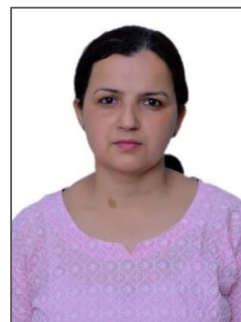


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