# Hypertension

Sustained and persistent rise in blood pressure is known as hypertension. This means that the blood applies too much force against the walls of the blood vessels. Hypertension is not a single disease but a syndrome with multiple causes.

## Categories

| S.No | Range (mm Hg) | Inference |
|---|---|---|
| 1 | 120/80 | Normal |
| 2 | 139/90 | Pre-Hypertension |
| 3 | 159/100 | Stage I Hypertension |
| 4 | Above 160 | Stage II Hypertension |

## Cause

1. Increase in Cardiac output, due to
    a.) Renal disease
    b.) Excessive salt intake
    c.) Hypersecretion of ADH.
2. Stress
    a.) Stimulation of sympathetic nervous system
3. Pheochromocytoma (Tumour of Kidney)
    a.) Increase secretion of Adrenaline
4. Increased Peripheral Resistance
    Atherosclerosis
    Diabetes
    Obesisty
    Stiffness in artery wall

## Types

### Primary (essential) hypertension

There's no identifiable cause of high blood pressure. This type of high blood pressure, called primary (essential) hypertension, tends to develop gradually over many years.

### Secondary hypertension

This type of high blood pressure, called secondary hypertension, tends to appear suddenly due to another medical condition and cause higher blood pressure than primary hypertension. The examples of medical condition are

- Obstructive sleep apnoea
- Kidney problems
- Adrenal gland tumors
- Thyroid problems
- Certain defects you're born with (congenital) in blood vessels
- Certain medications, such as birth control pills, cold remedies, decongestants, over-the-counter pain relievers and some prescription drugs
- Illegal drugs, such as cocaine and amphetamines

### Resistant Hypertension

It means Hypertension is hard to treat and may also have an underlying secondary cause.

**Pseudo-Hypertension**

This type of blood pressure usually appears in senior citizens. Pseudohypertension is a falsely elevated blood pressure reading obtained by the blood pressure machine. This is due to calcification of the blood vessels which cannot be compressed.

**White coat hypertension**

This is a fairly common phenomenon whereby blood pressure is only elevated when a patient is in the doctor's surgery. People with white coat syndrome have normal readings at home, and only have high readings when their BP is taken by a doctor.

## Symptoms

- Hypertension by itself does not cause symptoms. Headaches, fatigue, and dizziness, Changes in vision including blurry vision, Chest Pain, Anxiety, and Shortness of breath are sometimes observed in hypertension patient. This is why hypertension is called "the silent killer." Because it do not have clear sign and symptoms.

## Diagnosis

A diagnosis of hypertension usually requires at least three elevated blood pressure readings taken at least one week apart by the help of sphygmomanometer.

## Treatment

**Life style modification**

- Eating a heart-healthy diet.
- Getting regular physical activity
- Maintaining a healthy weight or losing weight if you're overweight or obese
- Limiting the amount of alcohol you drink.
- Reducing the amount of sodium in your diet to less than 1,500 milligrams a day if you have high blood pressure

**There are several types of drugs used to treat high blood pressure, including:**

- Angiotensin-converting enzyme (ACE) inhibitors
- Angiotensin II receptor blockers (ARBs)
- Diuretics
- Beta-blockers
- Calcium channel blockers
- Alpha-blockers
- Alpha-agonists
- Renin inhibitors
- Combination medications

# Congestive heart failure

*Congestive heart failure* is present when the heart cannot pump enough blood to satisfy the needs of the body.

## Causes

Due to various possible causes,

- The heart can't pump the blood into the body due to weakness and thinning of ventricle.
- The heart cant fills properly due to stiffness of ventricle muscles.

Thus all the tissue and organ does not get required amount of blood and oxygen supply. As a result, the kidneys may respond by causing the body to retain fluid (water) and salt. This causes accumulation of fluid in the arms, legs, ankles, feet, lungs, or other organs, the body becomes congested and congestive heart failure is the term used to describe the condition.

## Types

| Type of heart failure | Description |
|---|---|
| Left-sided heart failure | Fluid may back up in your lungs, causing shortness of breath. |
| Right-sided heart failure | Fluid may back up into your abdomen, legs and feet, causing swelling. |
| Systolic heart failure | The left ventricle can't contract vigorously, indicating a pumping problem. |
| Diastolic heart failure (also called heart failure with preserved ejection fraction) | The left ventricle can't relax or fill fully, indicating a filling problem. |

## Congestive heart failure stages

| Stage | Main symptoms | Outlook |
|---|---|---|
| Class I | You don't experience any symptoms during typical physical activity. | CHF at this stage can be managed through lifestyle changes, heart medications, and monitoring. |
| Class II | You're likely comfortable at rest, but normal physical activity may cause fatigue, palpitations, and shortness of breath. | CHF at this stage can be managed through lifestyle changes, heart medications, and careful monitoring. |
| Class III | You're likely comfortable at rest, but there's a noticeable limitation of physical activity. Even mild exercise may cause fatigue, palpitations, or | Treatment can be complicated. Talk with your doctor about what heart failure at this stage may mean for you. |

| | | |
|---|---|---|
| | shortness of breath. | |
| Class IV | You're likely unable to carry on any amount of physical activity without symptoms, which are present even at rest. | There's no cure for CHF at this stage, but there are still quality-of-life and palliative care options. You'll want to discuss the potential benefits and risks of each with your doctor. |

**Symptoms**

| Symptoms you may notice first | Symptoms that indicate your condition has worsened | Symptoms that indicate a severe heart condition |
|---|---|---|
| fatigue | irregular heartbeat | chest pain that radiates through the upper body |
| swelling in your ankles, feet, and legs | a cough that develops from congested lungs | rapid breathing |
| weight gain | wheezing | skin that appears blue, which is due to lack of oxygen in your lungs |
| increased need to urinate, especially at night | shortness of breath, which may indicate pulmonary edema | fainting |

## Diagnosis

To diagnose heart failure, your doctor will take a careful medical history, review your symptoms and perform a physical examination. Using a stethoscope, your doctor can listen to your lungs for signs of congestion. The stethoscope also picks up abnormal heart sounds that may suggest heart failure.

- **Blood tests.** Your doctor may take a blood sample to look for signs of diseases that can affect the heart. He or she may also check for a chemical called N-terminal pro-B-type natriuretic peptide (NT-proBNP).
- **Chest X-ray.** X-ray images help your doctor see the condition of your lungs and heart.
- **Electrocardiogram (ECG).** This test records the electrical activity of your heart through electrodes attached to your skin. It helps your doctor diagnose heart rhythm problems and damage to your heart.
- **Echocardiogram.** An echocardiogram uses sound waves to produce a video image of your heart. This test can help doctors see the size and shape of your heart along with any abnormalities. It gives an idea about how well heart is pumping the blood.
- **Stress test.** Stress tests measure the health of your heart by how it responds to exertion. You may be asked to walk on a treadmill while attached to an ECG machine.
- **Cardiac computerized tomography (CT) scan.** An X-ray tube inside the machine rotates around your body and collects images of your heart and chest.

- **Magnetic resonance imaging (MRI).** Radio waves are broadcast toward these aligned particles, producing signals that create images of your heart.
- **Coronary angiogram.** In this test, a thin, flexible tube (catheter) is inserted into a blood vessel at your groin or in your arm and guided through the aorta into your coronary arteries. A dye injected through the catheter makes the arteries supplying your heart visible on an X-ray, helping doctors spot blockages.

### Treatment

Heart failure is a chronic disease needing lifelong management.

#### Medications

1. **Angiotensin-converting enzyme (ACE) inhibitors:** These drugs help people with systolic heart failure live longer and feel better.
2. **Angiotensin II receptor blockers.**
3. **Beta blockers:** This class of drugs not only slows your heart rate and reduces blood pressure but also limits or reverses some of the damage to your heart if you have systolic heart failure.
4. **Diuretics:** Often called water pills, diuretics make you urinate more frequently and keep fluid from collecting in your body.
5. **Inotropes:** These are intravenous medications used in people with severe heart failure in the hospital to improve heart pumping function and maintain blood pressure.
6. **Digoxin:** This drug, also referred to as digitalis, increases the strength of your heart muscle contractions.

#### Surgery and medical devices

1. Coronary bypass surgery.
2. Heart valve repair or replacement
3. Implantable cardioverter-defibrillators (ICDs). An ICD is a device similar to a pacemaker.
4. Heart transplant.

## Arteriosclerosis / atherosclerosis

Arteriosclerosis occurs when the blood vessels that carry oxygen and nutrients from your heart to the rest of your body (arteries) become thick and stiff — sometimes restricting blood flow to your organs and tissues. Healthy arteries are flexible and elastic, but over time, the walls in your arteries can harden, a condition commonly called hardening of the arteries.

Atherosclerosis is a termed used when fats, cholesterol and other substances deposit in and on your artery walls (plaque), which can cause problem in blood flow.

### Symptoms

- **If you have atherosclerosis in your heart arteries,** you may have symptoms, such as chest pain or pressure (angina).

- **If you have atherosclerosis in the arteries leading to your brain,** you may have signs and symptoms such as sudden numbness or weakness in your arms or legs, difficulty speaking or slurred speech, temporary loss of vision in one eye, or drooping muscles in your face.
- **If you have atherosclerosis in the arteries of your arms and legs,** you may have symptoms of peripheral artery disease, such as leg pain when walking (claudication).
- **If you have atherosclerosis in the arteries leading to your kidneys,** you develop high blood pressure or kidney failure.

## Causes

Although the exact cause is unknown, atherosclerosis may start with damage or injury to the inner layer of an artery. The damage may be caused by:

- High blood pressure
- High cholesterol
- High triglycerides, a type of fat (lipid) in your blood
- Smoking and other sources of tobacco
- Insulin resistance, obesity or diabetes
- Inflammation from diseases, such as arthritis, lupus or infections, or inflammation of unknown cause
- High intake of fat in diet

Once the inner wall of an artery is damaged, blood cells and other substances often clump at the injury site and build up in the inner lining of the artery.

## Diagnosis

- A weak or absent pulse below the narrowed area of your artery
- Decreased blood pressure in an affected limb
- **Blood tests:** Lab tests can detect increased levels of cholesterol and blood sugar that may increase the risk of atherosclerosis.
- **Ultrasound:** To measure your blood pressure at various points along your arm or leg. These measurements can help doctor to find the degree of any blockages, as well as the speed of blood flow in your arteries.
- **Ankle-brachial index.** This test can tell if you have atherosclerosis in the arteries in your legs and feet.
- **Electrocardiogram (ECG)**
- **Cardiac catheterization and angiogram.** This test can show if your coronary arteries are narrowed or blocked.
- **Other imaging tests.** Your doctor may use ultrasound, a computerized tomography (CT) scan or magnetic resonance angiography (MRA) to study your arteries. These tests can often show hardening and narrowing of large arteries, as well as aneurysms and calcium deposits in the artery walls.

## Treatment

### Lifestyle and home remedies

- Stop smoking
- Exercise most days of the week
- Eat healthy foods

- Lose extra pounds and maintain a healthy weight
- Manage stress

**Medications**

- Cholesterol medications
- Anti-platelet medications
- Beta blocker medications
- Angiotensin-converting enzyme (ACE) inhibitors
- Calcium channel blockers
- Water pills (diuretics)

# Angina

*Angina* is not a disease in its own right but a probable symptom of coronary artery disease. It is a tightness, pain, or discomfort in the chest that occurs when an area of the heart muscle receives less blood oxygen than usual.

**Cause**

A fatty substance called plaque deposits up in your arteries, blocking blood flow to the heart muscle. This forces your heart to work with less oxygen. That causes pain. You may also have blood clots in the arteries of your heart, which can cause angina.

**Types of Angina**

**Stable angina (Angina at Work)**

- Develops when your heart works harder, such as when you exercise or climb stairs
- Can usually be predicted
- Lasts a short time, perhaps five minutes or less
- Disappears sooner if you rest or use your angina medication
- Stable angina occurs when the plaque or clot formed in coronary artery becomes stable and does not move.

**Unstable Angina (Angina at Rest)**

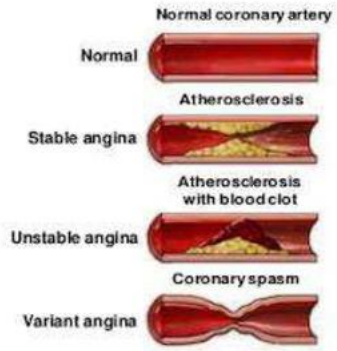
- Occurs even at rest
- Is unexpected
- Is usually more severe and lasts longer than stable angina, maybe 30 minutes or longer
- May not disappear with rest or use of angina medication
- Might signal a heart attack
- Unstable angina occurs when the plaque or clot formed in coronary artery does not become stable and moves in coronary artery.

**Variant Angina (Prinzmetal's Angina)**

- Usually happens when you're resting in night
- Is often severe
- May be relieved by angina medication
- This type of angina occurs due to spasm in coronary arteries.

## Three types of angina

- **Stable angina**/Classic angina/Effort angina
- **Unstable angina**/Crescendo angina
- **Variant angina**/Prinzmetal angina




## Common signs and symptoms of a angina include:

- Pressure, fullness or a squeezing pain in the center of your chest that lasts for more than a few minutes
- Pain extending beyond your chest to your shoulder, arm, back, or even to your teeth and jaw
- Increasing episodes of chest pain
- Prolonged pain in the upper abdomen
- Shortness of breath
- Sweating
- Impending sense of doom
- Fainting
- Nausea and vomiting
- Inability to sleep

## Diagnosis

**Electrocardiogram:** To identify the patterns among these heartbeats to see if the blood flow through your heart has been slowed or interrupted or if you're having a heart attack.
**Stress test:** During a stress test, you exercise by walking on a treadmill or pedaling a stationary bicycle. While exercising, your blood pressure is monitored and your ECG readings are watched.
**Echocardiogram:** An echocardiogram uses sound waves to produce images of the heart. The areas of your heart muscle that have been damaged by poor blood flow.
**Chest X-ray.** to see if you have an enlarged heart.
**Coronary angiography.** Coronary angiography uses a type of dye that's visible by X-ray machine to examine the inside of your heart's blood vessels.
**Cardiac computerized tomography (CT) scan.** collects images of your heart and chest, which can show if any of your heart's arteries are narrowed or if your heart is enlarged.
**Cardiac MRI.** produces detailed images of your heart's structure and its blood vessels.

## Treatment

### Lifestyle changes

- If you smoke, stop smoking.
- If you're overweight, talk to your doctor about weight-loss options.
- Eat a healthy diet with limited amounts of saturated fat.
- Treat diseases or conditions that can increase your risk of angina, such as diabetes, high blood pressure and high blood cholesterol.
- Avoiding stress is easier said than done, but try to find ways to relax.
- Limit alcohol consumption

### Medications

- **Nitrates.** Nitrates relax and widen your blood vessels, allowing more blood to flow to your heart muscle. The most common form of nitrate used to treat angina is with nitro-glycerine tablets put under your tongue.
- **Aspirin.** Aspirin reduces the ability of your blood to clot, making it easier for blood to flow through narrowed heart arteries. Preventing blood clots can also reduce your risk of a heart attack.
- **Clot-preventing drugs.** Certain medications such as clopidogrel (Plavix), prasugrel (Effient) and ticagrelor (Brilinta) can help prevent blood clots from forming by making your blood platelets less likely to stick together.
- **Beta blockers.** Beta blockers work by blocking the effects of the hormone epinephrine, also known as adrenaline. As a result, the heart beats more slowly and with less force, thereby reducing blood pressure.
- **Statins.** Statins are drugs used to lower blood cholesterol.
- **Calcium channel blockers.** Calcium channel blockers widen blood vessels by affecting the muscle cells in the arterial walls.
- **Blood pressure-lowering medications.**

### Surgery

- **Angioplasty and stenting.** During an angioplasty- also called a percutaneous coronary intervention (PCI)-a tiny balloon or a stent is inserted into your narrowed artery. This procedure improves blood flow in your heart, reducing or eliminating angina.
- **Coronary artery bypass surgery.** During coronary artery bypass surgery, a vein or artery from somewhere else in your body is used to bypass a blocked or narrowed heart artery.

# Myocardial ischemia

Myocardial ischemia occurs when blood flow to heart is reduced, due to partial or complete blockage of coronary arteries preventing it from receiving enough oxygen. Thus, the reduced amount of oxygen supply caused death of myocardial tissue.

### Causes

- **Coronary artery disease (atherosclerosis).** Plaques made up mostly of cholesterol build up on your artery walls and restrict blood flow. Atherosclerosis is the most common cause of myocardial ischemia.
- **Blood clot.** The plaques that develop in atherosclerosis can rupture, causing a blood clot. The clot might block an artery and lead to sudden, severe myocardial ischemia, resulting in a heart attack. Rarely, a blood clot might travel to the coronary artery from elsewhere in the body.

- **Coronary artery spasm.** This temporary tightening of the muscles in the artery wall can briefly decrease or even prevent blood flow to part of the heart muscle.
- **High blood cholesterol level**

### Symptoms

Some people who have ischemia don't experience any signs or symptoms (silent ischemia). When signs and symptoms occur, the most common is chest pressure or pain, typically on the left side of the body (angina pectoris). Other signs and symptoms include:

- Neck or jaw pain
- Shoulder or arm pain
- A fast heartbeat
- Shortness of breath when you are physically active
- Nausea and vomiting
- Sweating

### Diagnosis

Your doctor will start with a medical history and physical exam. After that, your doctor might recommend:

- Electrocardiogram (ECG)
- Echocardiogram
- Nuclear scan
- Coronary angiography
- Cardiac CT scan
- Stress test

### Medications

Same as that of Angina

## Asthma

Asthma is a condition in which your airways narrow and swell and produce extra mucus. This can make breathing difficult and trigger coughing, wheezing and shortness of breath.

### Types of asthma

The most common type of asthma is bronchial asthma, which affects the bronchi in the lungs.

Other types of asthma are described below.

**Allergic asthma (extrinsic asthma)**

Allergens trigger this type of asthma. These might include:

- pet hair from animals like cats and dogs
- food
- mold
- pollen
- dust

Allergic asthma is more likely to be seasonal because it often goes hand-in-hand with seasonal allergies.

**Nonallergic asthma (intrinsic asthma)**

Irritants in the air not related to allergies trigger this type of asthma. Irritants might include:

- burning wood and cigarette smoke
- cold air
- air pollution
- viral illnesses
- air fresheners
- household cleaning products
- perfumes

**Occupational asthma**
Occupational asthma is a type of asthma induced by triggers in the workplace. These include:

- dust
- dyes
- gases and fumes
- industrial chemicals
- animal proteins
- rubber latex

These irritants can exist in a wide range of industries, including farming, textiles, woodworking, and manufacturing.

## Cause of asthma

No single cause has been identified for asthma. Instead, researchers believe that the breathing condition is caused by a variety of factors. These factors include:

- **Genetics.** If a parent has asthma, you're more likely to develop it.
- **History of viral infections.** People with a history of viral infections during childhood are more likely to develop the condition.
- **Hygiene hypothesis.** This hypothesis proposes that babies aren't exposed to enough bacteria in their early months and years. Therefore, their immune systems don't become strong enough to fight off asthma and other conditions.
- Air pollutants and irritants, such as smoke
- Airborne substances, such as pollen, dust mites, mold spores, pet dander or particles of cockroach waste
- Respiratory infections, such as the common cold
- Physical activity (exercise-induced asthma)

## Pathophysiology

On exposure to a trigger, the trigger sensitizes helper T cells, which initiates B-lymphocyte activation. Excessive release of IgE occurs, IgE binds to mast cells related to inflammation. This action causes release of inflammatory mediators (such as chemokines, nitric oxide, prostaglandin D2, cytokines, histamine, and leukotrienes), in turn triggering airway inflammation and bronchoconstriction.

## Asthma signs and symptoms include:

- Shortness of breath
- Chest tightness or pain
- Trouble sleeping caused by shortness of breath, coughing or wheezing
- A whistling or wheezing sound when exhaling (wheezing is a common sign of asthma in children)
- Coughing or wheezing attacks that are worsened by a respiratory virus, such as a cold or the flu

- Fatigue
- Excessive mucous production blocking trachea and bronchi
- Airway narrowing

### Diagnosis

**Patient history:** If you have family members with the breathing disorder, your risk is higher. Alert your doctor to this genetic connection.
**Physical exam:** Your doctor will listen to your breathing with a stethoscope.
**Skin test:** looking for signs of an allergic reaction such as hives or eczema. Allergies increase your risk for asthma.
**Spirometry:** This test estimates the narrowing of your bronchial tubes by checking how much air you can exhale after a deep breath and how fast you can breathe out.
**Peak flow:** A peak flow meter is a simple device that measures how hard you can breathe out. Lower than usual peak flow readings are a sign your lungs may not be working as well and that your asthma may be getting worse.

### Treatment

**Avoiding triggers of asthma:** Prevent yourself from exposing to the chemicals, smells, or products that have caused breathing problems in the past.
**Reducing exposure to allergens:** If you've identified allergens, such as dust or mold, that trigger an asthma attack, avoid them as best you can.
**Getting allergy shots:** Allergen immunotherapy is a type of treatment that may help alter your immune system. With routine shots, your body may become less sensitive to any triggers you encounter.
**Taking preventive medication.**
**Inhaled corticosteroids:** These anti-inflammatory drugs include fluticasone
**Bronchodilators:** Quick-relief inhalers quickly open swollen airways that are limiting breathing.
**Leukotriene modifiers: Montileukast**

## Chronic obstructive pulmonary disease (COPD)

Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory lung disease that causes obstructed airflow from the lungs. Symptoms include breathing difficulty, cough, mucus (sputum) production and wheezing. It's caused by long-term exposure to irritating gases or particulate matter, most often from cigarette smoke.

Emphysema and chronic bronchitis are the two most common conditions that contribute to COPD.

### Symptoms

COPD symptoms often don't appear until significant lung damage has occurred, and they usually worsen over time, particularly if smoking exposure continues. For chronic bronchitis, the main symptom is a daily cough and mucus (sputum) production at least three months a year for two consecutive years.

Other **signs and symptoms** of COPD may include:

- Shortness of breath, especially during physical activities
- Wheezing
- Chest tightness
- Having to clear your throat first thing in the morning, due to excess mucus in your lungs
- A chronic cough that may produce mucus (sputum) that may be clear, white, yellow or greenish
- Blueness of the lips or fingernail beds (cyanosis)
- Frequent respiratory infections
- Lack of energy
- Unintended weight loss (in later stages)
- Swelling in ankles, feet or legs

## Causes

The main cause of COPD in developed countries is tobacco (Cigarette) smoking. In the developing world, COPD often occurs in people exposed to fumes from burning fuel for cooking and heating in poorly ventilated homes.

**Chronic bronchitis** is inflammation of the lining of the bronchial tubes, which carry air to and from the air sacs (alveoli) of the lungs. It's characterized by daily cough and mucus (sputum) production.

**Emphysema** is a condition in which the alveoli at the end of the smallest air passages (bronchioles) of the lungs are destroyed as a result of damaging exposure to cigarette smoke and other irritating gases and particulate matter.

***Alpha-1-antitrypsin deficiency***

In about 1 percent of people with COPD, the disease results from a genetic disorder that causes low levels of a protein called alpha-1-antitrypsin. Alpha-1-antitrypsin (AAt) is made in the liver and secreted into the bloodstream to help protect the lungs. Alpha-1-antitrypsin deficiency can affect the liver as well as the lungs.

## Diagnosis

To diagnose your condition, your doctor will review your signs and symptoms, discuss your family and medical history, and discuss any exposure you've had to lung irritants — especially cigarette smoke.

**Lung (pulmonary) function tests:** Pulmonary function tests measure the amount of air you can inhale and exhale, and if your lungs are delivering enough oxygen to your blood.

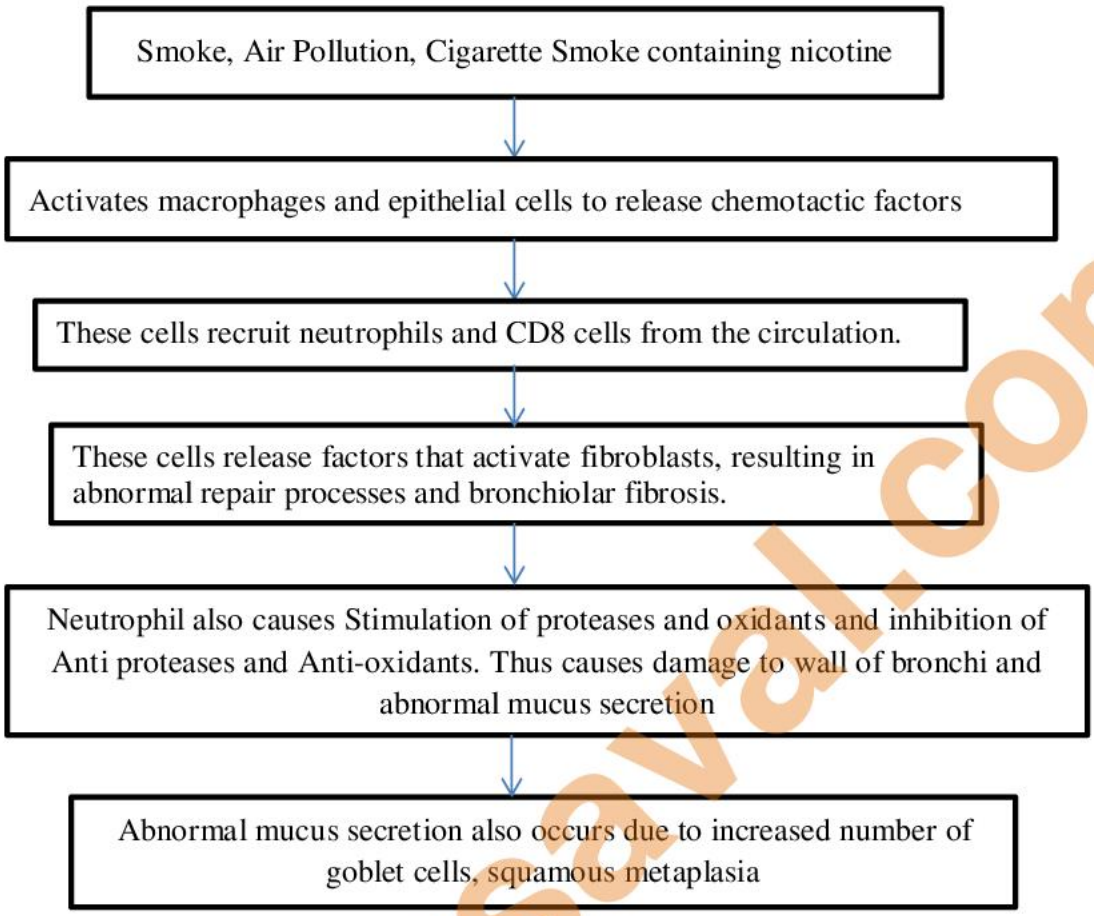
**Chest X-ray:** A chest X-ray can show emphysema, one of the main causes of COPD. An X-ray can also rule out other lung problems or heart failure.

**CT scan:** A CT scan of your lungs can help detect emphysema and help determine if you might benefit from surgery for COPD. CT scans can also be used to screen for lung cancer.

**Arterial blood gas analysis:** This blood test measures how well your lungs are bringing oxygen into your blood and removing carbon dioxide.

**Laboratory tests:** To determine if you have the genetic disorder alpha-1-antitrypsin (AAt) deficiency.

## Pathophysiology




## Medications

- **Bronchodilators**
  These medications — which usually come in an inhaler — relax the muscles around your airways.
- **Inhaled steroids**
  Inhaled corticosteroid medications can reduce airway inflammation and help prevent exacerbations.
- **Combination inhalers**
  Some medications combine bronchodilators and inhaled steroids.
- **Phosphodiesterase-4 inhibitors**
  This drug decreases airway inflammation and relaxes the airways.
- **Theophylline**
  This very inexpensive medication may help improve breathing and prevent exacerbations.

## Lung therapies

- **Oxygen therapy:** If there isn't enough oxygen in your blood, you may need supplemental oxygen.

- **Pulmonary rehabilitation program:** These programs generally combine education, exercise training, nutrition advice and counselling.

## Surgery

- **Lung volume reduction surgery:** In this surgery, your surgeon removes small wedges of damaged lung tissue from the upper lungs. This creates extra space in your chest cavity so that the remaining healthier lung tissue can expand and the diaphragm can work more efficiently.
- **Lung transplant.**

## Lifestyle Modifications

- Exercise regularly.
- Eat healthy foods.
- Avoid smoke and
- Avoid air pollution.
- Stop Cigarette smoking

# Acute kidney failure

Acute kidney failure (ARF) occurs when your kidneys suddenly become unable to filter waste products from your blood.

### Types of renal failure

ARF is of three types

1. **Pre-Renal failure:** This type indicates inadequate blood flowing to the kidney, thus leaving them unable to clean the blood properly.
2. **Intra-Renal failure:** This type indicates damage or injury to the kidney, thus leaving them unable to clean the blood properly.
3. **Post- Renal failure:** This type indicates the blockage affecting the normal flow of urine out of the kidney means problem in ureter, bladder, urethra.

### Cause

**Pre-Renal failure**

- An infection
- Liver failure
- Medications (aspirin, ibuprofen, naproxen)
- Blood pressure medications
- Heart failure
- Severe burns or dehydration
- Blood or fluid loss

**Intra-Renal failure**

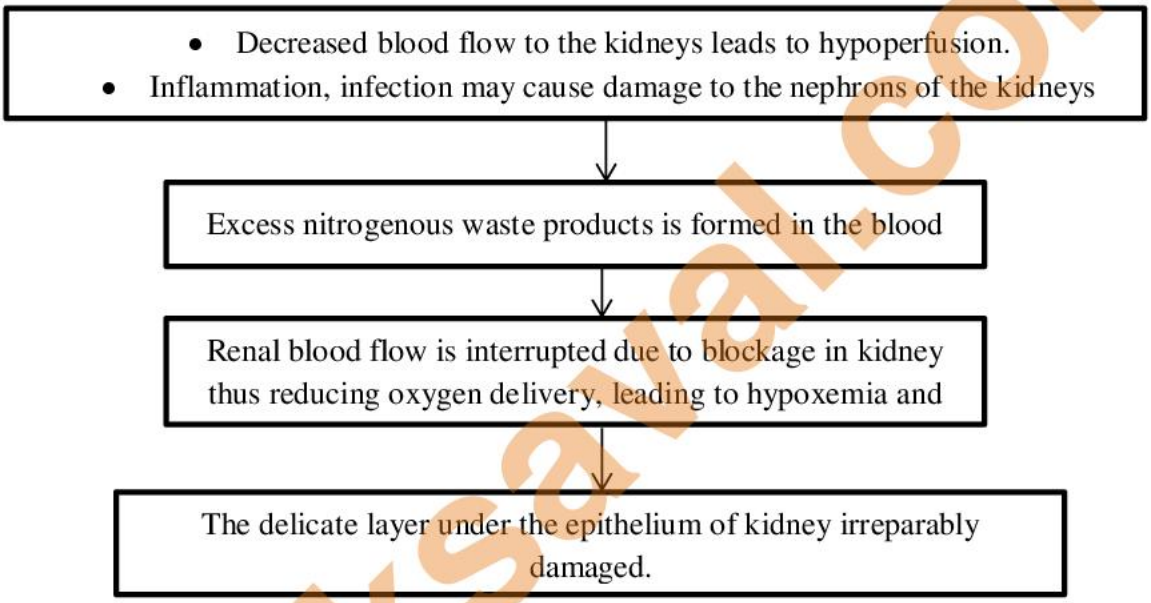
- Blood clots in the veins and arteries in and around the kidneys
- Cholesterol deposits that block blood flow in the kidneys

- Glomerulonephritis: Inflammation of the tiny filters in the kidneys (glomeruli)
- Infection

**Post- Renal failure**

- Bladder, cervical, colon or prostate cancer
- Blood clots in your urinary tract
- An enlarged prostate
- Kidney stones
- Nerve damage in your bladder
- Medications that can directly damage kidneys, including NSAIDS, chemotherapy, and antibiotics

**Pathophysiology of Acute Renal failure**




**Symptoms**

Signs and symptoms of acute kidney failure may include:

- Decreased urine output, although occasionally urine output remains normal
- Fluid retention, causing swelling in your legs, ankles or feet
- Shortness of breath
- Fatigue
- Confusion
- Nausea
- Weakness
- Irregular heartbeat
- Chest pain or pressure
- Seizures or coma in severe cases

## Diagnosis

**Urine output measurements:** Measuring how much you urinate in 24 hours may help your doctor determine the cause of your kidney failure.

**Urine tests:** Analyzing a sample of your urine (urinalysis) may reveal abnormalities that suggest kidney failure.

**Blood tests:** A sample of your blood may reveal rapidly rising levels of urea and creatinine — two substances used to measure kidney function.

**Imaging tests:** Imaging tests such as ultrasound and computerized tomography may be used to help your doctor see your kidneys.

**Biopsy: Small amount of tissue is removed from the kidney and analysed for the cancer.**

## Treatment

**Diet**: Limit the amount of salt and potassium you can take in until your kidneys heal.

**Drugs**: Doctor may prescribe medicines that regulate the amount of phosphorous and potassium in your blood. When your kidneys fail, they can't remove these substances from your body.

**Dialysis:** If you have acute kidney failure, your doctor will most likely recommend hemodialysis. In this procedure, you're hooked up to a machine that cleans your blood.

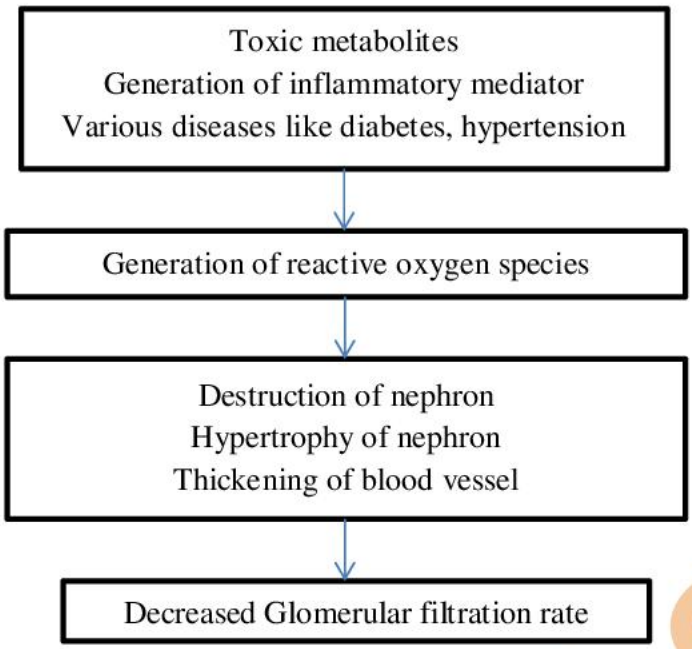
# Chronic Renal Failure

Chronic renal failure, or end-stage renal disease (ESRD), is a progressive, irreversible deterioration in renal function in which the body's ability to maintain metabolic and fluid and electrolyte balance fails, resulting in uremia or azotemia (retention of urea and other nitrogenous wastes in the blood).

**Cause**

- Systemic diseases, such as diabetes mellitus (leading cause)
- Hypertension
- Chronic glomerulonephritis
- Pyelonephritis (inflammation of the renal pelvis)
- Obstruction of the urinary tract
- Hereditary lesions
- Vascular disorders
- Infections
- Medications or toxic agents.

## Pathophysiology of Chronic kidney failure




**Symptoms**

Signs and symptoms of chronic kidney disease develop over time if kidney damage progresses slowly. Signs and symptoms of kidney disease may include:

- Nausea
- Vomiting
- Loss of appetite
- Fatigue and weakness
- Sleep problems
- Changes in how much you urinate
- Decreased mental sharpness
- Muscle twitches and cramps
- Swelling of feet and ankles
- Persistent itching
- Chest pain, if fluid builds up around the lining of the heart
- Shortness of breath, if fluid builds up in the lungs
- High blood pressure (hypertension) that's difficult to control

## Diagnosis

## Diagnosis

**Urine output measurements:** Measuring how much you urinate in 24 hours may help your doctor determine the cause of your kidney failure.

**Urine tests:** Analyzing a sample of your urine (urinalysis) may reveal abnormalities that suggest kidney failure.

**Blood tests:** A sample of your blood may reveal rapidly rising levels of urea and creatinine — two substances used to measure kidney function.

**Imaging tests:** Imaging tests such as ultrasound and computerized tomography may be used to help your doctor see your kidneys.

**Biopsy:** Small amount of tissue is removed from the kidney and analysed for the cancer.

## Treatment

**Diet**: Limit the amount of salt and potassium you can take in until your kidneys heal.

**Drugs**: Doctor may prescribe medicines that regulate the amount of phosphorous and potassium in your blood. When your kidneys fail, they can't remove these substances from your body.

**High blood pressure medications:** People with kidney disease may experience worsening high blood pressure. Your doctor may recommend medications to lower your blood pressure

**Dialysis:** If you have acute kidney failure, your doctor will most likely recommend hemodialysis. In this procedure, you're hooked up to a machine that cleans your blood.

**Kidney transplant:** A kidney transplant involves surgically placing a healthy kidney from a donor into your body. Transplanted kidneys can come from deceased or living donors.