

## Hypertension

**Definition:** It is defined as the systolic blood pressure (SBP)  $\geq$  140 mm Hg, diastolic blood pressure (DBP)  $\geq$  90 mmHg.

### **Risk factors:**

- ❖ **Age:** SBP rises progressively with increasing age.
- ❖ **Alcohol:** Excessive alcohol intake strongly associated with Hypertension.
- ❖ **Cigarette smoking:** Smoking greatly increases the risk of cardiovascular disease.
- ❖ **Diabetes mellitus:** Hypertension is common in hypertensive patients.
- ❖ **Elevated serum lipids:** Elevated serum levels of cholesterol and triglycerides are primary risk factors in atherosclerosis. Hyperlipidemia is more in people with hypertension.
- ❖ **Excess dietary sodium intake**
- ❖ **Gender:** hypertension is more prevalent in men in young adulthood and early middle age (< 55 years of age). After the age of 55, hypertension is more prevalent in women.
- ❖ **Obesity**
- ❖ **Sedentary life style:** Sedentary life style increases risk of cardiovascular diseases.
- ❖ **Socioeconomic status:** hypertension is more prevalent in lower socioeconomic groups and among the less educated.
- ❖ **Stress**

### **CAUSESS**

**The causes of hypertension can be classified as primary and secondary.**

1. **Primary Hypertension:** Primary (essential or idiopathic) hypertension is elevated BP without an identified cause and accounts for 90 to 95% all cases of hypertension. But few contributing factors are identified they are:

- Dysfunction of SNS
- .Dysfunction renin-angiotensin- aldosterone system
- .Vasoconstriction
- Increased sodium intake
- Obesity
- Diabetes mellitus
- Insulin resistance
- Stress
- Dyslipidemia
- Excessive alcohol consumption.
- **Secondary Hypertension:** Secondary hypertension is elevated BP with a specific cause that often can be identified and corrected. This type of hypertension accounts for 5 to 10% of hypertension.
- Renal disease such as renal artery stenosis, primary sodium retention, renin-producing tumors parenchymal disease.
- Endocrine disorders such as pheochromocytoma, cushing syndrome, acromegaly, hypothyroidism, hyperthyroidism, and hyperaldosteronism.
- Coarctation or congenital narrowing of the aorta.
- Neurologic disorders such as brain tumors, tetraplegia, Guillain-Barre syndrome and head injury.
- Sleep apnea.
- Cirrhosis of liver.
- Pregnancy-induced hypertension.

## **Classification**

**Accelerated hypertension:** A significant recent increase in blood pressure over previous hypertensive levels, with evidence of vascular damage on fundoscopic examination.

**Malignant hypertension:** Triad of blood pressure  $> 200/140$  mm Hg grade IV retinopathy (papilledema) and renal dysfunction.

**Hypertensive urgency:** Here blood pressure is markedly elevated without evidence of some end organ damage.

**Hypertensive emergency:** Here blood pressure is markedly elevated with evidence of some end organ damage.

**White coat hypertension:** A transient increase in blood pressure in normal individuals, when BP is recorded by a doctor.

**Pseudohypertension:** A false increase in blood pressure due to stiff and non-compliant vessels (Osler's sign), Occurring in old age. Here intra-arterial BP is lower than the BP measured by sphygmomanometer.

**Transient hypertension:** An increased blood pressure for a particular period of time and then dropping back to normal. It is seen in acute cerebrovascular accidents, acute myocardial infarction, acute glomerulonephritis, pregnancy.

**Paradoxical hypertension:** Here the patients show a sudden increase in BP even on antihypertensive drugs.

**Hypertensive crisis:** It is a severe and abrupt elevation in BP, where diastolic blood pressure is more than 140 mm Hg

**Isolated Systolic hypertension:** Here the systolic blood pressure (SBP)  $\geq 140$  mm Hg, but the diastolic blood pressure (DBP)  $< 90$  mm Hg.

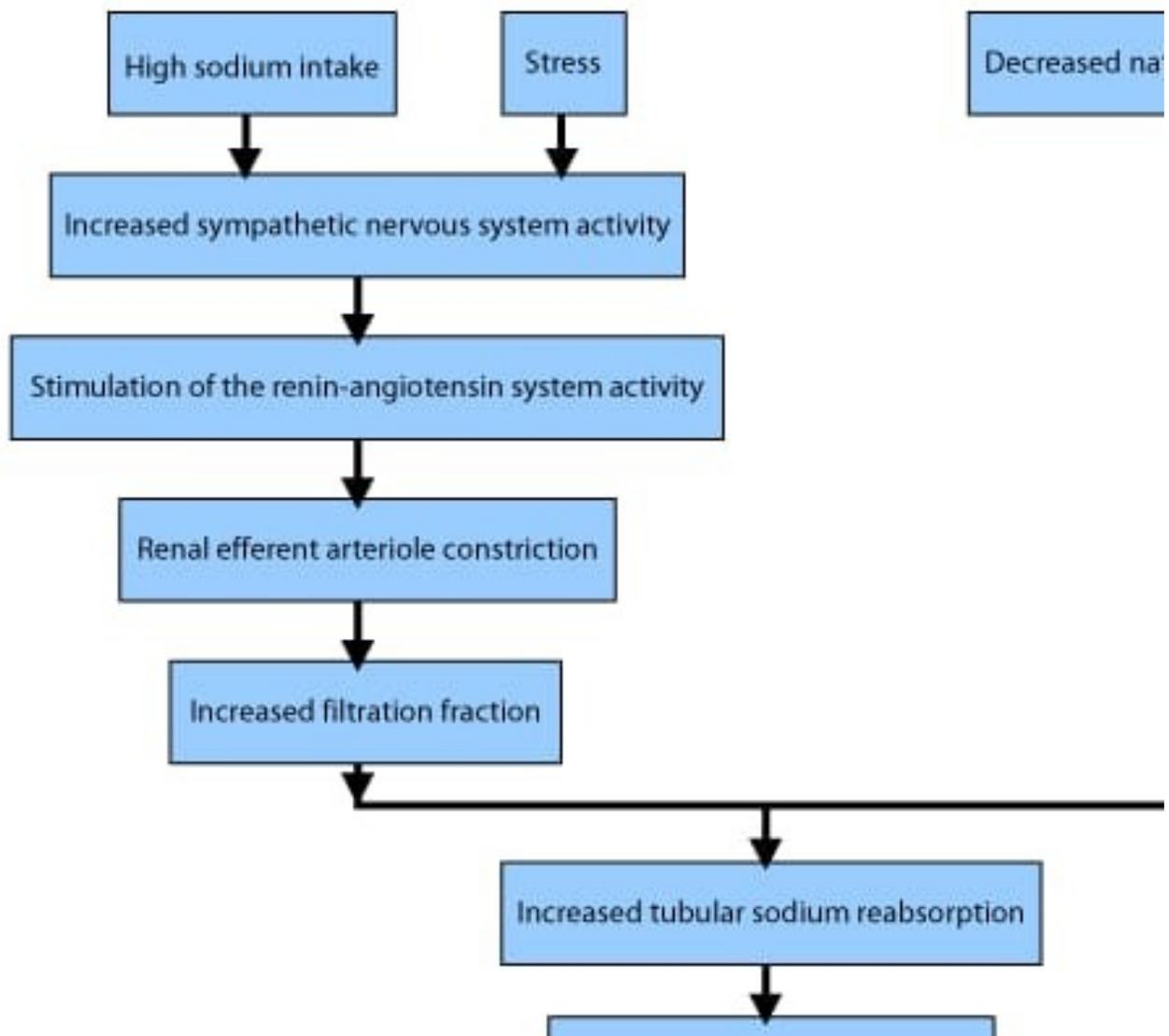
**Another type of classification:**

<b>BP Classification</b>	<b>SBP (mm Hg)</b>	<b>DBP (mm Hg)</b>
<b>Normal</b>	<b><math>&lt; 120</math></b>	<b><math>&lt; 80</math></b>
<b>Prehypertension</b>	<b>120-139</b>	<b>80-89</b>
<b>Hypertension, Stage 1</b>	<b>140-159</b>	<b>90-99</b>
<b>Hypertension, Stage 2</b>	<b><math>\geq 160</math></b>	<b><math>\geq 100</math></b>

**Abbreviation: SBP-Systolic blood pressure; DBP-Diastolic blood pressure**

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**Pathophysiology:**



## **CLINICAL MANIFESTATIONNS**

Hypertension is often called the "silent killer" because it is frequently asymptomatic until it becomes severe and target organ disease has occurred.

Cardiac symptoms:

- CAD
- Left ventricular hypertrophy
- Heart failure

Cerebrovascular :

- Transient ischemic attack or stroke
- Hypertensive encephalopathy.

### **Peripheral Vascular**

- One or more major puises in the extremities (except for dorsalis pedis) reduced or absent
- .intermittent claudication
- .Abdominal or carotid bruits/thrills
- Aneurysm.

### **Renal**

- Nephrosclerosis
- Renal failure
- Serum creatinine  $\geq 1.5$  mg/dl
- Proteinuria (1+ or greater)
- Micro albuminuria.

## **Retinopathy**

- Generalized or focal narrowing of retinal arterioles
- Arteriovenous nicking
- Hemorrhages or exudates, with or without papilledema.

A patient with severe hypertension may experience a variety of symptoms secondary to effects on blood vessels in the various organs and tissues or to the increased workload of the heart. These secondary symptoms include fatigue, reduced activity tolerance, dizziness, palpitations, angina and dyspnea.

## **COMPLICATIONS**

The most common complications of hypertension are target organ diseases occurring in the heart (hypertensive heart disease), brain (cerebrovascular disease), peripheral vasculature (peripheral vascular disease), kidney (nephrosclerosis), and eyes (retinal damage).

**Coronary Artery Disease:** Hypertension is a major risk factor for coronary artery disease (CAD). In people older than 50 years, systolic hypertension is a much more important risk factor for cardiovascular disease than diastolic hypertension.

**Left Ventricular Hypertrophy:** Sustained high BP increases the cardiac workload and produces left ventricular hypertrophy (LVH).

**Heart Failure:** Heart failure occurs when the heart's compensatory adaptations are overwhelmed and the heart can no longer pump enough blood to meet the metabolic needs of the body. Contractility is depressed, and stroke volume and cardiac Output are decreased.)

## **Cerebrovascular Disease**

Atherosclerosis is the most common cause of cerebrovascular disease. Hypertension is a major risk factor for cerebral atherosclerosis and stroke. Even in mildly hypertensive people, the risk of stroke is 4 times higher than in normotensive people. Adequate control of BP diminishes the risk of stroke.

**Peripheral Vascular Disease:** As it does with other vessels, hypertension speeds up the process of atherosclerosis in the peripheral blood vessels, leading to the development of peripheral vascular disease, aortic aneurysm, and aortic dissection.

## **Nephrosclerosis**

Renal dysfunction is the direct result of ischemia caused by the narrowed lumen of the intrarenal blood vessels. Gradual narrowing of the arteries and arterioles leads to atrophy of the tubules, destruction of the glomeruli, and eventual death of nephrons. Initially intact nephrons can compensate, but these changes may eventually lead to renal failure.

## **Retinal Damage**

The appearance of the retina provides important information about the severity and duration of the hypertensive process. The retina is the only place in the body where the blood vessels can be directly visualized. Therefore damage to retinal vessels provides an indication of concurrent vessel damage in the heart, brain, and kidney. An ophthalmoscope is used to visualize the blood vessels of the eye. Manifestations of severe retinal damage include blurring of vision, retinal hemorrhage, and loss of vision.

## **ASSESSMENT AND DIAGNOSTIC STUDIES**

### **1. History Collection**

### **2. Physical Assessment or Examination**

### **3. Diagnostic Studies**

- Urinalysis for blood, protein and glucose
- Blood urea, electrolytes and creatinine, Blood glucose level
- Serum total cholesterol and high-density lipoprotein (HDL) cholesterol, LDL cholesterol, triglycerides
- 12-lead ECG (left ventricular hypertrophy, coronary artery disease)
- Thyroid function test:
- Chest X-ray: To detect cardiomegaly, heart failure, coarctation of the aorta
- Ambulatory BP recording: To assess borderline or 'white coat' hypertension
- Echocardiogram: To detect or quantify left ventricular hypertrophy
- Renal ultrasound: To detect possible renal disease
- Renal angiography: To detect or confirm presence of renal artery stenosis
- Urinary catecholamines: To detect possible pheochromocytoma
- Urinary cortisol and dexamethasone suppression test: To detect possible Cushing's syndrome
- Plasma renin activity and aldosterone: To detect possible primary aldosteronism.

## **MANAGEMENT OF HYPERTENSION**

### **Drug therapy :**

- ✚ Diuretics: example: Aldactone (spironolactone), Esidrix (hydrochlorothiazide), Lasix (furosemide)

✚ **Direct vasodilators: Examples:** hydralazine (Apresoline), minoxidil (Loniten), sodium nitroprusside (Nipride, Nitropress) \*High Alert Medication\*

✚ **Angiotensin inhibitors: Examples:** Captopril, Enalapril (Vasotec)

✚ **Calcium channel blockers: Examples:** Amlodipine, Diltiazem, Nifedipine,, Verapamil

### **Nursing Management:**

Risk for decreased cardiac output related to inadequate oxygenated blood pumped by the heart to meet metabolic demands.

### **Nursing intervention:**

- Assess vital signs, focusing on blood pressure and pulses and record.
- Thoroughly check the patient's laboratory results such as blood cell counts, ABGs, electrolytes and cardiac marker studies.
- Check blood pressure readings on arms and record.
- Advise the patient to limit intake of food high in sodium and cholesterol.

Acute pain related to potential tissue damage secondary to decreased oxygen tissue perfusion

### **Nursing intervention:**

- Assess patient's report of pain, noting the characteristics of pain.
- Observe the patient's mood and demeanor during assessment, noting for both verbal and non-verbal cues to pain.
- Check medication history and determine if the patient has indications of substance abuse.

- Provide patient non-pharmacologic pain management techniques such as backrubs, use of cool cloths to the forehead and allowing the patient to assume a position of comfort.
- Provide diversionary activities to help manage pain such as guided imagery, use of music, meditation.

Activity intolerance related to insufficient energy to complete activities of daily living secondary to hypertension as evidenced by: Reports of weakness or fatigue

**Nursing intervention:**

- Note the factors that may contribute to the presence of fatigue (age, overall physical health, stage of illness).
- Observe the patient when performing physical activities, noting when intolerance occurs and how severe it affects the ability of the patient to perform activities of daily living.
- Monitor vital signs before, during and after activities.
- Allow the patient to perform simple tasks before progressing to more complex ones while ensuring that these are done within the level of tolerance.

**Health education:**

**Lifestyle modifications:** It includes weight reduction, DASH (Dietary Approaches to Stop Hypertension) eating plan, and dietary sodium reduction, moderation of alcohol consumption, regular aerobic physical activity, and avoidance of tobacco use (smoking and chewing).

**Weight reduction**

**DASH eating plan:** This diet involves eating several servings of fish each week, eating plenty of fruits and vegetables, increasing fiber intake, and drinking a lot of water. The DASH diet significantly lowers BP. These decreases have been compared to those achieved with BP-lowering medication.

**Dietary sodium reduction:** It has been recommended that healthy adults restrict salt intake to less than 6 g of salt (NaCl) or less than 2.4 g of sodium per day. This involves avoiding foods known to be high in sodium and not adding salt in the preparation of foods or at meals. The patient and family, especially the member who prepares the meals, should be taught about sodium-restricted diets.

### **Moderation of alcohol consumption**

**Physical activity:** It is recommended that all adults have regular aerobic physical activity (e.g. brisk walking) at least 30 minutes per day at least 5 days in a week. Moderately intense activity such as brisk walking, jogging, and walking can lower BP, promotes relaxation, and decrease or control body weight. Regular activity of this type can reduce SBP in the hypertensive patient by approximately 4 to 9 mm Hg.

### **Avoidance of tobacco products:**

**Stress management:** Stress can raise BP on a short-term basis and has been implicated in the development of hypertension. Relaxation therapy, guided imagery, and biofeedback may be useful in helping patients manage stress, thus decreasing BP.

## **CORONARY ARTERY DISEASE**

Definition: Coronary artery disease (CAD) is an obstructed blood flow through the coronary arteries to the heart muscle. The primary cause of CAD is atherosclerosis.

### **Causes:**

#### **Non-Modifiable Risk Factors: Age, Gender, and Ethnicity**

The incidence of CAD and MI is highest among middle-aged men. After the age of 65, the incidence in men and women equalizes although cardiovascular disease causes more deaths in women than men.

#### **Family History and Genetics**

Genetic predisposition is an important factor in the occurrence of CAD, although the exact mechanism of inheritance is not fully understood.

#### **Modifiable Major Risk Factors**

- **Elevated Serum Lipids:**

An elevated serum lipid level is one of the most firmly established risk factors for CAD. The risk of CAD is associated with a serum cholesterol level of more than 200 mg/dL or a fasting triglyceride level of more than 150 mg/dL.

Lipoproteins are vehicles for fat mobilization for fat mobilization and transport. The different types of lipoproteins vary in composition and are classified as high density lipoproteins (HDLs), low density lipoproteins (LDLs), and very low density lipoproteins (VLDLs).

HDLs carry lipids away from arteries and to the liver for metabolism. Therefore high serum HDL levels are desirable and low HDL levels are considered a risk

factor for the development of CAD. This process of HDL transport prevents lipid accumulation within the arterial walls. The higher the HDL levels in the blood, the lower the risk of CAD.

Low density lipoproteins (LDLs) contain more cholesterol than any of the other lipoproteins and have an affinity for arterial walls. VLDLs contain both cholesterol and triglycerides and also are thought to deposit cholesterol directly on the walls of arteries. Elevated LDL levels correlate most closely with an increased incidence of atherosclerosis and CAD.

- **Hypertension**
- **Tobacco Use**
- **Physical Inactivity**
- **Obesity**

### **Modifiable Contributing Risk Factors**

#### **Diabetes Mellitus**

#### **Metabolic Syndrome**

Metabolic syndrome refers to a cluster of risk factors for CAD whose underlying pathophysiology is thought to be related to insulin resistance. These risk factors include obesity as defined by increased waist circumference, elevated triglycerides, hypertension, abnormal serum lipids, and an elevated fasting blood glucose. These multiple, interrelated risk factors of metabolic origin appear to promote the development of CAD.

#### **Psychologic States**

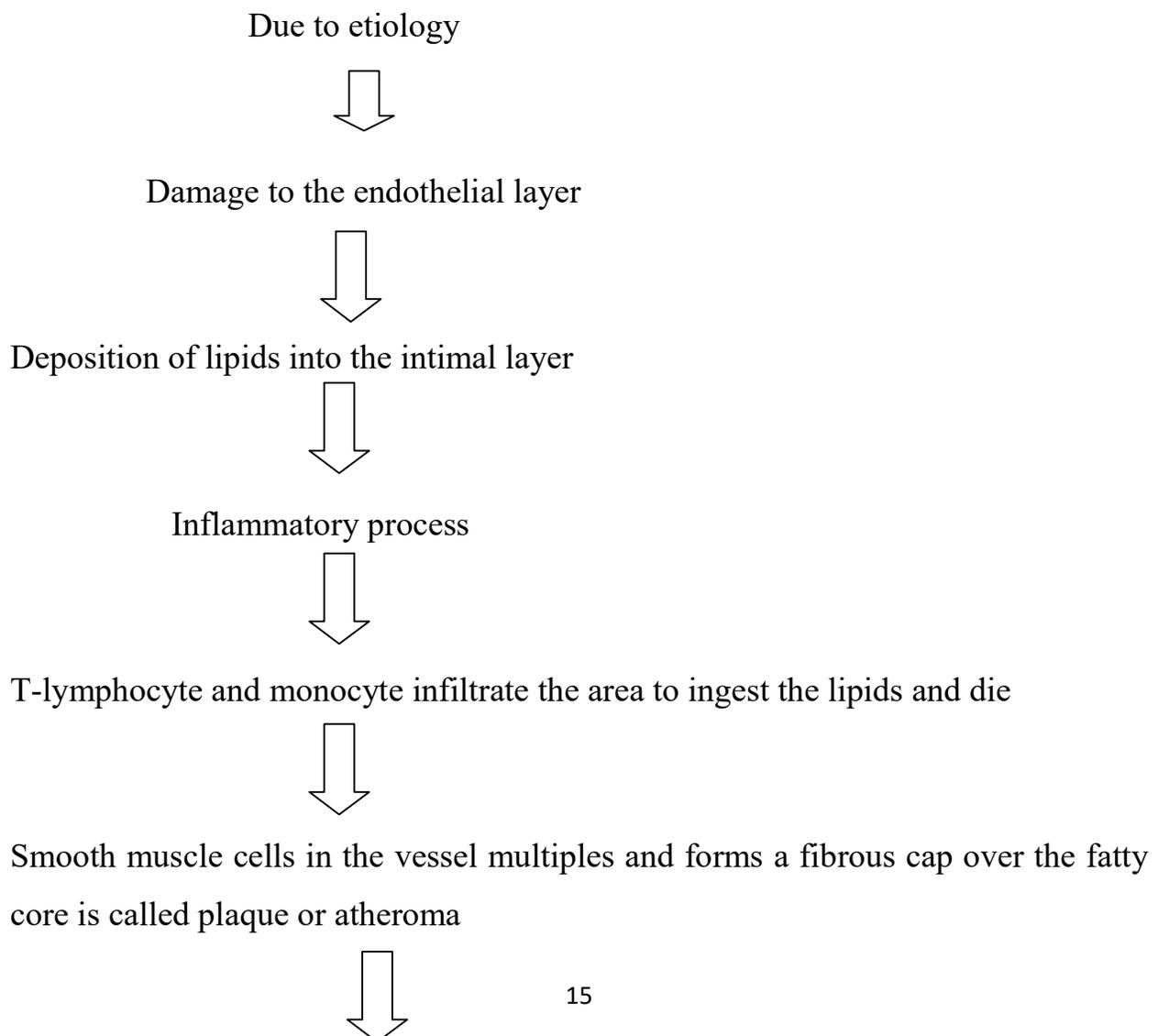
Stressful states have also been correlated with the development of CAD.

## Homocysteine

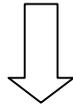
High blood levels of homocysteine have been linked to an increased risk for CAD and other cardiovascular diseases. Homocysteine, a sulfur-containing amino acid, is produced by the breakdown of the essential amino acid methionine, which is found in dietary protein. High homocysteine levels (>12 to 15 mmol/L) possibly contribute to atherosclerosis by-

- (1) damaging the inner lining of blood vessels, (2) promoting plaque build up, and
- (3) altering the clotting mechanism to make clots more likely to occur

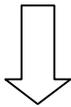
### **Pathophysiology of myocardial infarction or CAD**



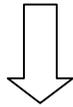
Plaque protrudes into the lumen of the vessel, causing narrowing of blood vessel and obstructing the blood flow



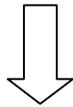
If the fibrous cap of plaque is thick and the lipid pool remains stable, it can resist the stress of the blood flow



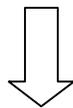
If the fibrous is thin, as the lipid core grows causing the rupture of cap and bleeding into the plaque



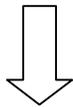
Formation of thrombus



Thrombus may obstruct the blood flow to the coronary artery



Myocardial ischemia



CAD or Myocardial infarction

**Clinical Manifestations:** Asymptomatic until later stages.

### **Vascular**

- Diminished peripheral pulses

- Capillary refill greater than 3 seconds
- .Dry skin
- Loss of hair on extremities
- Thickened nails
- Pallor in nail beds
- Leg cramps

### **Cardiac**

- Diaphoresis
- Fatigue
- Shortness of breath
- Chest pain
- Dizziness
- Nausea
- Arterial bruits
- Weakness

### **Diagnostic evaluation:**

1. History Collection
2. Physical Assessment or Examination
3. Blood investigations: CPK, CKMB, Troponin –I, serum cholesterol
4. ECG
5. Echocardiogram
6. TMT
7. Coronary angiogram

### **Management**

### **Medical management:**

Antiplatelet medications are administered to prevent platelet aggregation, which impedes blood flow. Aspirin prevents platelet activation and reduces the incidence of MI and death in patients with CAD. Clopidogrel and Ticlopidine Clopidogrel (Plavix) or ticlopidine (Iclid) is given to patients who are allergic to aspirin or given in addition to aspirin in patients at high risk for MI.

Lipid lowering medications: example: Atorvastatins, Niacin.

### **Nursing management:**

#### **Nursing diagnosis:**

#### **Health education:**

- **Life Style Changes**
- Control of blood cholesterol level

Less than 160 mg/dL for patients with one or no risk factors.

Less than 130 mg/dL. for patients with two or more risk factors.

Less than 100 mg/dL for patients with CAD or a CAD risk equivalent.

The level of HDL should exceed 40 mg/dL and should ideally be more than 60 mg/dL.

Triglycerides levels should be less than 150 mg/dL.

- **Diet:** Which is rich in fresh fruit, cereal grains, vegetables, and legumes, enhance the excretion of the metabolized cholesterol.
- Low fat diet

- **Low salt diet**
- **Moderation of alcohol consumption.**
- **Physical activity:** Brisk walking for 30 minutes/day, 5 days in a week.
- **Cessation of smoking and tobacco use**
- **Controlling of hypertension and diabetes mellitus**

### ANGINA PECTORIS

**Definition:** Angina pectoris is a clinical syndrome usually characterized by episodes or paroxysms of pain or pressure in the anterior chest. The cause is usually insufficient coronary blood flow.

The insufficient flow results in a decreased oxygen supply to meet an increased myocardial demand for oxygen in response to physical exertion or emotional stress. In other words, the need for oxygen exceeds the supply.

#### **Causes:**

**Physical exertion:** which can precipitate an attack by increasing myocardial oxygen demand.

**Exposure to cold,** which can cause vasoconstriction and an elevated blood pressure, with increased oxygen demand.

**Eating a heavy meal,** which increases the blood flow to the mesenteric area for digestion, thereby reducing the blood supply available to the heart muscle.

**Stress,** causes the release of epinephrine and increasing blood pressure, which may accelerate the heart rate and increase the myocardial workload.

## Types of Angina

- ✚ **Stable angina:** Predictable and consistent pain that occurs on exertion and it usually last for 5-10 minutes a relieved by rest or nitrates.
- ✚ **Unstable angina** (also called pre-infarction angina or crescendo angina): symptoms occur more frequently longer than stable angina (> 20 minutes). The pain occurs during exertion and pain may occur at rest.
- ✚ **Intractable or refractory angina:** Severe incapacitating chest pain.
- ✚ **Variant angina (also called Prinzmetal's angina):** Pain at rest with reversible ST-segment elevation; thought to be caused by coronary artery vasospasm.
- ✚ **Silent ischemia:** Objective evidence of ischemia (such as electrocardiographic changes with a stress test), but patient reports no symptoms.

## Canadian Cardiovascular Society Angina Grading Scale

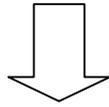
- ✚ **Class I:** Angina only during strenuous or prolonged physical activity.
- ✚ **Class II:** Slight limitation, with angina only during vigorous physical activity.
- ✚ **Class III:** Symptoms with everyday living activities, i.e. moderate limitation.
- ✚ **Class IV:** Inability to perform any activity without angina or angina at rest, i.e. severe limitation.

## Pathophysiology:

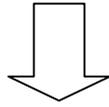
Due to etiology



Decreased blood supply to the coronary artery



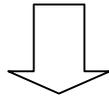
**Necrosis of heart muscle**



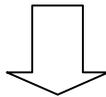
**Signs and symptoms**

**Or**

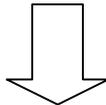
**Due to the etiology**



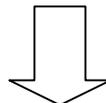
**Narrowing of the coronary artery**



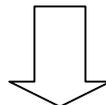
**Insufficient blood flow**



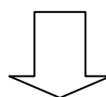
**Myocardial oxygen demand exceed supply**



**Anaerobic metabolism with lactic acid accumulation**



**Myocardial nerve fibers irritated**



**Pain message transmitted to cardiac nerves & upper posterior nerve roots.**

## **Clinical Manifestations**

- ✓ Pain or discomfort: Pain may radiate to the neck, jaw, shoulders and inner aspects of the upper arms. Usually left arm.
- ✓ Feeling of weakness or numbness in the arms, wrists, and hands.
- ✓ Shortness of breath
- ✓ Pallor
- ✓ Diaphoresis,
- ✓ Dizziness or lightheadedness
- ✓ Nausea and vomiting.

## **Diagnostic evaluation:**

1. History Collection
2. Physical Assessment or Examination
3. Blood investigations: CPK, CKMB, Troponin –I, serum cholesterol, C-reactive protein (CRP) is a marker for inflammation of vascular endothelium. High blood levels of CRP have been associated with increased coronary artery calcification and risk of an acute cardiovascular event
4. ECG
5. Echocardiogram
6. TMT
7. Coronary angiogram

## **Complications:**

- M.I.
- Dysrhythmia
- Congestive cardiac failure

- Death.

## **Medical Management**

- ✚ **Administer oxygen**
- ✚ **Nitroglycerine therapy: Example: Tab. Isosorbide mononitrate, isosorbid dinitrate.**
- ✚  **$\beta$  –adrenergic blocking agents: Tab. Prprpranolol, or Tab. Metoprolol or Tab. Atenolol**
- ✚ **Calcium channel blockers: Tab. Amlodipine**
- ✚ **Antiplatelet agents: Tab. Aspirin 75mg, Tab. Clopidogrel**
- ✚ **Anti- coagulant therapy: Heparin.**

## **Surgical management:**

- ❖ Percutaneous coronary interventional (PCI) procedures (e.g. percutaneous transluminal coronary angioplasty |PTCA|)
- ❖ Intracoronary stents
- ❖ Coronary artery bypass graft (CABG),
- ❖ Percutaneous transluminal myocardial revascularization (PTMR)

## **Nursing Management**

Place the patient in Fowler's position to reduce the oxygen requirements of the ischemic myocardium.

Nitroglycerin is administered sublingually, and the patient's response is assessed (relief of chest pain and efect on blood pressure and heart rate).

Administer oxygen if the patient's respiratory rate is increased or the oxygen saturation level is decreased.

If the pain is significant and continues after these interventions, the patient is usually transferred to intensive care unit.

## **MYOCARDIAL INFARCTION**

A myocardial infarction, commonly known as a heart attack, results in the death of heart muscle. The affected myocardial cells in the heart are permanently destroyed. An MI occurs from a partial or complete blockage of a coronary artery, which decreases the blood supply to the cells of the heart supplied by the blocked coronary artery.

**Definition:** A myocardial infarction (MI), commonly known as a heart attack, occurs when blood flow decreases or stops to the coronary artery of the heart, causing damage to the heart muscle.

**Or**

**MI is defined as the irreversible damage to the myocardial tissue caused by prolonged ischemia and hypoxia.**

### **Risk Factors**

#### **1. Non-modifiable Risk Factors**

- Age
- Gender
- Ethnicity
- Genetic predisposition and family history of heart disease.

#### **2. Modifiable Risk Factors**

- Serum lipids: Elevated triglycerides, and low density LDL cholesterol; decreased HDL cholesterol
- Hypertension
- Tobacco use
- Physical inactivity
- Obesity:

### **Contributing Factors**

- Diabetes mellitus
- Psychologic stress
- Homocysteine levels.

### **Clinical Manifestations of Myocardial Infarction**

Pain: Heaviness, pressure, tightness, burning, constriction or crusting. Common locations are substernal, retrosternal or epigastric areas.

Sympathetic nervous system stimulation:

- ✓ Shortness of breath
- ✓ Hypotension
- ✓ Pallor
- ✓ Diaphoresis & vasoconstriction of peripheral blood vessels
- ✓ Dizziness or lightheadedness
- ✓ Nausea and vomiting.
- ✓ Jugular vein distension
- ✓ Hepatic engorgement
- ✓ Peripheral edema
- ✓ Abnormal heart sounds ( S<sub>3</sub> ,S<sub>4</sub> are present)

- ✓ Fever

### **Diagnostic evaluation:**

- History Collection
- Physical Assessment or Examination
- Blood investigations: CPK, CKMB, Troponin –I, serum cholesterol,
- C-reactive protein (CRP) is a marker for inflammation of vascular endothelium. High blood levels of CRP have been associated with increased coronary artery calcification and risk of an acute cardiovascular event
- ECG
- Echocardiogram
- TMT
- Coronary angiogram

### **Complications:**

- Dysrhythmia
- Congestive cardiac failure
- Cardiogenic shock:
- Papillary muscle dysfunction
- Ventricular aneurysm
- Pericarditis
- Dressler's syndrome : (Post-myocardial infarction syndrome, post-pericardiotomy pericarditis) Dressler's syndrome is a secondary form of pericarditis that occurs due to injury of the heart or the pericardium. It consists of a triad of features, fever, pleuritic pain and pericardial effusion.
- Death.

## **Medical Management:**

- ✚ **I.V. Nitroglycerine : Helps to improve coronary blood flow**
- ✚ **Morphine sulfate: To reduce pain**
- ✚ **ACE inhibitor: (Angiotensin- converting enzyme inhibitor): Example: Captopril**
- ✚ **Anti-dysrhythmic drugs: Sodium channel blockers: Lidocaine**
- ✚ **Cholesterol lowering drugs**
- ✚ **Fibrinolytic therapy or thrombolytic therapy**
- ✚ **β –adrenergic blocking agents: Tab. Propranolol, or Tab. Metoprolol or Tab. Atenolol**
- ✚ **Calcium channel blockers: Tab. Amlodipine**
- ✚ **Antiplatelet agents: Tab. Aspirin 75mg, Tab. Clopidogrel**
- ✚ **Anti- coagulant therapy: Heparin.**
- ✚ **Nutritional Therapy:** Initially, patients may be in a condition of NPO (nothing by mouth), except for the sips of water until stable (eg. pain free, nausea resolved). Diet is advanced as tolerated to a low-salt, low saturated fat, and low cholesterol diet.

## **Surgical management:**

- ❖ Percutaneous coronary interventional (PCI) procedures (e.g. percutaneous transluminal coronary angioplasty |PTCA|)
- ❖ Intracoronary stents
- ❖ Coronary artery bypass graft (CABG),
- ❖ Percutaneous transluminal myocardial revascularization (PTMR)

## **Nursing Management:**

The nursing management involved in MI is critical and systematic, and efficiency is needed to implement the care for a patient with MI.

### **Nursing Assessment**

One of the most important aspects of care of the patient with MI is the assessment.

- Assess for chest pain not relieved by rest or medications.
- Monitor vital signs, especially the blood pressure and pulse rate.
- Assess for presence of shortness of breath, dyspnea, tachypnea, and crackles.
- Assess for nausea and vomiting.
- Assess for decreased urinary output.
- Assess for the history of illnesses.
- Perform a precise and complete physical assessment to detect complications and changes in the patient's status.
- Assess IV sites frequently.

### **Diagnosis**

Based on the clinical manifestations, history, and diagnostic assessment data, major nursing diagnoses may include.

- **Ineffective cardiac tissue perfusion** related to reduced coronary blood flow.
- **Risk for ineffective peripheral tissue perfusion** related to decreased cardiac output from left ventricular dysfunction.
- **Deficient knowledge** related to post-MI self-care.

### **Planning & Goals**

To establish a plan of care, the focus should be on the following:

- Relief of pain or ischemic signs and symptoms.
- Prevention of myocardial damage.
- Absence of respiratory dysfunction.
- Maintenance or attainment of adequate tissue perfusion.
- Reduced anxiety.
- Absence or early detection of complications.
- Chest pain absent/controlled.
- Heart rate/rhythm sufficient to sustain adequate cardiac output/tissue perfusion.
- Achievement of activity level sufficient for basic self-care.

- Anxiety reduced/managed.
- Disease process, treatment plan, and prognosis understood.
- Plan in place to meet needs after discharge.

### **Nursing Interventions**

Nursing interventions should be anchored on the goals in the nursing care plan.

- Administer oxygen along with medication therapy to assist with relief of symptoms.
- Encourage bed rest with the back rest elevated to help decrease chest discomfort and dyspnea.
- Encourage changing of positions frequently to help keep fluid from pooling in the bases of the lungs.
- Check skin temperature and peripheral pulses frequently to monitor tissue perfusion.
- Provide information in an honest and supportive manner.
- Monitor the patient closely for changes in cardiac rate and rhythm, heart sounds, blood pressure, chest pain, respiratory status, urinary output, changes in skin color, and laboratory values.

### **Evaluation**

After the implementation of the interventions within the time specified, the nurse should check if:

- There is an absence of pain or ischemic signs and symptoms.
- Myocardial damage is prevented.
- Absence of respiratory dysfunction.
- Adequate tissue perfusion maintained.
- Anxiety is reduced.