Assist. L zainab Hassan 4th Stage :Nursing

Management of patient with Cardiovascular Disorders in cardic care unit

Introduction

Cardiovascular system: consists of the heart, arteries, veins, and capillaries. The heart and blood vessels work together intricately to provide adequate blood flow to all parts of the body

Heart:is a hollow, muscular organ about the size of a closed fist, Located between the lungs in the mediastinum. heart has four chambers, two atria and two ventricles separated by a cardiac septum, also the heart has four valve.

The heart has two sets of valves:

- **Atrioventricular** (between atria and ventricles) — tricuspid valve on the heart's right side and mitral (bicuspid) valve on its left
- **Semilunar** — pulmonary valve (between the right ventricle and pulmonary artery) and aortic valve (between the left ventricle and aorta).

Key terms

Diastole: period of ventricular relaxation resulting in ventricular filling.

Systole: period of ventricular contraction resulting in ejection of blood from the ventricles into the pulmonary artery and aorta.

Sinoatrial (SA) node: primary pacemaker of the heart, located in the right atrium.

Atrioventricular (AV) node: secondary pacemaker of the heart, located in the right atrial wall near the tricuspid valve.

Cardiovascular disease (CVD) :is any disease involving the heart or blood vessels. CVDs constitute a class of diseases that includes: coronary artery diseases (e.g. angina, heart attack), heart failure, hypertensive heart disease, rheumatic heart disease, cardiomyopathy, arrhythmia, congenital heart disease, valvular heart disease, carditis, aortic aneurysms, peripheral artery disease, thromboembolic disease, and venous thrombosis.

Coronary artery diseases

1. Angina: sudden attacks of pain, tightness or discomfort in the chest that occurs when an area of the heart muscle receives less blood oxygen than. Usually .The pain often also spreads to the shoulders, arms, jaw, neck and back It usually happens when one or more arteries supplying the heart become hardened and narrowed , But, it is not a disease. It is a symptom of an underlying heart problem, usually coronary heart disease (CHD).

Types of angina

- **Stable angina.** There is predictable and consistent pain that occurs on exertion and is relieved by rest and/or nitroglycerin.
- **Unstable angina.** The symptoms increase in frequency and severity and may not be relieved with rest or nitroglycerin.
- **Intractable or refractory angina.** There is severe incapacitating chest pain.
- **Variant angina.** There is pain at rest, with reversible ST-segment elevation and thought to be caused by coronary artery vasospasm.

Causes of angina

The most common cause of angina reduced blood flow to the heart muscle is coronary artery disease (CAD). The heart (coronary) arteries can become narrowed by fatty deposits called plaques. This is called atherosclerosis

Several factors are associated with angina.

- **Physical exertion.** This can precipitate an attack by increasing myocardial oxygen demand.
- **Exposure to cold.** This can cause vasoconstriction and elevated blood pressure, with increased oxygen demand.
- **Stress.** Stress causes the release of catecholamines, which increased blood pressure, heart rate, and myocardial workload.
  - **Tobacco use**
  - **High cholesterol or triglycerides**
  - **High blood pressure**
  - **Drug misuse. Cocaine and other stimulants can cause blood vessel spasms and trigger angina**

Symptoms of angina

1. felt in the chest region as: squeezing , pressure , heaviness ,tightening burning or aching across the chest, usually starting behind the breastbone . This pain often spreads to the neck, jaw, arms, shoulders, throat, back, or even the teeth.

2. **Other symptoms**

-shortness of breath

-.indigestion

-Heartburn

- Sweating .

-weakness

Diagnosis of angina

1. **ECG:** often normal when a patient at rest or when pain-free; depression of the ST segment or T wave inversion signifies ischemia. Dysrhythmias and heart block may also be present. Significant Q waves are consistent with a prior MI.

2. **Chest X-ray.** a chest X-ray shows the condition of the heart and lungs. A chest X-ray may be done to determine if other conditions are causing chest pain symptoms and to see if the heart is enlarged.

3. **Blood tests**: can measure the level of cardiac troponin in the blood to help healthcare providers tell unstable angina from a heart attack. Troponin is a type of protein found in the heart muscles. When the heart muscles are damaged, troponin can leak into the bloodstream.

4. **Coronary angiography:** coronary angiography uses X-ray imaging to examine the inside of the heart's blood vessels. It's part of a general group of procedures known as cardiac catheterization.

Complications of angina

-Myocardial infarction: is the end result of angina pectoris if left untreated.

- Cardiac arrest: the heart pumps more and more blood to compensate the decreased oxygen supply, and the cardiac muscle would ultimately fail leading to cardiac arrest.

- Cardiogenic shock

Medical management

1. **Oxygen therapy**

2. **Pharmacologic Therapy**

-Nitroglycerin gives long-term and short-term reduction of myocardial oxygen consumption through selective vasodilation within three (3) minutes.

-Beta-blockers: reduces myocardial oxygen consumption by blocking beta-adrenergic stimulation of the heart such as Metoprolol , Propranolol

-**Calcium channel blockers**. :such as Amlodipine

-Antiplatelet: medications prevent platelet aggregation and **anticoagulants** prevent thrombus formation such as aspirin

Nursing management for angina

Goal: to relieve acute pain and reduce the cardiac work load

1. Administer oxygen to relieve ischemia

2. Assess and document continuous ECG rhythm, vital signs, mental status, heart and lung sounds.
3. Assess and document pain characteristics: location, duration, intensity (have patient grade pain on a scale from 1 to 10), precipitating factors, relief measures and any symptoms that indicate changes in these parameters.
4. Begin IV nitroglycerin titrated until acute pain is relieved; check blood pressure every 15 minutes

5. Maintain activity restrictions based on the patient's activity tolerance to reduce myocardial oxygen demands.
6. Give sublingual, oral, or topical nitroglycerin prophylactically for chronic pain
7. Begin the patient on a low-cholesterol, low-sodium diet to alleviate

the modifiable risk factors

2. Myocardial infraction (heart attack)

Defined as a diseased condition which is caused by reduced blood flow in a coronary artery due to atherosclerosis & occlusion of an artery by an embolus or thrombus. MI or heart attack is the irreversible damage of myocardial tissue caused by prolonged ischemia & hypoxia

Signs and symptom of myocardial infraction

•pain / chest discomfort

• Chest pain is less in women, their common symptoms are weakness, fatigue & dyspnea

•Pain or discomfort that spreads to the shoulder, arm, back, neck, jaw, teeth

• Dyspnea

•Palpitation

• hypertension or hypotension, arrhythmia

Diagnosis of myocardial infraction

1. **ECG:** ST elevation signifying ischemia; peaked upright or inverted T wave indicating injury; development of Q waves signifying prolonged ischemia or necrosis

2. Coronary angiography (also called a cardiac catheterization)

3. Echocardiogram

4. Blood tests: can detect if high levels of proteins (biochemical including CK, CK-MF and troponin) exist in the bloodstream

Medical management

- **Morphine** administered in IV boluses is used for MI to reduce pain and anxiety.
- **ACE Inhibitors:** ACE inhibitors prevent the conversion of angiotensin I to angiotensin II to decrease blood pressure and for the kidneys to secrete sodium and fluid, decreasing the oxygen demand of the heart such as Captopril (Capoten)

- **Thrombolytic:** Thrombolytic dissolve the thrombus in the coronary artery ,allowing blood to flow through the coronary artery again, minimizing the size of the infarction and preserving ventricular function such as Alteplase

-Emergent Percutaneous Coronary Intervention(procedure)

Nursing management

- 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.
- 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.

Heart failure

Heart failure :is the inability of the heart to pump sufficient blood to meet the needs of the tissues for oxygen and nutrients.

The term heart failure indicates myocardial disease in which there is a problem with contraction of the heart (systolic dysfunction) or filling of the heart (diastolic dysfunction) that may or may not cause pulmonary or systemic congestion.

Classification of heart failure

Heart failure is classified into two types: left-sided heart failure and right-sided heart failure.

1. Left-sided heart failure: or left ventricular failure have different manifestations with right-sided heart failure.

Pulmonary congestion occurs when the left ventricle cannot effectively pump blood out of the ventricle into the aorta and the systemic circulation.

Pulmonary venous blood volume and pressure increase, forcing fluid from the pulmonary capillaries into the pulmonary tissues and alveoli, causing pulmonary interstitial edema and impaired gas exchange.

2. Right-Sided Heart Failure

When the right ventricle fails, congestion in the peripheral tissues and the viscera predominates.

The right side of the heart cannot eject blood and cannot accommodate all the blood that normally returns to it from the venous circulation.

Increased venous pressure leads to JVD and increased capillary hydrostatic pressure throughout the venous system.

Left-sided HF symptoms

-Dyspnea or shortness of breath may be precipitated by minimal to moderate activity.
-Cough. The cough associated with left ventricular failure is initially dry and nonproductive.
-Pulmonary crackles. Bibasilar crackles are detected earlier and as it worsens, crackles can be auscultated across all lung fields.
-Low oxygen saturation levels. Oxygen saturation may decrease because of increased pulmonary pressures.

Right-sided HF symptoms

-Enlargement of the liver: result from venous engorgement of the liver.
Accumulation of fluid in the peritoneal cavity may increase pressure on the stomach and intestines and cause gastrointestinal distress.
Loss of appetite results from venous engorgement and venous stasis within the abdominal organ

Diagnosis of heart failure

-ECG: May show hypertrophy, axis deviation, ischemia, and damage patterns. Dysrhythmias and ST-T segment abnormalities may be present.

-Chest x-ray: May show enlarged cardiac shadow or abnormal contour indicating ventricular aneurysm.

-Sonograms (echocardiography Doppler, and transesophageal echocardiography): May reveal chamber dimensions, valvular function/structure, and ventricular dilation and dysfunction.

-Heart scan (MUGA): Measures cardiac volume, ejection fraction, and wall motion

Medical treatment of heart failure

- **ACE Inhibitors**: ACE inhibitors slow the progression of HF, improve exercise tolerance, and promote vasodilation and diuresis by decreasing afterload and preload such as Capoten (captopril)
- **Beta Blockers**: Beta blockers reduce the adverse effects from the constant stimulation of the sympathetic nervous system such as Carvedilol
- **Diuretics**: are prescribed to remove excess extracellular fluid by increasing the rate of urine produced in patients with signs and symptoms of fluid overload such as Furosemide
- **Calcium Channel Blockers**: cause vasodilation, reducing systemic vascular resistance but contraindicated in patients with systolic HF such as Amlodipine

Additional Therapy for heart failure

-**Supplemental Oxygen**: The need for supplemental oxygen is based on the degree of pulmonary congestion and resulting hypoxia.

-**Cardiac Resynchronization Therapy**: CRT involves the use of a biventricular pacemaker to treat electrical conduction defects.

-**Ultrafiltration**: Ultrafiltration is an alternative intervention for patients with severe fluid overload

Complication of heart failure

1. **Kidney damage or failure**
2. **Liver damage**
3. **Sudden cardiac death**

Nursing management

1. Monitoring vital signs: Regularly monitoring the patient's blood pressure, heart rate, respiratory rate, and oxygen saturation levels can provide valuable information about their condition
2. Administering medications: Nursing interventions may involve administering prescribed medications such as diuretics, ACE inhibitors, beta blockers, or vasodilators to manage symptoms and improve cardiac function.
3. Providing oxygen therapy: If necessary, oxygen therapy can be implemented to maintain adequate oxygenation and relieve respiratory distress
4. Monitoring fluid balance: Monitoring daily weights, urine output, and assessing for signs of fluid retention can help identify and manage fluid overload in patients with heart failure
5. Implementing dietary modifications: Collaborating with a dietitian to develop a suitable meal plan, which may involve a low-sodium diet, can help manage symptoms and prevent fluid retention

Best wishes