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Clinical Overview and Case Analysis of Coronary Artery Disease with Diagnostic and Nursing Perspectives

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Abstract: ***Coronary artery disease is a progressive condition that limits blood flow to the heart through the gradual accumulation of plaque within the coronary vessels, and it presents a wide spectrum of clinical manifestations that often emerge only after years of silent development. The overview examines its incidence patterns, the major pathological mechanisms that drive vessel narrowing, and the range of contributing causes and risk factors that shape disease severity across populations. It also outlines the clinical forms of the disease, spanning obstructive, non-obstructive, and microvascular variants, each with its own challenges for diagnosis and treatment. A case study of a 63-year-old woman illustrates how symptoms, diagnostic findings, and laboratory results converge to confirm the condition, leading to interventional procedures such as percutaneous coronary intervention and angiography. Medical, surgical, and alternative management strategies are presented, alongside common complications and essential nursing considerations, offering a comprehensive picture of how this condition is identified and addressed in clinical practice.***

Keywords: coronary artery disease, atherosclerosis, cardiac intervention, risk factors, nursing management

1.Introduction

Coronary artery disease (CAD) is a common type of heart disease. It affects the main blood vessels that supply blood to the heart, called the coronary arteries. In CAD, there is reduced blood flow to the heart muscle. A buildup of fats, cholesterol and other substances in and on the artery walls, a condition called atherosclerosis, usually causes coronary artery disease. The buildup, called plaque, makes the arteries narrow. Coronary artery disease often develops over many years. Symptoms are from the lack of blood flow to the heart. They may include chest pain and shortness of breath. A complete blockage of blood flow can cause a heart attack.

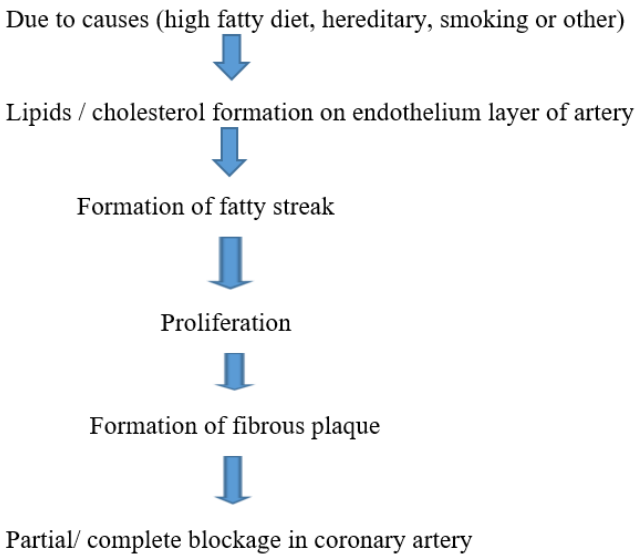
Incidence

The incidence of coronary artery disease (CAD) varies geographically and demographically. Globally, there were 315 million prevalent cases in 2022, with an age-standardized prevalence of 3605 per 100,000. In India, a study found an overall prevalence of 4.24% in a tertiary care hospital. Prevalence is higher in urban areas compared to rural areas, and males generally have a higher prevalence than females, except in certain age groups.

Types of coronary artery disease

- **Obstructive coronary artery disease:** It occurs when plaque accumulates in the coronary arteries, medically called atherosclerosis, narrowing the arteries that supply blood to the heart, progressively restricting blood flow and oxygen if the blockage becomes severe, leading to a heart attack.
- **Non-obstructive coronary artery disease:** It is defined as arterial hardening caused by the accumulation of plaque that remains unblocked and does not severely restrict blood flow or develop angina symptoms.
- **Microvascular coronary artery disease:** Coronary microvascular disease (MVD) is a cardiac condition affecting small arteries that branch from the larger coronary arteries. It causes inner wall damage and spasms and restricts blood flow to the heart muscle.

Pathophysiology



Causes

- Arteriosclerosis
- Coronary artery spasm
- Coronary artery embolism
- Coronary artery aneurysm
- Vasculitis (inflammation of the blood vessel)

Risk Factors

Modified Non modified

Smoking Age
Unhealthy diet Gender
Obesity or overweight Family history
High blood pressure
High cholesterol
Diabetes

Management

Medical Management:

- Cholesterol medicine
- Aspirin (prevent blood clot)
- Beta blockers
- Calcium channel blockers
- Angiotensin-converting enzyme inhibitors
- Nitroglycerin
- ranolazine

Surgical Management

- Coronary artery stent and angioplasty
- Coronary artery bypass surgery

Alternative Medicine

- Omega -3 fatty acid
- Garlic
- barley
- Myolysis

Case study of Mrs. X

Mrs. X 63 years old admitted in Kims health with the complaints of chest pain with associated radiation to both arms and back. History collection physical examination, investigation and ultrasound scan was taken. She is diagnosed as coronary artery disease

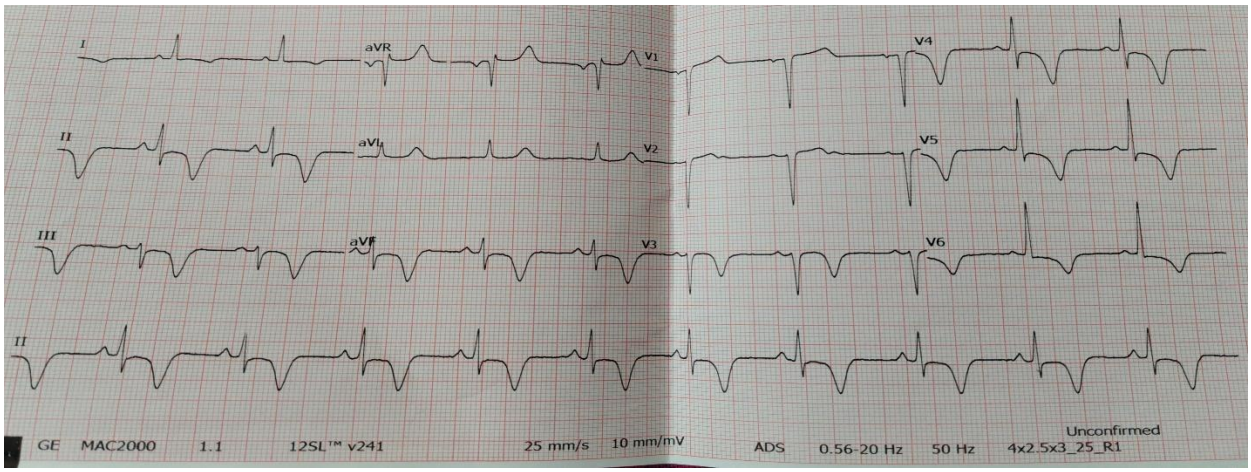
Investigation

The ECG report was taken. The result of the report is

- Normal sinus rhythm
- Left ventricular hypertrophy and repolarization abnormality

The ECHOCARDIOGAPHY report is

- Normal sized cardiac chamber
- Regional wall motion abnormality present
- Grade II diastolic dysfunction. Global ejection fraction 57%



Lab Report

Haematology

Haemoglobin - 13g/dl
Polymorphs - 41%
Lymphocytes - 4.5%
Eosinophil - 1.2 %
Monocyte - 4.5%
Basophil - 0.3%
PCV/HCT - 42.9%
MCV - 79.7fl
MCH - 27.9pg
MCHC - 35g/dl
Platelet - 370/cu.mm
Sodium - 135mmol/l
Potassium -4.6mmol/l
Glucose random - 508mg/dl
Cholesterol - 135mg/dl
HDL - 33.6mg/dl
Triglycerides - 68mg/dl

Procedure

The surgery procedure done to the patient was percutaneous coronary intervention and coronary angiography.

Complication

- Heart attack
- Heart failure
- Arrhythmias
- Stroke

Signs and Symptoms

Book picture	Patient picture
Chest pain	Chest pain
Myocardial infraction	
Chest heaviness	Chest heaviness
Dyspnea	Dyspnea
Fatigue	

Nursing Diagnosis

- Ineffective tissue perfusion related to decreased blood flow
- Acute pain related to hypoxia due to coronary obstruction
- Activity intolerance related to fatigue as manifested by decreased cardiac output
- Risk for infection related to surgery
- Anxiety related to disease condition

Nursing Management

- Educate patient on heart healthy lifestyle changes including diet, exercise and smoking cessation
- Promote weight management
- Encourage stress management techniques
- Provide comfortable environment and warm reassurance

2.Conclusion

Coronary artery disease remains a major health problem that continues to shape clinical priorities worldwide, and the material presented here offers a clear view of how its causes, presentations, and outcomes intersect in real settings. In my view, the case study reinforces the way subtle symptoms can escalate into urgent conditions once vessel narrowing becomes critical, and it highlights how timely diagnostic and interventional steps can influence recovery. It is evident that effective management depends not only on medication or procedures but also on patient education, lifestyle modification, and coordinated nursing support. Taking this further, the integration of medical, surgical, and preventive strategies provides a more balanced pathway for long term control of the disease burden.

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