

# Coronary Vascular Disorders

Dr. Rexi Thomas

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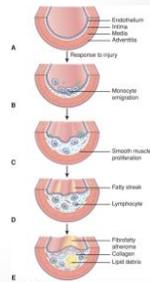
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## Atherosclerosis- Pathophysiology

- Injury to vascular endothelium
  - Smoking
  - HTN
  - Other
- Narrowing of lumen
- Rupture plaque
  - ACS
  - MI



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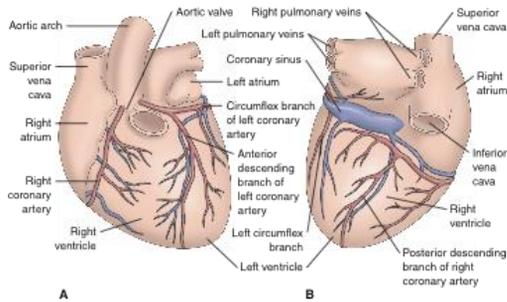
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## The Coronary Arteries



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## Risk Factors for CAD

### Non-modifiable

- Family hx
- Age
- Gender
- Race

### Modifiable

- HTN
- Smoking
- Hyperlipidemia  
(↑ cholesterol, LDL, ↓ HDL)
- Metabolic syndrome
- DM
- Obesity
- ↓ Physical activity

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## Metabolic Syndrome

- 3 of the following:
  - Insulin resistance
  - Central obesity
  - Dyslipidemia
  - BP > 130/85 mmHg
  - Proinflammatory states (C-reactive protein)
  - Prothrombic state

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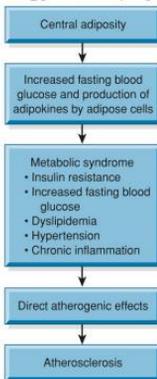
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## Physiology/Pathophysiology




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## CAD Prevention

- 4 modifiable risk factors
- Cholesterol
  - Fasting lipid profile every 5 yrs ( $\geq$  age 20)
  - Medications (see next slide)
- Dietary changes
- Physical activity
- Cessation of smoking
- Manage HTN
- Control DM
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## Cholesterol Medications

- ❖ Six types of lipid-lowering agents: affect the lipid components somewhat differently (Table 23-1)
  - 3-Hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) (or statins)
  - Nicotinic acids
  - Fibric acids (or fibrates)
  - Bile acid sequestrants (or resins)
  - Cholesterol absorption inhibitors
  - Omega-3 acid-ethyl esters

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## Angina Pectoris

- ❖ A syndrome characterized by episodes or paroxysmal pain or pressure in the anterior chest caused by insufficient coronary blood flow
- ❖ Physical exertion or emotional stress increases myocardial oxygen demand, and the coronary vessels are unable to supply sufficient blood flow to meet the oxygen demand
- ❖ Types of angina
  - Refer to Chart 23-2

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## Angina Pectoris

- Pathophysiology
- Types
  - Stable angina
  - Unstable angina (preinfarction or crescendo angina)
  - Intractable/ Refractory
  - Variant angina (Prinzmetal)
  - Silent ischemia

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### Assessment and Findings for Angina

- ❖ May be described as tightness, choking, or a heavy sensation
- ❖ Frequently retrosternal and may radiate to neck, jaw, shoulders, back or arms (usually left)
- ❖ Anxiety frequently accompanies the pain
- ❖ Other symptoms may occur: dyspnea or shortness of breath, dizziness, nausea, and vomiting
- ❖ The pain of typical angina subsides with rest or NTG
- ❖ Unstable angina is characterized by increased frequency and severity and is not relieved by rest and NTG. Requires medical intervention!

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### Assessment of the Patient with ACS

- ❖ Chest pain
  - Occurs suddenly and continues despite rest and medication
  - Other S&S: SOB; C/O indigestion; nausea; anxiety; cool, pale skin; increased HR, RR
- ❖ ECG changes
  - Elevation in the ST segment in two contiguous leads is a key diagnostic indicator for MI
- ❖ Lab studies: cardiac enzymes, troponin, creatine kinase, myoglobin

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## Angina Pectoris

- Diagnostics
  - ECG
  - CRP
  - Cardiac enzymes
  - Stress test
  - Cardiac catheterization/ angiography

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### Gerontologic Considerations for Angina

- ❖ Diminished pain transition that occurs with aging may affect presentation of symptoms
- ❖ "Silent" CAD
- ❖ Teach older adults to recognize their "chest pain-like" symptoms (i.e., weakness)
- ❖ Pharmacologic stress testing; cardiac catheterization
- ❖ Medications should be used cautiously!

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## Angina Pectoris

- Treatment/ Management
  - Medication
    - Nitroglycerin
    - Beta-Adrenergic
      - Metoprolol, Atenolol
    - Calcium channel blockers
    - Antiplatelet/ Anticoagulants
      - ASA, plavix, heparin, glycoprotein IIb/ IIIa
  - Oxygen

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## Treatment of Angina Pectoris

- ❖ Treatment seeks to decrease myocardial oxygen demand and increase oxygen supply
- ❖ Medications
- ❖ Oxygen
- ❖ Reduce and control risk factors
- ❖ Reperfusion therapy may also be done

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## Nursing Intervention: Treat Angina

- ❖ Priority
- ❖ Patient is to stop all activities and sit or rest in bed (semi-Fowler positioning)
- ❖ Assess the patient while performing other necessary interventions. Assessment includes VS, observation for respiratory distress, and assessment of pain. In the hospital setting, the ECG is assessed or obtained
- ❖ Administer medications as ordered or by protocol, usually NTG. Reassess pain and administer NTG up to three doses
- ❖ Administer oxygen 2 L/min by nasal cannula

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## Planning and Goals for the Patient with Angina Pectoris

- ❖ Goals
  - Immediate and appropriate treatment of angina
  - Prevention of angina
  - Reduction of anxiety
  - Awareness of the disease process
  - Understanding of prescribed care and adherence to the self-care program
  - Absence of complications

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## Nursing Intervention: Patient Teaching #1

- ❖ Balance activity with rest
- ❖ Follow prescribed exercise regimen
- ❖ Avoid exercising in extreme temperatures
- ❖ Use resources for emotional support (counselor)
- ❖ Avoid over-the-counter medications that may increase HR or BP before consulting with health care provider
- ❖ Stop using tobacco products (nicotine increases HR and BP)
- ❖ Diet low in fat and high in fiber

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## Nursing Intervention: Patient Teaching #2

- ❖ Medication teaching (carry NTG at all times!)
- ❖ Follow up with health care provider
- ❖ Report increase in S&S to provider
- ❖ Maintain normal BP and blood glucose levels

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## Acute Coronary Syndrome (ACS) and Myocardial Infarction (MI)

- ❖ Emergent situation
- ❖ Characterized by an acute onset of myocardial ischemia that results in myocardial death (i.e., MI) if definitive interventions do not occur promptly
- ❖ Although the terms *coronary occlusion*, *heart attack*, and *MI* are used synonymously, the preferred term is *MI*

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### Acute Coronary Syndrome (ACS)

- Unstable angina
- Non- ST segment elevation MI (NSTEMI)
- ST- segment elevation MI (STEMI)

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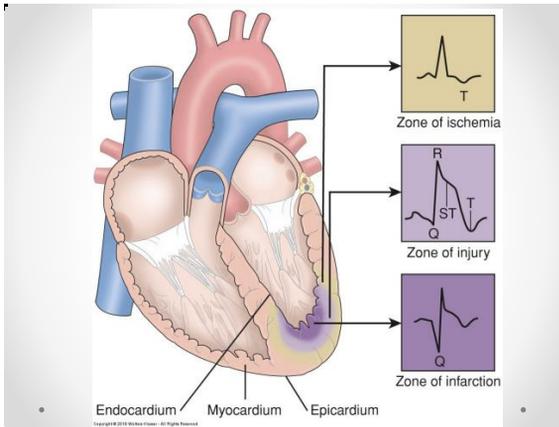
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### Assessment of ACS/ MI

- Cardiovascular
  - Chest pain, murmur, bp, pulse, ECG
- Respiratory
  - SOB, dyspnea, tachypnea, crackles
- GI/ GU
  - Nausea, vomiting, ↓ urine output
- Skin
  - Cool, clammy, diaphoretic, pallor
- Neurological
  - Anxiety, restlessness, lightheadedness

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## Collaborative Problems of the Patient with ACS

- Acute pulmonary edema (see Chapter 25)
- Heart failure (see Chapter 25)
- Cardiogenic shock (see Chapter 11)
- Arrhythmias and cardiac arrest (see Chapters 22 and 25)
- Pericardial effusion and cardiac tamponade (see Chapter 25)

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## Diagnostic/ Laboratory Test

- ECG
- CXR
- CRP
- Cardiac enzymes/ markers
  - Creatine kinase (CK-MB)
  - Myoglobin
  - Troponin

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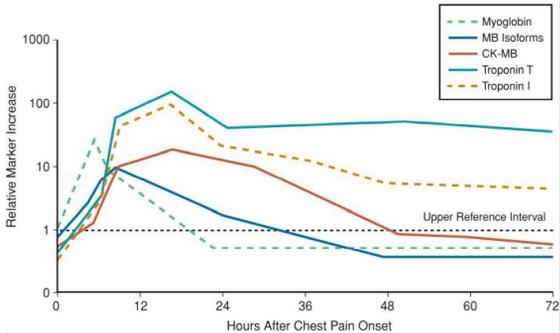
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Time Course of Enzyme Markers




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## Management/ Treatment

- Goal is reperfusion
- Decrease myocardial damage

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- Rapid transfer to hospital
- ECG within 10 minutes of arrival to ED
- Diagnostics/ lab tests
- Interventions
  - Oxygen
  - Nitroglycerin
  - Morphine
  - ASA
  - Beta blocker
  - ACE (within 24 hrs)
  - Anticoagulation with heparin and platelet inhibitors
- Evaluation for indications of reperfusion
  - Percutaneous coronary intervention (PCI) within 60 minutes
  - Thrombolytic therapy (t-PA/ r-PA within 30 minutes- alteplase/ reteplase)
- Continuous therapy as indicated
  - IV heparin
  - Plavix
  - Glycoprotein inhibitor
  - Bedrest minimum 12 to 24 hours

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## Nursing Management of the Patient with ACS

- ❖ Oxygen and medication therapy
- ❖ Frequent VS assessment
- ❖ Physical rest in bed with head of bed elevated
- ❖ Relief of pain helps decrease workload of heart
- ❖ Monitor I&O and tissue perfusion
- ❖ Frequent position changes to prevent respiratory complications
- ❖ Report changes in patient's condition
- ❖ Evaluate interventions!

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## Nursing Interventions for the Patient with ACS

- ❖ Relieve pain and S&S of ischemia
- ❖ Improve respiratory function
- ❖ Promote adequate tissue perfusion
- ❖ Reduce anxiety
- ❖ Monitor and manage potential complications
- ❖ Educate patient and family
- ❖ Provide continuing care

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## Percutaneous Coronary Interventions (PCI)

- Percutaneous Transluminal Coronary Angioplasty
- Coronary artery stent
- Atherectomy
- Brachytherapy

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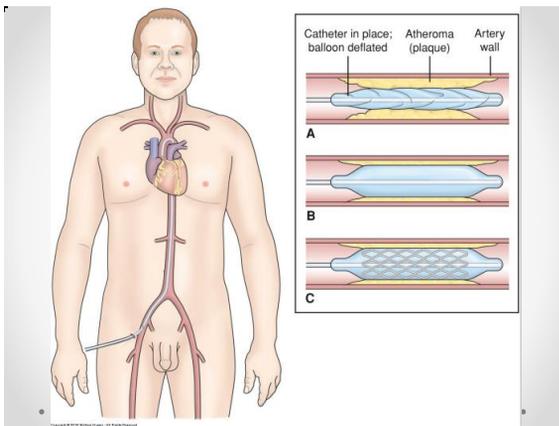
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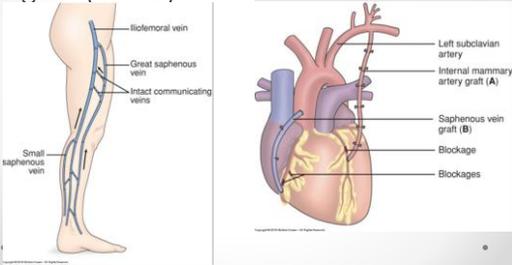
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### Coronary Artery Revascularization

- Traditional coronary artery bypass graft (CABG)




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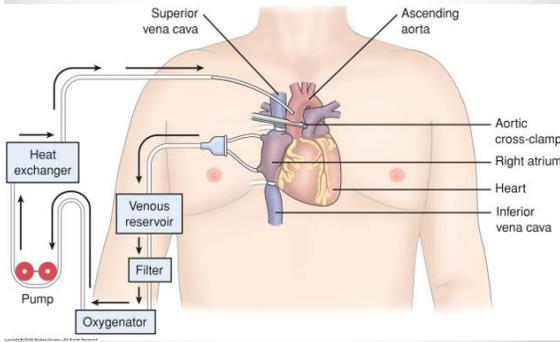
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### Cardiopulmonary Bypass




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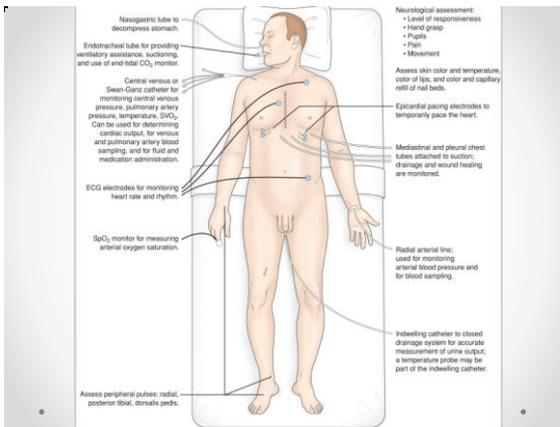
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### Nursing Management: Patient Requiring Invasive Cardiac Intervention #1

- ❖ Assessment of patient
- ❖ Reduce fear and anxiety
- ❖ Monitor and manage potential complications
- ❖ Provide patient education
- ❖ Maintain cardiac output
- ❖ Promote adequate gas exchange
- ❖ Maintain fluid and electrolyte balance
- ❖ Minimize sensory-perception imbalance

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### Nursing Management: Patient Requiring Invasive Cardiac Intervention #2

- ❖ Relieve pain
- ❖ Maintain adequate tissue perfusion
- ❖ Maintain body temperature
- ❖ Promote health and community-based care

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### Complications of Cardiac Surgery

- ↓ Cardiac output
  - Hypovolemia, bleeding, cardiac tamponade, fluid overload, hypothermia, HTN, tachydysrhythmias, bradycardia, cardiac failure, MI
- Pulmonary
  - Impaired gas exchange
- Neurological
  - CVA
- Renal/ Electrolyte
  - Acute renal failure (ARF), electrolyte imbalance
- Other
  - Hepatic failure, infection

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## Cardiac Rehabilitation

- Phase I
  - Dx of atherosclerosis
  - Unstable angina, MI
- Phase II
  - After discharge from hospital
  - 3x a week x 4-6 weeks
- Phase III
  - Long-term outpatient

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