

Coronary Artery Disease and Acute Coronary Syndrome

Myocardial Infarction

(relates to Chapter 33, “Nursing Management: Coronary Artery Disease and Acute Coronary Syndrome,” in the textbook)

Description



- **Cardiovascular diseases are the major cause of death in Canada**
- **Heart attacks are still the leading cause of all cardiovascular disease deaths and deaths in general**

Etiology and Pathophysiology

Developmental Stages

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- **Complicated lesion**
 - **Final stage in development**
 - **The most dangerous**
 - **Plaque consists of a core of lipid materials within an area of dead tissue**

Etiology and Pathophysiology

Developmental Stages

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- **Complicated lesion**
 - **With the incorporation of lipids, thrombi, damaged tissue, and accumulation of calcium, the growing lesion becomes complex**

Etiology and Pathophysiology

Collateral Circulation

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- **Normally some arterial branching, termed collateral circulation, exists within the coronary circulation**

Etiology and Pathophysiology

Collateral Circulation

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- **Growth of collateral circulation is attributed to two factors:**
 - **The inherited predisposition to develop new vessels**
 - **The presence of chronic ischemia**

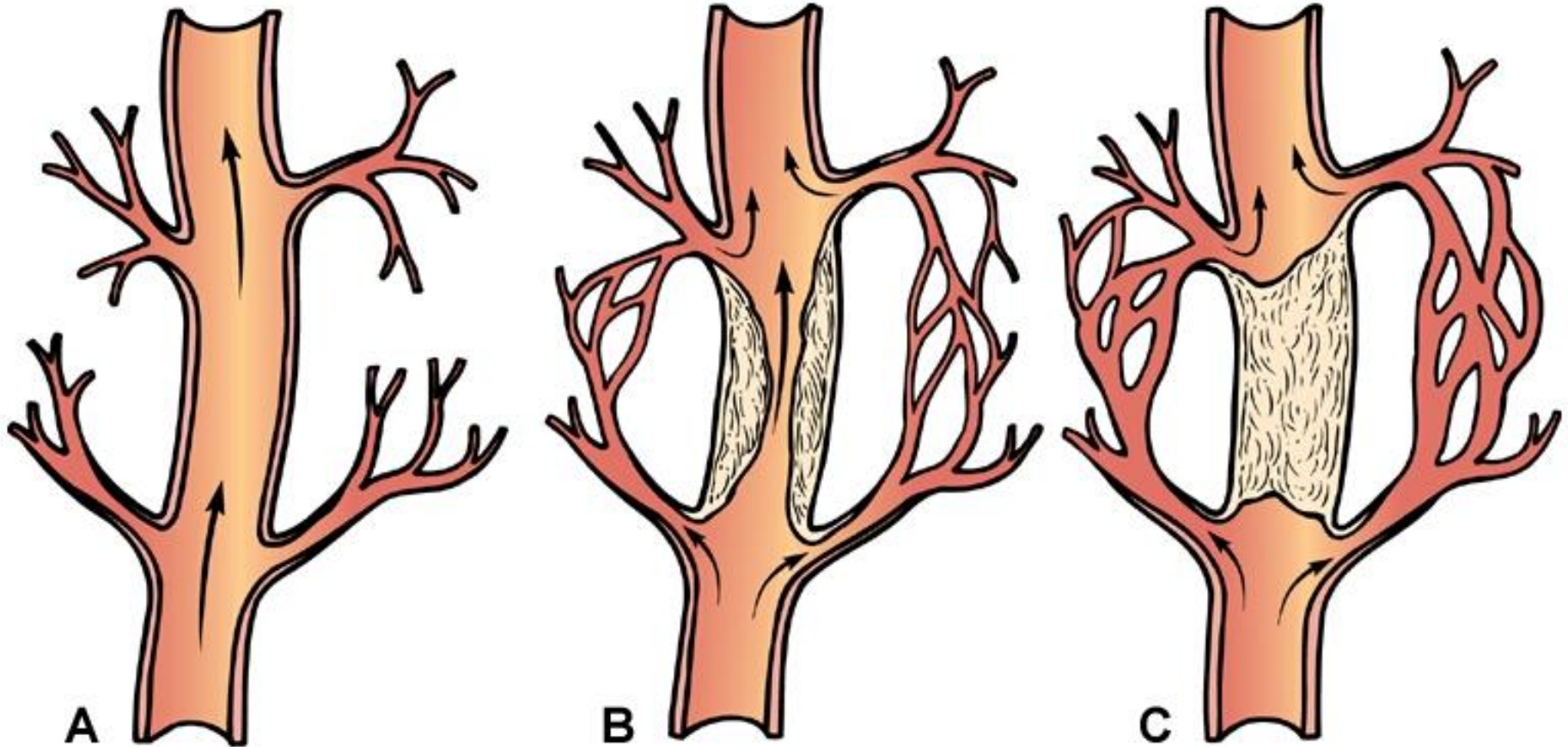
Etiology and Pathophysiology

Collateral Circulation

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- **When occlusion of the coronary arteries occurs slowly over a long period, there is a greater chance of adequate collateral circulation developing**

Collateral Circulation



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Clinical Manifestations of CAD

- **Angina Pectoris**
- **Acute Coronary Syndrome**
- **Sudden Cardiac Death**

Clinical Manifestations

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- **Stable Angina**
 - Results when the lack of oxygen supply is temporary and reversible

Clinical Manifestations

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- **Acute Coronary Syndrome (ACS)**
 - Develops when the oxygen supply is prolonged and not immediately reversible

Clinical Manifestations

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- **ACS encompasses:**
 - Unstable angina
 - **Non-ST-segment-elevation myocardial infarction (NSTEMI)**
 - **ST-segment-elevation (STEMI)**

Relationships Among CAD, Stable Angina, and MI

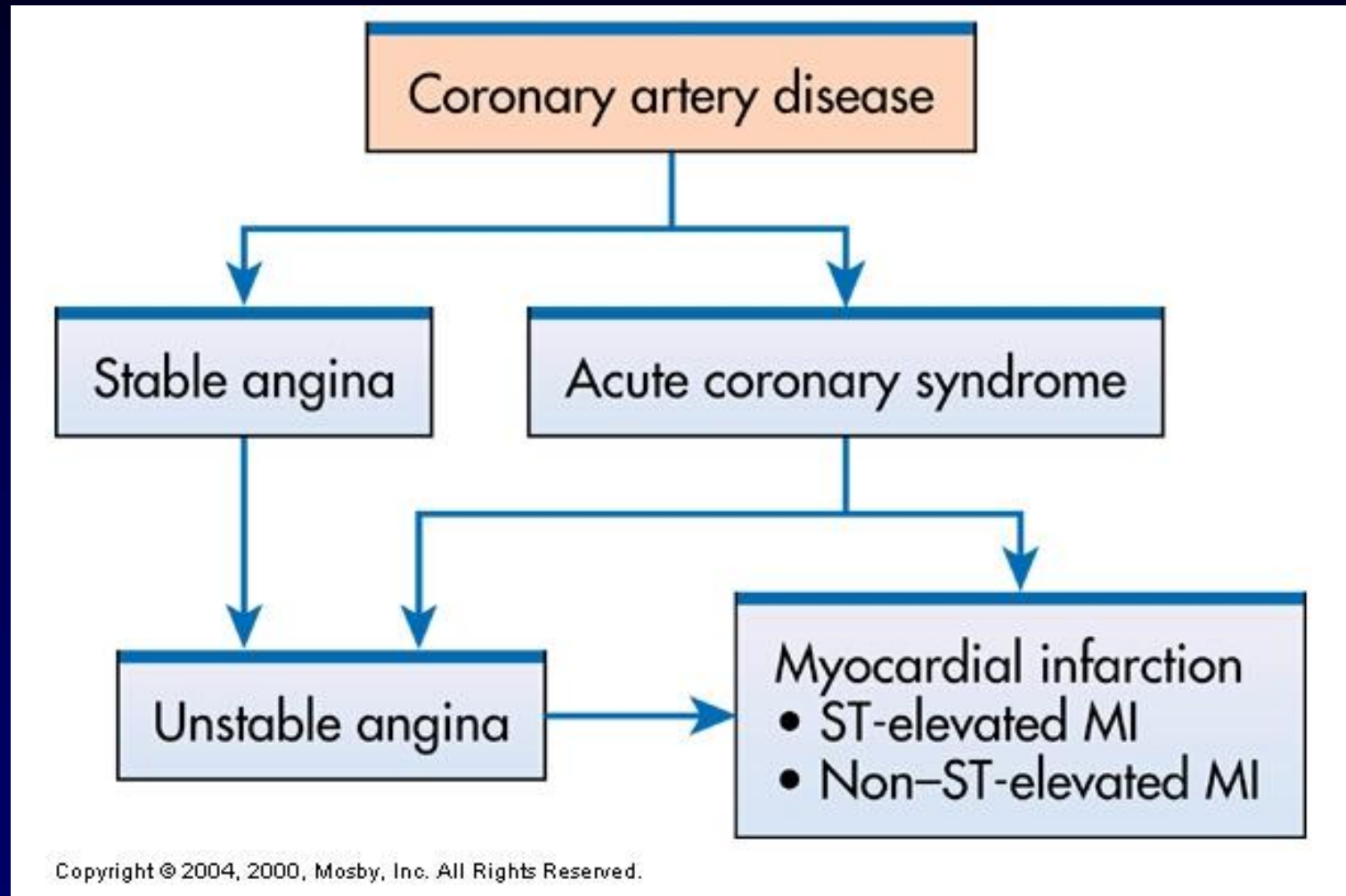


Fig. 33-8

Etiology and Pathophysiology

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- **Myocardial ischemia:**
 - O_2 demand $>$ O_2 supply
- **Primary reason for insufficient blood flow is narrowing of coronary arteries by atherosclerosis**

Etiology and Pathophysiology

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- **In CAD the coronary arteries are unable to dilate to meet increased metabolic needs because they are already chronically dilated beyond the obstructed area**

Etiology and Pathophysiology

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- **For ischemia to occur, the artery is usually 75% or more stenosed**
- **In addition, the diseased heart has difficulty increasing the rate of blood flow**

Etiology and Pathophysiology

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- *Coronary spasm*
 - The constriction is transient and reversible
 - Causes either subtotal or total narrowing

Etiology and Pathophysiology

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- **Myocardial cyanosis occurs within the 1st 10 seconds of coronary occlusion**
- **ECG changes**
- **Total occlusion → anaerobic metabolism and lactic acid accumulation**

Etiology and Pathophysiology

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- **Myocardial Infarction**
 - Occurs as a result of sustained ischemia, causing irreversible cellular death

Etiology and Pathophysiology

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- **Myocardial Infarction**
 - The degree of altered function depends on the area of the heart involved and the size of the infarct

Etiology and Pathophysiology

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- **Myocardial Infarction**
 - **Contractile function of the heart stops in the areas of myocardial necrosis**
 - **Most involve the left ventricle (LV)**

Etiology and Pathophysiology

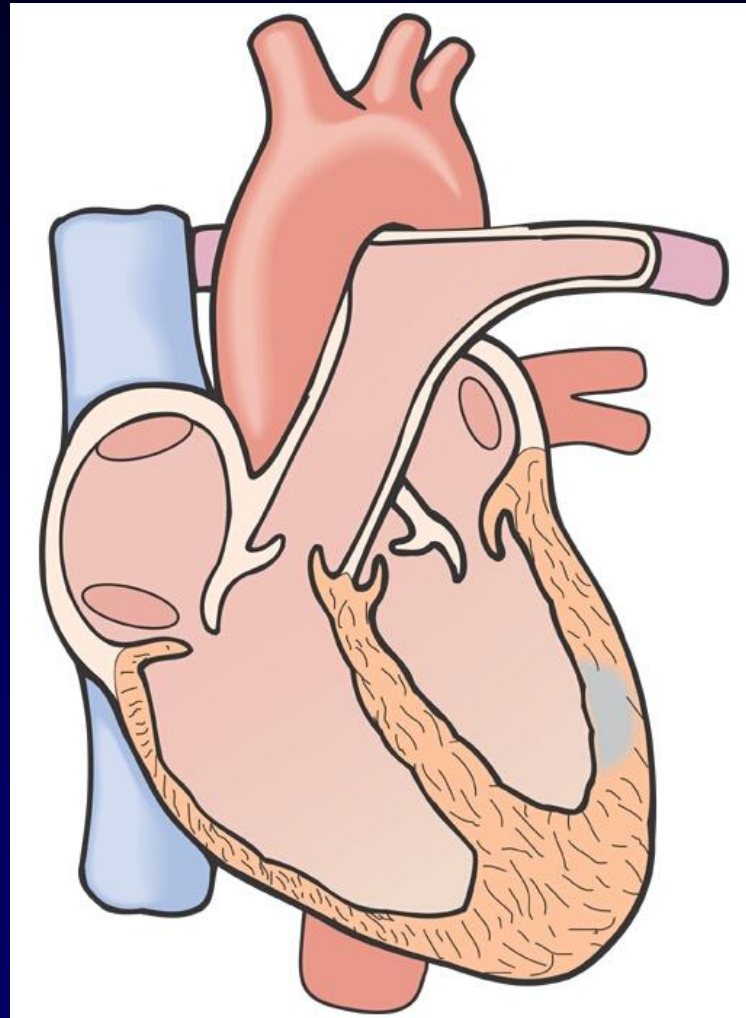
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- **Myocardial Infarction**

- **Transmural MI**

- **Involves the entire thickness of the myocardium**

Transmural MI



Courtesy Mayo Clinic, Rochester, MN.

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Fig. 33-11