

Coronary Ischemic Disease. Comprehensive Overview

Biomedical Engineering - URJC

Rafa Carretero, MD, PhD

Internal Medicine Department

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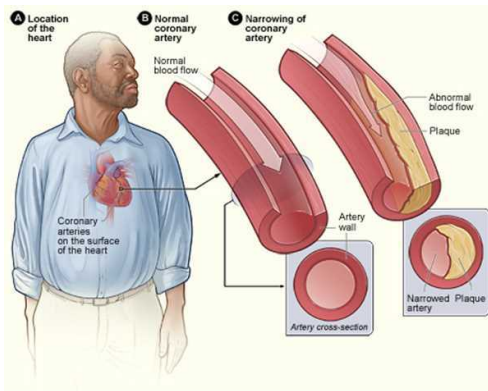


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Introduction

Definition

Coronary ischemic disease (CID) is characterized by reduced blood flow to the heart muscle due to narrowed or blocked coronary arteries.



Introduction

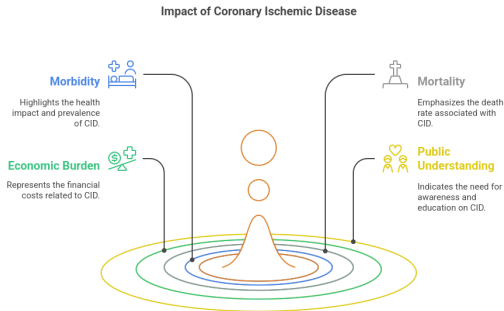
Causes Leading to Coronary Ischemic Disease



Global Health

Global Health

- Leading cause of morbidity and mortality worldwide.
- Key focus: Prevention, early diagnosis, and effective management.

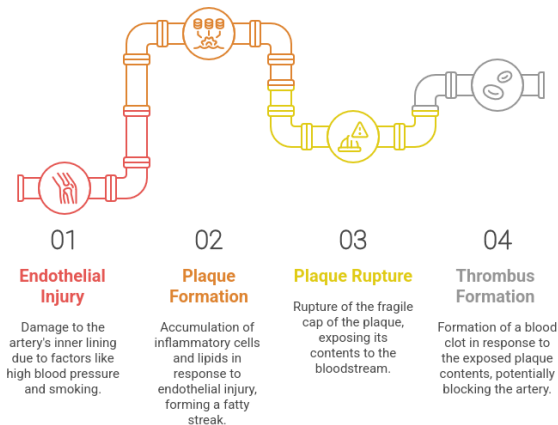


Key Concepts

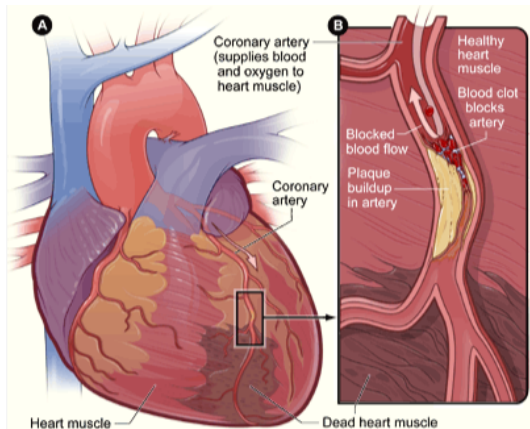
- Atherosclerosis: Plaque buildup in coronary arteries.
- Plaque rupture leads to thrombosis and ischemia.
- Myocardial infarction: Death of heart tissue due to prolonged ischemia.

Pathophysiology

Development and Complications of Atherosclerosis

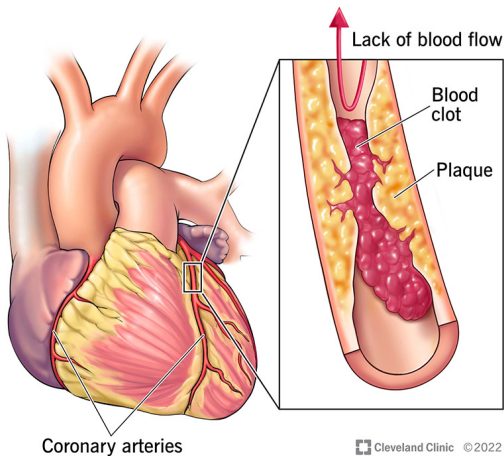


Pathophysiology



Pathophysiology

Coronary Artery Disease



Pathophysiology

Heart Condition Progression

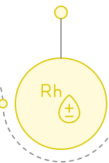
Narrowing or Blocking of Coronary Arteries

The coronary arteries become narrowed or blocked, restricting blood flow.



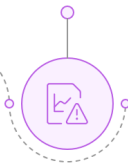
Insufficient Oxygen to Heart

The heart muscle does not receive enough oxygen.



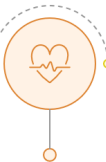
Severity of Damage

The severity of heart damage depends on artery size and restoration time.



Myocardial Ischemia

The heart muscle experiences ischemia due to insufficient oxygen.



Myocardial Infarction

A myocardial infarction occurs if blood flow is not restored.



Risk Factors

Modifiable

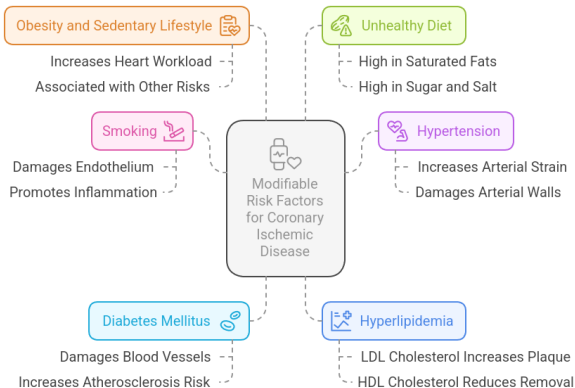
- Smoking, hypertension, diabetes, hyperlipidemia, obesity, sedentary lifestyle.

Non-Modifiable

- Age, gender, family history, genetics.

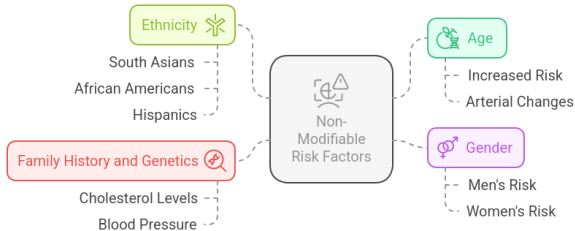
Risk Factors

Modifiable Risk Factors for Coronary Ischemic Disease



Risk Factors

Non-Modifiable Risk Factors for Coronary Ischemic Disease



Clinical Presentation

Stable Angina

- Predictable chest pain during exertion.
- Relieved by rest or nitroglycerin.

Acute Coronary Syndromes (ACS)

- Unstable angina: Pain at rest, unpredictable.
- Myocardial infarction: Severe, crushing chest pain.

Clinical Presentation

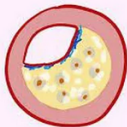


STABLE ANGINA

Chest pain worse with activity and relieved with rest

Inadequate oxygen to heart muscle during activity

NEGATIVE troponin



Stable plaque in coronary arteries

UNSTABLE ANGINA

Chest pain with activity and rest

Emergency because it can evolve into a heart attack!



NEGATIVE troponin



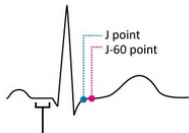
Plaque ruptures and partially blocks coronary arteries

Diagnosis

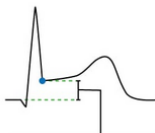
Key Tools

- ECG: ST-segment elevation (infarction), ST depression (ischemic).
- Cardiac biomarkers: Troponins, CK-MB.
- Imaging: Echocardiography, coronary angiography.

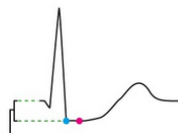
B) Measurement points



C) ST segment elevation



D) ST segment depression



Management

Acute Management

- MONA: Morphine, Oxygen, Nitroglycerin, Aspirin.
- Reperfusion: PCI or thrombolysis.

Long-Term Management

- Medications: Statins, beta-blockers, ACE inhibitors.
- Lifestyle changes: Diet, exercise, smoking cessation.

Complications

Common Complications

- Heart failure: Reduced pumping ability.
- Arrhythmias: Abnormal heart rhythms.
- Cardiogenic shock: Severe pump failure.

Prevention

Primary Prevention

- Healthy diet, regular exercise, smoking cessation.
- Control of hypertension, diabetes, and cholesterol.

Secondary Prevention

- Medications: Aspirin, statins, beta-blockers.
- Cardiac rehabilitation programs.

Conclusion

Key Takeaways

- Early diagnosis and treatment are critical.
- Lifestyle changes and adherence to medications improve outcomes.
- Public health initiatives can reduce the global burden of CID.