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ACUTE MYOCARDIAL INFARCTION: CAUSES, SYMPTOMS, DIAGNOSIS, AND TREATMENT

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Abstract

Acute myocardial infarction (AMI), commonly known as a heart attack, is one of the most critical cardiovascular events. It occurs when blood flow to a part of the heart muscle is blocked, leading to tissue damage due to lack of oxygen. Understanding its causes, symptoms, diagnosis, and treatment options is essential for improving outcomes and reducing mortality.

Keywords: Heart attack, Atherosclerosis, Thrombolysis, Heart failure, Cardiac biomarkers, Cardiogenic shock, Percutaneous coronary intervention (PCI), Coronary artery bypass grafting (CABG),Prevention of heart attack.

Introduction

Causes and Risk Factors

The primary cause of an acute myocardial infarction is the rupture of an atherosclerotic plaque in the coronary arteries, leading to a sudden reduction or blockage of blood flow. Key risk factors include:

- 1. Atherosclerosis: Build-up of fatty deposits in arteries.
- 2. Hypertension: High blood pressure that damages blood vessels over time.
- 3. Smoking: Contributes to plaque formation and artery damage.
- 4. **Diabetes**: Increases the risk of arterial plaque buildup.

5. **Obesity and Sedentary Lifestyle**: Lead to heart strain and a higher likelihood of plaque formation.

- 6. Family History: Genetic predisposition to cardiovascular diseases.
- 7. High Cholesterol Levels: Promote atherosclerotic plaque development.

Symptoms

The symptoms of an acute myocardial infarction can vary, but the most common include: Chest Pain or Discomfort: Often described as pressure, tightness, or squeezing, usually in the

center or left side of the chest. It may last for more than a few minutes or come and go.

Shortness of Breath: Due to the heart's inability to pump blood effectively.

Radiating Pain: Pain may spread to the shoulders, arms, neck, jaw, or back.

Nausea or Vomiting: A less common but important sign, particularly in women.

Cold Sweats and Dizziness: Caused by decreased blood circulation.

Fatigue or Weakness: A result of reduced oxygen supply to the muscles.



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Diagnosis

The diagnosis of acute myocardial infarction involves a combination of clinical assessment, electrocardiography (ECG), and laboratory tests:

1. **Electrocardiogram** (**ECG**): Detects electrical activity of the heart and identifies areas of reduced blood flow or damage.

2. **Blood Tests** (Cardiac Biomarkers): Troponins are specific markers for myocardial injury. Elevated levels confirm the occurrence of an infarction.

3. Echocardiogram: Visualizes the heart structure and function, showing areas with reduced movement or blood flow.

4. **Coronary Angiography**: Identifies blockages in the coronary arteries and determines the severity of the obstruction.

Treatment

Timely treatment is essential to limit heart muscle damage and improve survival rates. Treatment options include:

1. Medications:

Antiplatelet Agents (Aspirin): Prevents further clot formation. Thrombolytics: Used to dissolve existing blood clots. Beta-Blockers: Reduces heart rate and oxygen demand. ACE Inhibitors: Lowers blood pressure and decreases heart strain. Nitroglycerin: Alleviates chest pain by dilating blood vessels. Statins: Reduces cholesterol levels and prevents further plaque formation.

2. Revascularization Procedures:

Percutaneous Coronary Intervention (PCI): A catheter-based procedure where a balloon is used to open a blocked artery, often followed by stent placement.

Coronary Artery Bypass Grafting (CABG): Surgery where blood vessels are grafted to bypass blocked arteries and restore blood flow to the heart.

3. **Lifestyle Changes**: Post-heart attack care involves lifestyle modifications like quitting smoking, maintaining a healthy diet, exercising regularly, and controlling blood pressure and cholesterol.

Prognosis and Complications

The prognosis of acute myocardial infarction depends on the severity, location of the blockage, and promptness of treatment. Complications may include:

Heart Failure: Weakened heart muscle struggles to pump blood effectively.

Arrhythmias: Irregular heartbeats that can lead to sudden cardiac arrest.

Cardiogenic Shock: The heart is unable to pump enough blood to meet the body's needs.

Pericarditis: Inflammation of the sac around the heart.

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Preventive measures can significantly reduce the risk of myocardial infarction. These include: Healthy Diet: Focus on fruits, vegetables, whole grains, and lean proteins. Regular Physical Activity: At least 150 minutes of moderate exercise per week. Smoking Cessation: One of the most effective ways to lower heart attack risk. Regular Medical Check-ups: Monitor blood pressure, cholesterol levels, and blood sugar.

Conclusion

Acute myocardial infarction is a life-threatening condition that requires immediate medical attention. Early recognition of symptoms and timely intervention can save lives and limit heart muscle damage. Preventive measures, including lifestyle modifications and regular health monitoring, are essential to reduce the risk of future heart attacks and improve overall heart health.

