

**QUESTION**  
 A 65-year-old male patient with a long history of hypertension and hyperlipidemia presents to the emergency department with a 2-day history of severe, crushing chest pain. The pain is described as a heavy weight on his chest and is exacerbated by exertion. He has a history of smoking 20 cigarettes per day for 30 years. His medical history is significant for a previous myocardial infarction 10 years ago, treated with percutaneous coronary intervention. He is currently on aspirin, beta-blockers, and statins. On arrival, he is found to be diaphoretic and has a heart rate of 110 bpm, blood pressure of 180/100 mmHg, and oxygen saturation of 92% on room air. ECG shows ST-segment elevation in leads II, III, and aVF.

**ANSWER**  
 The patient's presentation is consistent with an acute ST-segment elevation myocardial infarction (STEMI). The key features include severe, crushing chest pain, diaphoresis, and ST-segment elevation in leads II, III, and aVF. The patient's history of hypertension, hyperlipidemia, and smoking significantly increases his risk for atherosclerotic disease. The previous myocardial infarction and percutaneous coronary intervention further suggest a high-risk profile. The current presentation requires immediate intervention to restore coronary blood flow and minimize myocardial damage.

## ACUTE MYOCARDIAL INFARCTION

The pathophysiology of an acute myocardial infarction involves the rupture of an atherosclerotic plaque in a coronary artery, leading to the formation of a thrombus that completely occludes the vessel. This results in a sudden and permanent cessation of blood flow to the myocardium. The affected area becomes ischemic, leading to the release of biomarkers such as troponin and creatine kinase-MB (CK-MB). The clinical presentation is characterized by severe, persistent chest pain, often described as a heavy weight or crushing sensation, which is not relieved by rest or nitroglycerin.

The ECG findings in this patient are diagnostic for a STEMI, showing ST-segment elevation in leads II, III, and aVF, which corresponds to the inferior wall of the heart. The patient's vital signs, including tachycardia and hypertension, are common findings in the early stages of an acute MI. Immediate reperfusion therapy, such as primary percutaneous coronary intervention (PPCI) or fibrinolytic therapy, is crucial to limit the extent of myocardial necrosis and improve long-term outcomes.