

For the Primer, visit doi:10.1038/s41572-019-0090-3

→ Myocardial infarction (MI) refers to death of cardiomyocytes as a result of ischaemia due to insufficient blood flow to the heart. ST-segment elevation MI (STEMI) is the most acute form of MI, as in most cases it results from a completely occluded coronary artery with ischaemia spreading throughout the myocardial wall.

EPIDEMIOLOGY

Globally, STEMI accounts for ~30% of cases of acute coronary syndrome (which includes all MIs and unstable angina). STEMI tends to occur at a younger age in men than in women, owing to the protective effect of oestrogen before menopause. However, women of <60 years of age presenting with STEMI usually have worse outcome than age-matched men. Improvements in reperfusion and preventive therapies have contributed to a reduction of adjusted in-hospital mortality from STEMI, although many patients still experience recurrent cardiovascular events.

MECHANISMS

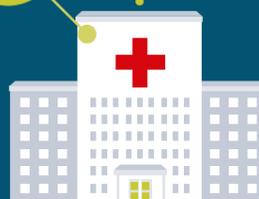
In most cases, STEMI is caused by total vessel occlusion due to the rupture of an atherosclerotic plaque and the resultant formation of a thrombus (clot). Ischaemic damage to the myocardium reduces contractility and can result in heart failure. Early reperfusion (re-establishing the blood flow in the occluded artery) is the most effective way to save ischaemic myocardium and limit infarct size. Rarely, STEMI is due to spontaneous coronary artery dissection, coronary spasm or coronary embolism.

Rx MANAGEMENT

Calling emergency medical services reduces the delay from symptom onset to first medical contact



PCI



PCI is the preferred reperfusion therapy option if it can be performed within 120 minutes of first medical contact. If PCI is not available, fibrinolysis is the alternative reperfusion therapy.



A patient presenting with STEMI to a non-PCI hospital should be transferred to a PCI facility immediately for primary PCI, if the time to the catheterization laboratory is <120 min



Patients should be evaluated for early and long-term risk for adverse cardiovascular events before hospital discharge; several lifestyle and pharmacological interventions are available for secondary prevention



! Antithrombotic therapy is also recommended, and the choice of therapy depends on the reperfusion strategy as well as the ischaemic and bleeding risk of the patient

DIAGNOSIS

Persistent chest pain is a hallmark of myocardial ischaemia and should prompt immediate recording of an electrocardiography (ECG) trace to aid the diagnosis. The degeneration of the heart muscle results in the release of cardiac troponins, which can be detected in the blood and are biomarkers of myocardial injury. However, in the setting of STEMI, reperfusion therapy should not be delayed while awaiting laboratory results. Transthoracic echocardiography after reperfusion is indicated to evaluate left ventricular function.



Normal

STEMI

OUTLOOK

The fact that ~20% of patients still experience recurrent cardiovascular events within the first year after acute MI demonstrates the need for new therapeutic targets, such as inhibition of inflammatory pathways, or measures to improve microvascular perfusion. Therapeutic improvements should be coupled with techniques to identify patients who would benefit the most from the treatment. The availability and adherence to guideline-recommended therapies and devices are markedly reduced in developing countries, whereas, by contrast, the number of patients continues to increase, with >70% of STEMI cases projected to occur in developing regions in the next 10 years. Closing this gap and harmonizing the standard of care across countries is an ongoing challenge.

PREVENTION

Prevention aims at reducing the burden of atherosclerosis. Exercise, a healthy diet and no tobacco use are recommended for all individuals. However, some patients might need pharmacological support to maintain low blood levels of cholesterol.



QUALITY OF LIFE

The major goals of STEMI treatment include the improvement of symptoms, functional status and quality of life by preserving viable myocardium to avert the development of heart failure. In addition, residual angina can negatively affect the quality of life as it is associated with depression, particularly in young patients and women.