Myocardial Infarction Diagnosis

In myocardial infarctions (MI), ischemia in the heart leads to death of cardiac myocytes as well as dysfunction in their firing patterns. Myocardial infarctions are also called “acute coronary syndromes” with classifications including STEMI (ST segment elevation MI) and NSTEMI (non-ST segment elevation MI). ECG changes can include ST elevation, Q wave prominence, and T wave inversion. Serum findings include elevated troponin and CK-M levels. Early diagnosis with ECG or cardiac stress testing leads to faster interventions and is key in producing better patient outcomes.



PLAY PICMONIC

Diagnosis

12 Lead ECG
12 Lead ECG
Electrocardiograms should be obtained with 12 leads. This allows for the maximal amount of visualization of electrical currents through the heart tissue. The number “12” is for the number of leads that are recorded simultaneously. Right sided ECGs include an additional 6 leads which allow for diagnosis of infarctions in the right ventricle.

ST Elevation
Elevated St.
Elevation of the ST segment above the isoelectric line must be seen in 2 contiguous leads for diagnosis of STEMI. Contiguous leads are leads that look at the same area of the heart. Leads II, III, and aVF for example indicate an inferior infarction.

Q Wave
Q-queen on Wave
The appearance of a prominent Q wave, often one-third the height of the QRS complex, indicates that cells are unable to depolarize in the ventricles. Presence of a Q wave may indicate current or previous infarction.

T Wave Inversion
Upside down Mr. T
T waves are normally upright and above the isoelectric line. During an acute infarction, T waves often invert as the ventricles are unable to repolarize. They may stay inverted or flattened until after the area has been reperfused.

Troponin T and I
T-rope and T.I.
Troponin T and I are cardiac cell proteins found in the blood as cardiac myocytes are destroyed. These proteins can be measured in serum as early as 2-4 hours after the onset of myocardial ischemia. Elevated levels of troponin T or I are highly specific indicators of an acute MI. Often these tests are completed with machines at the bedside because results can be obtained within 15-20 minutes.

CK-MB
Calvin Klein Model Boy
CK-MB is an isoenzyme released into the bloodstream during cardiac cell death. CK-MB can be measured in as early as 6 hours but does not peak until 24 hours. There are three creatine kinase isoenzymes (CK-BB, CK-MM, and CK-MB); however, CK-MB is the most specific for myocardial tissue. Myoglobin is another tissue marker that may assist in myocardial infarction diagnosis. Myoglobin is elevated as early as 2 hours and declines after 7 hours. Myoglobin is not cardiac cell specific and any muscle tissue injury could cause an increase in myoglobin levels.

Considerations

Sign up for FREE at picmonic.com

Early ECG

Early Morning ECG

Early identification of myocardial infarction allows for early intervention. Aside from prevention entirely, an early ECG allows for the earliest identification of myocardial ischemia.

Cardiac Stress Test

Stressed Heart

A cardiac stress test, exercise tolerance test, or exercise electrocardiography test may be administered to measure the heart's response increased workload. The patient's ECG and BP are measured while exercising on a treadmill or bicycle until a predetermined heart rate is reached, the patient experiences serious signs of symptoms, ECG changes are noted, or 20 minutes elapses. A variant of this test is given for patients who are unable to tolerate physical exercise. Medications such as dobutamine, a beta agonist and dipyridamole, a PDE inhibitor are injected which pharmacologically stimulate the heart to increase workload.

Sign up for FREE at picmonic.com