Myocardial Infarction

1. What is the difference between Troponin T and Troponin I? Which is a more reliable test in case of acute Myocardial Infarction?

Dr. V.L. Ganapathy, Bangalore, Karnataka.

RESPONSE FROM CMC FACULTY

Answer: Cardiac troponin I and T are components of the contractile apparatus of myocardial cells and are expressed almost exclusively in the heart. Hence, both the markers have high myocardial tissue specificity as well as a high clinical sensitivity. An increased troponin concentration is defined as a value exceeding the 99th percentile of a normal reference population [upper reference limit], a value defined by manufacturers.

Suggested reading: Direct comparison of high-sensitivity- cardiac troponin I vs. T for the early diagnosis of acute myocardial infarction. Available at http://eurheartj.oxfordjournals.org/content/ehj/35/34/2303.full.pdf

Hypertension

2. Does a HR of 114-120 require any medication or a just counseling and bed rest sufficient to reduce the HR? What are the best medications for hypertensive with tachycardia? Please give a guideline for treatment of hypertension with tachycardia.

Dr. Jyothi Ganapathy, Bangalore, Karnataka.

RESPONSE FROM CMC FACULTY

Answer: Normal sinus rate is considered to be between 60 and 100 beats per minute. Heart rate above 100/min characterizes tachycardia. First step would be to differentiate between sinus tachycardia and other tachycardia such as atrial fibrillation or atrial tachycardia.

Sinus tachycardia is a normal physiologic response to exercise and conditions in which catecholamine release is physiologically enhanced or, less commonly, the parasympathetic nervous system withdrawn. A long list of other factors may be responsible such as generalized anxiety, fever, volume depletion, anemia, hyperthyroidism, stimulants (nicotine, caffeine etc), anticholinergic drugs, beta blocker withdrawal etc. It is important to rule out pathological causes.

Chronic inappropriate sinus tachycardia is an unusual condition that occurs in individuals without apparent heart disease or other cause for sinus tachycardia and is often a diagnosis of exclusion.

Sinus tachycardia will improve or resolve following treatment directed at the underlying etiology. Patients with symptomatic persistent inappropriate sinus tachycardia may be treated with beta blockers or ivabradine.

For hypertensive with tachycardia, always evaluate for secondary etiologies especially in young adult for conditions such as phaeochromocytoma and hypothyroidism. If secondary causes are ruled out, betablockers are ideal choice.

Suggested reading:

1. NICE guideline available at https://www.nice.org.uk/guidance/cg127/chapter/1-guidance#choosing-antihypertensive-drug-treatment-2
**CLINICAL QUESTIONS**

3. What are the investigations and line of treatment to be given for a patient (middle aged) – diabetic and hypertensive, coming with chest pain? How can you pinpoint if it is Myocardial Infarction? Is Serum Troponin T sufficient to rule out any heart attack even if ECG is normal?

Dr. Jyothi Ganapathy, Bangalore, Karnataka.

**RESPONSE FROM CMC FACULTY**

When a middle aged patient with risk factors for coronary artery disease presents with chest pain, it is essential to have a stepwise approach for diagnosis regardless of the clinical setting (emergency or outpatient).

The most common causes of chest pain in outpatients setting are musculoskeletal and gastrointestinal conditions, and approximately 2 to 4 percent have acute myocardial ischemia (including myocardial infarction). Nevertheless, initial diagnostic approach should always consider a cardiac etiology, unless other etiologies for chest pain are apparent. On the right is a table with differential diagnoses for chest pain.

**The approach to patients with possible cardiac chest pain.** (William A Parsonage, Louise Cullen and John F Younger. Med J Aust 2013; 199 (1): 30-34.)

Patients who present with ACS (myocardial infarction and unstable angina) have anginal symptoms at rest, new onset angina that is not stable and predictable (eg, with exertion), or progressive symptoms (angina that is more frequent, longer in duration, or occurs with less exertion than previously). Symptoms that are described as pressure, tightness, squeezing, or indigestion or those that are similar to prior ACS events can be considered typical. Elderly and women are likely to present with atypical symptoms such as dyspnea, diaphoresis etc.

If the initial ECG is not diagnostic and the patient remains symptomatic with high clinical suspicion of ACS, it should be repeated at 5 to 10 minutes.

Myocardial infarction is diagnosed using following criteria from ACC/AHA (Third Universal Definition of Myocardial Infarction; Journal of the American College of Cardiology Volume 60, Issue 16, 16 October 2012, Pages 1581–1598):

Evidence of myocardial necrosis in a clinical setting consistent with acute myocardial ischemia. Any one of the following criteria meets the diagnosis for MI:

- Detection of a rise and/or fall of cardiac biomarker values [preferably cardiac troponin (cTn)] with at least one value above the 99th percentile upper reference limit (URL) and with at least one of the following:
  1. Symptoms of ischemia.
  2. New or presumed new significant ST-segment–T wave (ST–T) changes or new left bundle branch block (LBBB).
  3. Development of pathological Q waves in the ECG.
  4. Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality.
  5. Identification of an intracoronary thrombus by angiography or autopsy.

Patients who have typical symptoms, but with normal ECG and enzymes are labeled as Unstable Angina.

Answers provided by Dr. John Jose, DM (Cardiology), Assistant professor, Department of Cardiology, CMC Vellore.