

## Cardiac Enzyme Evaluation: Troponin

Troponin is a myocardial muscle protein used to measure cardiac muscle injury. The onset of troponin release is 1 hour, the peak is 24 - 36 Hours, and baseline levels return within 5-14 days. Troponin is the most specific indicator for cardiac muscle injury. Since elevated levels of troponin indicate a high risk of death, the patient with elevated levels should be treated immediately and aggressively.



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### Measures

#### Cardiac Muscle Injury

##### Heart Muscle Injured

Troponin is a muscle protein that is released into the bloodstream after myocardial injury of infarction. Troponin is the most specific biomarker of cardiac muscle injury. Usually, the two subtypes of troponin known as cardiac-specific troponin T (cTnT) and cardiac-specific troponin I (cTnI) are very low in the bloodstream. The normal cTnT levels is  $<0.1$  ng/mL while the normal cTnI level is  $<0.5$  ng/mL. Elevated levels of troponin indicate myocardial damage.

### Time Ranges

#### Detection in Blood: 4 Hours

##### Detective Detecting Blood and (4) Fork

The troponin is detected in blood 4 hours after the myocardial injury. High-sensitivity troponin assays may help detect myocardial damage early. Since increased troponin levels are associated with increased risk of mortality, patients with elevated troponin levels should be treated aggressively.

#### Peak: 24 - 36 Hours

##### Peak of mountain with Open (24) Hour sign and (36) Roulette-wheel

The peak of increasing levels of troponin is within 24 – 36 hours.

#### Return to Normal: 5 - 14 Days

##### Return to Ground with (5) Hand and (14) Valentine's-day

After myocardial injury, troponin levels return to baseline within 5-14 days. Compared with other cardiac enzymes, troponin levels take the longest time to return to normal. More specifically troponin I levels return to baseline within 7-10 days, while troponin T levels normalize within 10-14 days. However, the specific duration can depend on various factors, including the extent of myocardial damage.

### Considerations

#### Most Specific for Cardiac Muscle

##### Spicy-fist punching Heart Muscle

Troponin is the most specific indicator for cardiac muscle damage. The muscle protein has a high specificity and sensitivity for myocardial muscle injury. Other cardiac enzymes that are less specific than troponin include myoglobin and creatine kinase CK-MB (refer to the Picmonics on "Cardiac Enzyme Evaluation: Myoglobin" and "Cardiac Enzyme Evaluation: Creatine Kinase CK-MB").

#### Treat Aggressively

##### Nurse Treating Aggressively

Patients with elevated troponin levels should be treated aggressively to minimize complications. Rapid high-sensitivity troponin assays may be done at the bedside to determine protein levels. Since increased troponin levels are associated with a high risk of mortality, patients with low levels at the bedside or emergency department are also treated aggressively to minimize damage.