**Purpose of test**

Hs-Troponin T is mainly used for:
- investigation and risk stratification of patients with normal/nonspecific ECG or ECG which indicates non ST elevated myocardial infarct
- detecting myocardial infarction related to
  - stent thrombosis
  - percutaneous coronary intervention (PCI)
  - coronary artery bypass grafting (CABG)

Universal definition of acute myocardial infarct

Detection of rise and or fall of cardiac markers (preferably troponin) with at least one value above the 99th percentile of the upper reference limit together with evidence of myocardial ischemia with at least one of the following
- clinical symptoms of ischaemia
- ECG changes indicative of new ischaemia [new ST-T changes or new left bundle branch block (LBBB)]
- development of pathological Q waves on ECG
- imaging evidence of new loss of viable myocardium or new regional wall motion abnormality

**Sample**

Blood

**Sample Tube/Container**

Adult- Yellow top or Green top Lithium Heparin Gel

Please note the same sample type must be used for all time points

**Sample Volume**

4 ml

Minimum (see calculation of minimum volume)

**Special Precautions**

Ensure samples collected at
- presentation
- 2 - 3 hours post presentation
- 6 hour post presentation (if high risk or 2 - 3 hour sample inconclusive)

Troponins may remain elevated for up to 2 weeks due to proteolysis of the contractile apparatus. However interpret with care if > 48 hour post symptoms as in NSTE-ACS, minor troponin elevations usually resolve within 48 – 72 hours

**Request Form:**

Clinical Chemistry & Haematology Requests

**Laboratory**

Biochemistry

**Biological reference range**

<14ng/L

Note the lower reporting limit for our assay is 3ng/L. The range 3 - 14ng/L represents approximately 50% of the distribution in a healthy population
Clinical decision values

Clinical context is critical to the correct interpretation of any hs TnT result.

An initial hsTnT result < 3 ng/L at presentation has a high negative predictive value for ACS, if several hours post ictus. However, this may not hold for early presenters.

Patients presenting 6 – 48 hours following onset of chest pain with Troponin T (hs) <14 ng/L, are very unlikely to have AMI.

For all other patients measure a troponin at admission and then 2 - 3 hours post admission.

Baseline <14 ng/L
- patient where both the admission and 2 - 3 hour sample are <14 ng/L, and delta change is <20% are unlikely to have AMI
- patients where 2 – 3 hour sample is >14 ng/L and delta change is >50% with evidence of ischemia, fit the definition of MI
- for patients where the delta change is >20 but <50% repeat at 6 hours

Baseline 15-49ng/L
- patients with a delta change is >50% at 2 - 3 hour time point with evidence of ischemia, fit the definition of MI
- for patients where the delta change is <50% repeat at 6 hours

Baseline >50ng/L
- patients with a delta change is >20% at 2 - 3 hour time point with evidence of ischemia, fit the definition of MI
- for patients where the delta change is <20% repeat at 6 hours

In all patient with high risk or where the clinical suspicion remain high repeat at 6 hours.

Where AMI has been excluded, the reason for the observed Troponin T (hs) elevation should be pursued actively to identify the possible causes of myocardial injury.

PCI
Comparative prognostic thresholds for hsTnT vs CK remain unclear. SHSCT thus uses CK to define periprocedural MI (>3x ULN).
An early hsTnT at 4 hours may be taken to help facilitate same day discharge but CK instead of hsTnT should be used if the patient stays overnight

Factors affecting performance

In sample where icterus (bilirubin), haemolysis or lipemia is indicated by the manufacturer to cause inaccuracy of
>10%, the result will be dashed out or reported with a disclaimer

Causes of Troponin Elevations
It is important to know that hs-TnT is a marker of myocardial injury & not necessarily a specific marker of acute myocardial infarction. A number of clinical conditions (some of the common ones are listed below) can lead to elevation of troponin

Analytical
- assay based
  - poor performance
  - calibration errors
- sample based
  - samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration
  - heterophile antibody ie In rare cases, interference due to extremely high titers of antibodies to analyte-specific antibodies, streptavidin or ruthenium can occur
  - interfering substances
  - fibrin in heparin samples have been reported to cause false positives

Ischemic
- ACS
  - STEMI
  - non-STEMI
- non-ACS
  - coronary
    - tachy-bradyarrhythmias
    - hypertension
    - embolism
    - procedure-related (PCI)
    - cocaine/methamphetamine
  - non-coronary
    - hypoxia
    - global ischemia
    - hypo perfusion
    - cardiothoracic surgery
    - hypothyroidism

Non-ischemic
- systemic
  - pulmonary embolism
  - toxicity (adriamycin, 5-flurouracil, Herceptin, snake venoms)
  - trauma
  - renal failure
  - sepsis
  - acute neurological disease
    - stroke
    - subarachnoid haemorrhage
- cardiac
  - CHF
  - infection
  - inflammation
  - trauma
  - ablation procedures
  - malignancy
  - infiltrative disease

Source: Adapted from J Am Coll Cardiol 2012;60:2427–63

<table>
<thead>
<tr>
<th>Turnaround times</th>
<th>The Laboratory aims to report 90% of requests within the stated time from receipt</th>
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<tbody>
<tr>
<td></td>
<td>Urgent - 1 hour</td>
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<td>Ward - 4 hours</td>
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<td>GP and OPD – 1 working day</td>
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<tr>
<th>Patient preparation</th>
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<th>Instructions for patient collected sample</th>
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<tr>
<th>Sample transportation</th>
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<th>Special handling needs</th>
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<th>Patient consent required</th>
<th>Implied consent</th>
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<th>Specific rejection criteria</th>
<th>Generic rejection applies</th>
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<tr>
<th>Additional information</th>
<th>Minimum Retest Intervals- 2 hours</th>
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<td>High sensitivity troponin assays will usually require several samples – with a second sample within 3 hour of presentation, the sensitivity for myocardial infarction approaches 100%</td>
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<td>Single measurement at 24 hour post-surgery gives best correlation with outcome. Serial samples justified if clinical condition worsens and /or new ECG changes to assess ACS</td>
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<tr>
<td>- Lab Tests Online</td>
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<tr>
<td>- Roche insert 2012-05, V 5 English</td>
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<tr>
<td>- WHO use of anticoagulants in diagnostic laboratory investigations</td>
</tr>
<tr>
<td>- National Minimum Re-testing Interval Project: A final report detailing consensus recommendations for minimum re-testing intervals for use in Clinical Biochemistry 2012</td>
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<tr>
<td>- BD rapid serum tubes reduce false positive plasma troponin T results on the Roche Cobas e411 analyzer C.D.</td>
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Note: Printed documents are not controlled
How to use high-sensitivity cardiac troponins in acute cardiac care. European Heart Journal (2012) 33, 2252–2257

